

INSURANCE MARKET DEVELOPMENT AND ENTREPRENEURSHIP, WITH A
FOCUS ON LATIN AMERICA AND BRAZIL

by

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DEDICATION

This is dedicated to my mother Nella who recently passed away and to my father Giovanni Battista.

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ABSTRACT

INSURANCE MARKET DEVELOPMENT AND ENTREPRENEURSHIP, WITH A FOCUS ON LATIN AMERICA AND BRAZIL

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This research describes the relationships between insurance, economic activity and entrepreneurship; it develops a theoretical framework and a testable hypothesis to verify the impact of insurance coverage on entrepreneurship as well as the impact of “social insurance” (e.g., health and unemployment insurance provided by government programs) on entrepreneurship. The relationship between insurance and entrepreneurship is tested with panel data from Brazil. The findings indicate that policy makers should pursue the development of insurance markets to strengthen entrepreneurship and spur economic growth. The study opens up a number of opportunities for future work and research.

1. INTRODUCTION AND SUMMARY

There are several meanings of insurance but the simplest one is that of shifting risk from one person to another in exchange for a price, or premium. In this respect, insurance constitutes a market exchange that allows allocating risk to those that can bear it more efficiently.

Insurance is a well-established service that helps to reduce the overall level of uncertainty. Powers (2011, pp. 83–86) articulates the interactions between acts of gods and humanity and insurance and, following the insights of Knight(2012), links together risk, uncertainty and insurance and hints at the related role of the entrepreneur.

Insurance is routinely available in advanced economies and especially in the United States of America for individuals and businesses. Individuals buy insurance on their health, houses, automobiles, and other valuable goods. Businesses insure against accidents, lawsuits, fire and the like. However, insurance markets are not well developed in the Emerging Market Economies (also called emerging/developing countries), where individuals are less likely to insure their wealth; and insurance is not available for entrepreneurs (start-ups and small businesses) at affordable rates. The limited availability of insurance in the emerging market countries¹ fails to decrease the level of uncertainty

¹ The 2007-08 global financial and economic crisis has blurred the distinction between developed and emerging economies. Economic growth seems to come from the so-called BRICs (Brazil, Russia, India, and China), while the advanced economies have suffered the worst crisis since the Great Depression. In November 2009, a report from Everest Capital said, “Distinctions are disappearing between emerging and developed markets. Emerging markets represent half of the world’s economy; they are large and liquid with

and reduces the chances of people starting up a business, thus slowing down economic growth.

The variables that drive the evolution of the demand of insurance are three: availability of insurance, propensity to buy insurance and knowledge of insurance. In particular, propensity to buy insurance and availability of insurance are two connected concepts, in the sense that the propensity to buy insurance supports the conditions for the availability of insurance products² (see Chapter 10 on measures). In turn, these two aspects prompt entrepreneurship.

The background within which the research develops is that of institutions that favor the deployment of entrepreneurship, i.e., “the adoption of certain institutions ... channel and encourage entrepreneurial aspect of human activity in a direction that spurs economic growth” (Boettke and Coyne 2003, 3) also see (High, 2009a, p. 5), and insurance markets prompt productive actions and economic growth, Thus, insurance can be seen as a market institution.

The study looks at the relationships between the availability of insurance and economic activity and entrepreneurship; it develops a theoretical framework and a testable hypothesis to verify the impact of insurance coverage on entrepreneurship, as well as the impact of “social insurance”, which the Actuarial Standards Board (Committee on Social Insurance of the & American Academy of Actuaries, 1998, p. 1)

volatility similar to that of developed markets; and their corporate governance and government policies are no worse than, and in some cases superior to, those of developed markets” (Everest Capital, 2009, p. 2).

2 The propensity to buy insurance is equivalent to the propensity to save, which is higher among the rural poor than the urban poor stressing the argument that developing countries – the paper makes the case of Ethiopia- should introduce products to mobilize savings (Getahun, 2001, p. 3).

defines as a government sponsored program, like health and unemployment contributions, established by statute and with a given level of subsidy.

This study examines the conditions under which entrepreneurship operates, i.e., “Why, when and how different modes of action are used to exploit entrepreneurial opportunities” (Shane & Venkataraman, 2000, p. 218).

The association between insurance and entrepreneurship is tested using panel data for Brazil to exploit both the time-series and cross-state variations in insurance and entrepreneurship.

The findings and results indicate that in Brazil, and possibly in other Emerging Market Economies, there is a need for a public policy agenda that includes the development of inclusive and independent insurance markets to support entrepreneurship.

The study develops along these lines: Chapter 2 provides indications about the purpose of the study and defines a conceptual framework of analysis. Chapter 3 considers the relationships between risk aversion, uncertainty and entrepreneurship and economic activity. Chapter 4 examines the history of insurance. Chapter 5 reviews the status of the insurance markets in advanced countries - countries that belong to the Organization for Economic Cooperation and Development (OECD) and the United States - that constitute a benchmark for the countries of Latin America including Brazil. Chapter 6 reviews various aspects of the literature. Based on theoretical considerations and literature, historical review, status of insurance markets, Chapter 7 spells out the considerations related to the areas of study. Chapter 8 articulates the research questions and hypotheses, and their importance. Chapter 9 reviews the measures for the main variables and

particularly entrepreneurship and insurance. Chapter 10 displays results and findings, and Chapter 11 presents conclusions, policy implications and potential directions for future research. Appendix 1 spells out some of the more technical and theoretical aspects related to risk aversion; Appendix 2 expands the chapter on measures and lists the data used for the analysis and their sources and provides the design of a global database to test as part of future work, at the global level, the relationship between insurance and entrepreneurship. Appendix 3 articulates the methodology. Appendix 4 includes Stata code and procedures. Appendix 5 examines research on policy uncertainty.

2. PURPOSE OF THE STUDY: A CONCEPTUAL FRAMEWORK

The historical and literature reviews, along with Chapter 3 on risk aversion and entrepreneurship, intend to prove that insurance can decrease uncertainty and facilitate entrepreneurs to undertake economic activities.

Insurance interacts with economic activities and initiatives and has the function of serving and supporting these activities and in turn favors economic growth and development. However, the state of insurance in emerging markets mainly in countries of Latin America presents shortcomings like flaws of institutions and excessive level of premiums. This situation is not conducive to economic activity and entrepreneurship and insurance cannot accomplish its institutional market function.

The study reviews several areas, mainly economic growth, financial markets, insurance markets and entrepreneurship. Researchers found that these areas are linked, e.g., financial sector and economic growth; financial sector and entrepreneurship; and entrepreneurship and economic growth, the development of the financial sector is thought to be a decisive factor for entrepreneurship and growth; entrepreneurship and growth are strictly associated, in that entrepreneurship stimulates growth. However, the connection between insurance and entrepreneurship and the role of insurance markets in relation to entrepreneurship have to be further studied and tested.

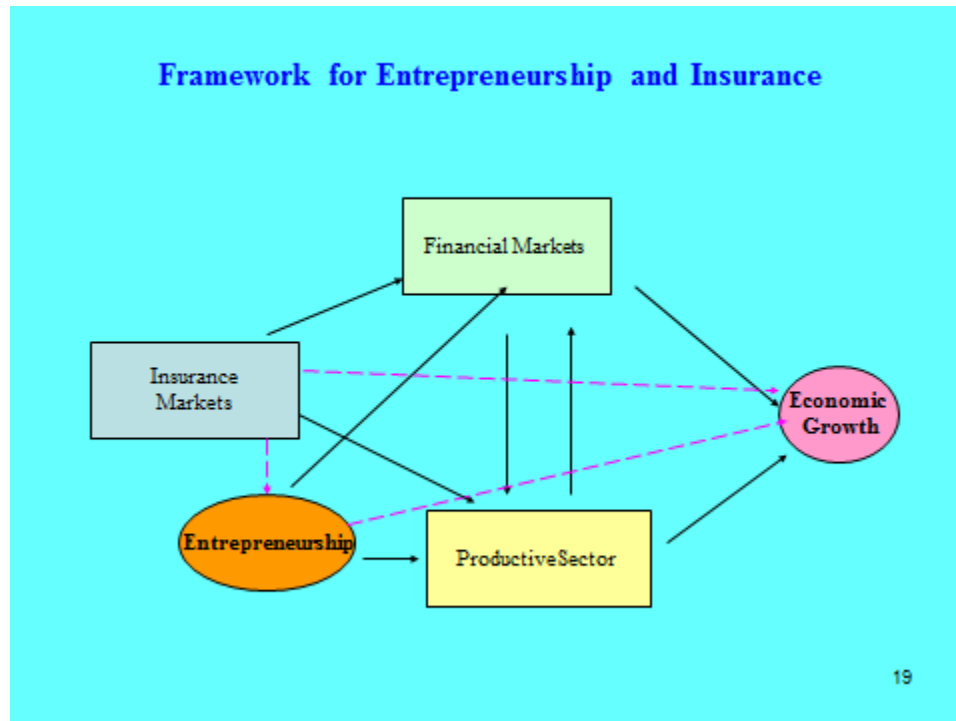


Figure 1: Framework for Insurance Markets

The conceptual framework for the study (Figure 1) displays the interactions among economic growth, financial markets, insurance and entrepreneurship. The interactions between insurance and entrepreneurship and economic growth (i.e., the pink dotted line in Figure 1) are uncharted territory and constitute the focus of this study.

Theories, definitions and measures of entrepreneurship are strictly connected (i.e., different theories and definitions of entrepreneurship refer to different measures) and entail different implications for public policies (Iversen, Jorgensen, & Malchow-Moller, 2007). The exploration of the relationship between insurance and entrepreneurship enriches the analysis and enhances the role of policies.

Several researchers (Congregado, 2010; Iversen et al., 2007) stress that the best measures of entrepreneurship are those of Small and Medium sized Enterprises (SMEs), start-ups and self-employment. In this respect, large firms and low-income people do not measure entrepreneurship, but play a role in the economy. For entrepreneurs and businessmen, the availability of financial services, and particularly insurance, is crucial to operate.

However, insurance and other financial services have to provide an effective service: the greater the effectiveness, the more uncertainty will be reduced.

The relationship between the concept of entrepreneurship and the different types of companies implies that the contribution of entrepreneurship to economic growth depends on the circumstances in which entrepreneurship operates (Sorensen & Chang, 2006). Along these lines, the measures of entrepreneurship most appropriate are those related to the distinction between entrepreneurship by necessity and entrepreneurship by opportunity (Wong, Ho, & Autio, 2005). In this respect, particularly notable are the measures of total entrepreneurship activity or Total Early-Stage Entrepreneurial Activity (TEA) - and the related measures of opportunity TEA and necessity TEA - developed by the Global Entrepreneurship Monitor (GEM; <http://www.gemconsortium.org/>). This analysis is not possible for the study of Brazil since the distinction between opportunity and entrepreneurship is not available at the level of state.

Table 1 — deduced from empirical research— portrays the availability of insurance policies in emerging markets in parallel with that in advanced markets, e.g., the United States. As Table 1 shows, there is a great difference between the insurance

policies available in developed countries with respect to emerging countries. The access to insurance products varies greatly.

**Table 1. Availability of Financial Services
Particularly Availability of Insurance to Various Forms of Economic Activity in the United States and Emerging Markets**

Type of Activity	Availability of Financial Services and Insurance	
	United States	Emerging Markets - Latin America and the Caribbean
Large Firm	Easily available	Available
Small and Medium-Sized Enterprises	Easily available	Scarcely available
Entrepreneurs-Startups	Easily available	Scarcely available
Micro entrepreneurs	Available	Scarcely available
Poor People	Incipient	Rarely available

This study intends to link the availability of insurance with entrepreneurship and provide evidence that emerging countries and particularly Latin American countries and Brazil should develop an agenda to strengthen the delivery of insurance products.

In this respect, Susan L. Segal, president and chief executive officer of the Council of the Americas/Americas Society, puts emphases over that increasing the availability of insurance would help promoting business environments that foster entrepreneurship for any type of entrepreneurs from the owners of a store to the creators of technology (Council of the Americas, 2008). It constitutes a supply side approach for insurance.

Within this background, the study reviews the association between insurance and entrepreneurship looking at the history and the literature, to define the hypothesis,

testable for empirical verification, of the connection and the causality between insurance and entrepreneurship.

3. RISK AVERSION, ENTREPRENEURSHIP, AND ECONOMIC ACTIVITY

This section reviews the rich literature on risk, uncertainty, insurance (Bernstein, 1998) and entrepreneurship, economic growth and development (Schumpeter, 1982)³ and tries to link those various concepts with regard to developing countries.

The immature status of the insurance markets in developing countries does not provide any help to reduce uncertainty and thus does not encourage risk taking. In other words, the underdevelopment of insurance markets in developing countries does not reduce uncertainty and thus limits the potential of entrepreneurship and economic growth.⁴

Players in the economy (i.e., individuals or firms) are risk-neutral if they are indifferent between choices with equal expected payoffs even if one choice is riskier. Players are risk-averse if, facing two choices with the same expected monetary value, they would prefer the smaller and more certain of the options. In other words, possessing X dollars is worth less than losing X dollars.

Risk-seeking or risk-loving are individuals who have a preference for risk. The utility of risk-seeking individuals rises as they take more chances, i.e., if offered either \$50 or a

³ Schumpeter wrote *The Theory of Economic Development: An Inquiry into Profits, Capital, Credit, Interest and the Business Cycle* in 1911.

⁴ This section articulates the background and the theory behind the research. It is based on an extensive literature review (see also Section 6). The technical aspects of this section draws from various sources (Nicholson and Snyder 2011); (Pratt, 1964); (Shavell, 2007).

50% each chance of either \$100 or nothing, a risk-seeking individual would choose the gamble even though the gamble and the sure thing have the same expected value. Along this reasoning, entrepreneurs—including people who own SMEs—seize chances, creating economic worth and therefore come across as risk-neutral or less risk-averse⁵.

The so-called prospect theory (Kahneman & Tversky, 1979) emphasizes physiological motivations and provides a description of preferences compared to the theory of expected utility (Lenfant & Pradier, 2008). The fundamental point for the prospect theory is that the behavior of individuals varies with the circumstances, i.e., the attitude towards gains (risk averse) is different from the attitude in case of losses (risk seeking). (Baumol 2006) argues that innovative entrepreneurs are risk lovers.

Frank Knight is his book *Risk, Uncertainty, and Profit* (Knight, 2012, p. 37)⁶ laid out the difference between risk and uncertainty:

... Uncertainty must be taken in a sense radically distinct from the familiar notion of Risk, from which it has never been properly separated. The term “risk,” as loosely used in everyday speech and in economic discussion, really covers two things which, functionally at least, in their causal relations to the phenomena of economic organization, are categorically different. ... The essential fact is that “risk” means in some cases a quantity susceptible of measurement, while at other times it is something distinctly not of this character; and there are far-reaching and crucial differences in the bearings of the phenomenon depending on which of the two is really present and operating. ... It will appear that a measurable uncertainty, or “risk” proper, as we shall use the term, is so far different from an immeasurable one that it is not in effect an uncertainty at all. We ... accordingly restrict the term “uncertainty” to cases of the non-quantitative type.

⁵ Behavioral economists follow the so-called prospect theory (Kahneman & Tversky, 1979). Kahneman and Tversky argue individual’s approach towards profits involving risk may differ from their approach towards losses involving risk. Kahneman and Tversky (1979, pp. 264–5) present various examples that, if given the option of acquiring \$1,000 for sure as opposed to having a 50% possibility of acquiring \$2,500, people will likely opt for the certain option despite the possible rewards of the uncertain option being greater, i.e. \$1250. This is risk aversion. This attitude is considered as risk aversion. Kahneman and Tversky discovered that the same participants often chose the riskier option when faced with a confirmed loss of \$1,000 as opposed to a 50% chance of no loss or a \$2,500 loss. This is risk-seeking.

⁶ Knight wrote his main book in 1921.

Hence, Knightian uncertainty cannot be measured or calculated while risk can be. Risk unlike uncertainty can be covered by insurance.

Whereas business failure or success cannot be insured, pure risks⁷ - like industrial mishaps, product faults, health and, to a certain extent, also natural disasters- could be insured (Knight, 2012). Insurance, when feasible, converts uncertainty into risk, thereby reducing the effect of uncertainty in business⁸. Powers articulates the relationship among risk, uncertainty and insurance (Powers, 2011, pp. 28–34,83–86). Although insurance coverage can be obtained at affordable prices in developed markets, the same cannot be said for emerging markets.

Insurance markets in Emerging Market Economies, particularly in Latin America and Brazil, are undeveloped. Insurance's rate of penetration or penetration ratio, i.e., total premiums as percentage of gross domestic product (GDP) gauges effective insurance markets, and indicates that insurance markets in developing countries are immature and risk aversion is high because of the insufficient institutional framework and lower levels of wealth. For instance, currently, the average Brazilian spends less than US\$ 350 in insurance per year and the insurance penetration is only 3.5 percent or just above 50 percent of the OECD countries' average (IMF, 2012a, p. 6). Hence, in emerging countries, there is under provisioning of insurance and inefficient forms of insurance. Subsequently, entrepreneurs shun away from business activities and prefer less daring

⁷ Pure risk is a category where loss is the only possible outcome; there is no beneficial result.

⁸ The function of uncertainty in economic activity has taken prominence with the financial crisis of 2007–8 and the ensuing crisis of the European debt in 2011–12.

undertakings; i.e., entrepreneurs may be directed to unproductive activities, thereby reducing economic growth (Baumol 1968, 1990, 2006).

Public policy should concentrate on improving the conditions of the supply of insurance particularly for entrepreneurs, who are at the center of economic growth.

I. Risk Aversion in Developed and Emerging Market Economies

Insurance consumption, i.e., demand for insurance, depends on the type of insurance (e.g., life, business) and various factors, e.g., risk approaches, wealth, amount covered, level of premiums, wealth, probability that the event occurs, demographic structure and composition of the population, influence the demand of insurance.

Insurance's need is linked to the individual's utility function and aversion of risk, which persuade him/her to buy insurance. Literature and logic dictate that, in general, diversity across individuals in the composition of the portfolio mirror risk preferences in the sense that individuals who are less risk averse are more inclined to start uncertain enterprises. Individuals who are more risk-averse will have less fluctuating earnings; however, they would find themselves, on average, poorer than less risk-averse people. Guiso and Paiella (2005, p. 14) ascertain that "our measure of risk preferences has considerable explanatory power for individual decisions (e.g., occupation, job, disposition to risks and to become an entrepreneur)". Guiso and Paiella (2005) also demonstrate that individuals are not willing to buy insurance if they perceive it as too expensive and if they observe that supervision is deficient. The reasons are that overpriced insurance and poor supervision disturb the link between risk aversion and coverage. Hence, insufficient transparency and mispriced insurance products results in

people, who may want to take a risk like undertaking an enterprise, being more averse to risk than what they would normally be.

In other words, differences in risk-aversion are compounded when individuals mistrust the environment, be it lawful, regulatory and administrative, in which insurance companies operate. Under these circumstances, risk-averse people tend not to buy insurance policies.

Evans and Leighton (1990, pp. 520–525) argue that people having larger wealth and resources are considerably more prone to move to self-employment and accept risk and uncertainty of a business activity. Baur et al. (2004) recognize several significant aspects that ascertain the development of the insurance industry, which include the level and allocation of wealth, the legal structure and property rights, regulation and supervision, trust and risk awareness. Religion, culture and education termed as noneconomic factors also affect the growth of insurance.

For instance, people in emerging market economies owning \$10,000 remain considerably more wary about risk than people in advanced economies also owning \$100,000.

Furthermore, natural disasters like fire in a house are more likely to occur in emerging market economies than in developed countries. In a developed economy, the chance of a fire in a house is, say 5%, and can lead to lose roughly 80% of the worth of the asset.

Conversely, in a developing market economy, the probability of the fire occurring is greater, say 15%, which would be equivalent to losing 100% of all capital and so enduring poverty for the remaining of his or her life.

II. Insurance in Emerging Market Economies

In the event of the house fire, the risk premium in developing countries represents a high percentage of wealth, whilst it is a lot smaller in advanced economies (see Appendix 1). Thus, individuals in developing countries face a larger variance among utilities than individuals in developed economies, i.e., the utility of buying insurance. Usually, getting insurance leaves people who are risk-averse richer in terms of expected utility. However, in emerging countries, due to the level of wealth and the cost of insurance as a share of wealth and institutional ineffectiveness, encompassing insecurity with claims and indemnities, people are not favorably inclined to buy insurance products and are more risk-averse than an individual in advanced economies. Hence, people in emerging market countries do not feel better off buying insurance and they buy less insurance and bear risk inefficiently. In different words, in developing countries there is a condition of under provisioning of insurance and people hesitate taking initiatives like those that an “entrepreneur” would take.

III. Entrepreneurs, Small and Medium-Sized Enterprises and Insurance

Different authors (Acs, 1999, 2010; Acs & Szerb, 2009, 2010; Wennekers & Thurik, 1999) describe the relationship between entrepreneurship and the level of GDP. The function has a U-shaped form, i.e., entrepreneurship is high at low levels of GDP per capita, declines at middle levels of GDP per capita and then picks up at upper levels of GDP per capita.

In developing countries, the opportunity cost to start business is particularly high and people prefer to keep their job. This circumstance is in line with the characterization of “entrepreneurs by necessity rather than by opportunity.” The unreliable institutional setting and the low level of “wealth” cause an undue uncertainty that discourages businessmen (e.g., start-ups, SME). Quite the opposite happens in advanced economies. The United States represents an example of a country where the institutional situation normally functions correctly, profit is recognized as a legitimate outcome of talent and initiative, and insurance is extensively employed as an efficient market institution to cover a variety of events related to business and personal activities. In developing countries, an “additional premium” is required to remunerate entrepreneurs who are more risk-averse for the increased uncertainty (Hamilton, 2000, p. 605). Due to the fact that wealth is low, people are not in position to bear the additional premium.

The significant amount of risk premium indicates that developing countries present favorable prospects for insurance to be exploited, i.e., sale of insurance that would reduce the current level of under provision.

Empirical evidence (Masci, Tejerina, & Webb, 2007) shows that economic actors in Latin America tend not to buy insurance because of a number of inadequacies (e.g., level of premium; level of wealth; level of uncertainty; judicial system; satisfaction, transparency and reliability of claims; level of trust; cultural factors; social factors related to the recognition of profit), see also (Erbas, 2004). All these factors, in emerging markets economies, reduce the demand of insurance and individuals refuse buying insurance and select inefficient forms of shield.

If the insight of De Soto (2002, 2003) is recognized and properties in developing countries and in Latin America are appropriately priced, people would see a wealth uplift and go towards the right of the curve of utility (i.e., utility index on the y axis and wealth on the x axis), and the curve's shape becomes less concave as well since the risk aversion would be lower and individuals would be more willing to undertake initiatives.

IV. Risk Aversion and Firms

The attitude that firms assume toward risks mirrors that of their managers and shareholders. So much so that managers in a company are averse to risk and the rewards are linked to the performance of the company, they would like the firm to act in a fashion that is risk-averse, i.e., avoid risks that are jeopardizing profitability. Even so, in developed economies, firms that work within greater competition will need initiative and innovation. Furthermore, shareholders normally have portfolios that are well diversified, and they might not be particularly worried with regards to the risks that a firm faces. As a result, shareholders would frequently want companies to operate in as close to risk-neutral manner as possible, and companies would work that way as long as shareholders oversee managers and through selling and purchasing the companies' stock cast the vote of confidence (Sharpe, 1964; Shavell, 2007). In this respect, shareholders play the role of role of monitoring and disciplining the markets (Borio & Conference on Market Discipline: The Evidence across Countries and Industries, 2004).

However, in developing countries with weak financial markets, it is difficult for stockholders to exercise an impact over management; and therefore, the inclination of firms in a relatively uncompetitive atmosphere is to act in a fashion that is more risk-

averse instead of being less risk-averse or risk neutral. As a result, in emerging market economies, companies shun “entrepreneurial” attitudes aimed at “grabbing” opportunities.

V. Negative Externalities and the under provisioning of Insurance

The under provisioning of insurance products offered at above fair actuarial prices contribute to three negative effects: reduced economic growth, instability of jobs and increased informality.

Schumpeter (1982) argues that innovation and entrepreneurship lead to economic growth. In the United States, Baumol (2004) finds that entrepreneurs and small firms provide a share of radical innovations proportionally greater than what large companies make available. In developing countries, uncertainty, under provision and level of wealth constitute negative externalities that make entrepreneurs, start-ups and SMEs less willing to undertake new initiatives and pursue innovation.

Therefore, the negative externalities reduce economic growth that entrepreneurs would favor. In other words, in developing countries⁹, *ceteris paribus*, it is reasonable to think that entrepreneurs contribute less to economic growth than they would do in advanced economies with mature insurance markets and less risk-averse entrepreneurs.

⁹ While old definitions such as those of developed and underdeveloped countries are disappearing, a country like Brazil is still to be considered a strong emerging country that will become an advanced economy. Sean Williams states: “In spite of its recent success, Brazil’s goal of becoming an advanced economy has not yet been met. It must continue to diversify its economy, reduce regulatory and legal inhibitors to efficiency, and fight poverty through social spending and education. President Rousseff must also find a way to balance the country’s budget without slowing growth. In spite of these issues, Brazil is still capable of becoming an advanced economy, and certainly deserves its position among the BRIC countries” (S. Williams, 2011).

Entrepreneurs and SMEs provide a big portion of jobs in an economy. IBGE “Instituto Brasileiro de Geografia e Estatística” of Brazil says SMEs are responsible for 45 percent of job opportunities in the formal sector and most of the informal jobs that make up 40 percent of all the jobs in that country. Better availability of products of insurance and greater propensity to buy insurance contracts would create stronger companies, more stability and more jobs created. Furthermore, entrepreneurs and SMEs that are insured are less likely to go bankrupt as they transfer some of the risks they do not want to bear. Thus, entrepreneurs and SMEs are in control of a large share of jobs in the economy.

A third negative “externality” is the shadow economy. In 2011, according to IBGE data, in Brazil, micro-companies involve jobs for 10 million people and 92% of people get less than R\$1,000¹⁰ monthly and are below the lowest income tax bracket. Thus, about 8% of the micro-companies are eligible to pay taxes. However, informal companies start to pay taxes when some external situation takes them to formality, e.g., a micro-company must open an account, to give a receipt, or indeed borrow. In this respect, insurance products with reasonable premiums could push firms out of the shadow.

On the three grounds cited above, economic growth, jobs and reduction of informality, it is crucial that public policies favor entrepreneurs, start-ups and SMEs that introduce innovations.

¹⁰ The real is the present-day currency of Brazil. Its sign is R\$, and the code for the International Standards Organization (ISO) is BRL.

VI. Risk Aversion and Social Welfare

From the point of view of the overall society, the difference among categories of attitudes regarding risks connotes that the risk allocation among less risk-averse and risk-averse people would itself have an impact on welfare of society (Shavell, 2007, p. 190).

Assuming that social welfare is summation of utilities of the various parties, the shift of risk from the risk-averse to risk neutral or less risk-averse would increase welfare of society. This is owing to the fact that risk bearing by more risk-averse will lead to a bigger decrease in the expected utility than the risk bearing by the not so risk-averse. Of course, owing to this particular cause, those more averse to risk would pay those less averse to risk for the assumption of risk, to leave both parties much better off with regards to the anticipated utility.¹¹ Appendix 1 describes the mechanics of the transfer of risk for social welfare.

Social welfare is increased also by risk sharing among the parties that are risk-averse as well. Dividing risk lessens the expected loss magnitude that an individual could face. Hence, for instance, someone might decide to start a business with other partners with whom he can divide the risks and rewards.

Even so, the risk shift for the welfare of the society might not help in the creation of incentives for supplying risk-neutral people: policies of redistribution might decrease the incentive to behave in a risk-neutral fashion, and entrepreneurs may not have the inclination to undertake initiatives that are risky.

¹¹ The source of this section is (Shavell, 2007, pp. 186–193) and <http://cyber.law.harvard.edu/bridge/LawEconomics/risk.htm>.

Ilmakunnas and Kanninen (2001) suggest “economic risks shape the allocation of human capital between entrepreneurs and the labor supply.” With a panel data for various OECD countries, Ilmakunnas and Kanninen (2001) study the interactions among the birth of private companies, entrepreneurship, and social insurance. The results ascertain the Knightian perception of businessmen as risk-takers and that “business risk” cannot be insured. Another discovery is that the presence of “differential social risk insurance” implies rises in public spending and social regulation that produce ramifications that are detrimental to entrepreneurship and the willingness of taking risk. The research applies to developed countries. However, emerging market countries have in place several forms of social welfare and social protection and the model of Ilmakunnas and Kanninen could provide similar results for them. Following the logic of the article (Ilmakunnas & Kanninen, 2001), the risk transfer in the social welfare context might have damaging effects on emerging markets as incentives for going ahead with risky and productive business activities would be reduced and as a result the supply of risk-neutral or less risk-averse individuals might wither, since they might feel utilized for the transfer of cumulative risk instead of taking risk that is private. This kind of policy might punish the businessmen willing to start economic activities and hence favor economic growth.

However, the role of social insurance on entrepreneurship is not a settled issue. The research in this field is complex (see section on Social Insurance in the Literature review). It is important to continue to define the issue, present a theory, use appropriate data and measure it. This study tests the role of social insurance on entrepreneurship in Brazil.

VII. The Basic Theory of Insurance

Insurance assumes that there exist a multitude of risk-averse individuals who are insured and face independent, identical loss risks that can be covered through insurance that makes the pooling of risks possible. There are three ways to take care of the risks:¹² retain the risk; avoid the risk; or transfer the risk.

Retaining is self-insurance, i.e., bearing the cost of the loss in its entirety.

Avoiding is the decision not to face risk.

Transferring risk takes place when one purchases a policy of insurance that makes the insurer party responsible for payments in case of the occurrence of the event, i.e., the insurer must pay the amount agreed according to the contract signed (on the evolution of contracts with particular attention to those related to gambling and insurance, Kreitner 2006). Supposing that there are no expenses of administration linked with the operations of the insurer, the insurance theory implies that the insurer can practically be certain of giving coverage to costs by mustering from every party the expected amount to be paid. If each party faces 10% chance of losing \$10,000 and would be given that sum in case there is a loss according to a policy of insurance, the insurer through premium of \$1000 can cover the costs. This premium is called “actuarially fair premium”. It represents the expected value of the amount the insurer has to pay the insured party. However, the

¹² Existing risk is what distinguishes gambling from insurance. Gambling introduces risk where none exists. Insurance mitigates risk where risk exists. Gambling creates a risk situation that offers an opportunity for gain as well as for loss. Insurance deals with “pure” risk. With pure risk there is the possibility that a certain event will occur, e.g., accident or sickness. In addition, the purpose of insurance is to restore the insured to his original position, not to afford the injured person the possibility of making a profit. Gambling can provide a gain, while in insurance there is no possibility of gain. Mises underscores the differences among insurance, betting and gambling in a perspective not related to probability (Mises, 2007, pp. 115–19).

insurer will have to insure several peoples to pool the risks and act as an insurer. If the insurer enters one single contract, then he would make a gamble. According to Shavell (Shavell, 2007, p. 192), “if the premium equals the actuarially fair amount plus some minor additional amount (i.e., say, 0.0001), then the probability that the insurer will cover its costs approaches 100% as the number of insured entities grows. Thus, the insurer covers its costs by charging the actuarially fair premium.”

Hence, the goal of the insurer is to meet claims, and to that end insurers face the so-called solvency risks, i.e., the insurer might not be able to pay his obligations (e.g., indemnities for claims).

Besides technical and investment risks, the insurer has to face the potential default of a partner (e.g., a reinsurer), unprofessional conduct, and systemic risk.

VIII. The Limits of Insurance

This section reviews two models that explain the relationship between insurance and GDP: **a.** the S-curve of Enz and **b.** the BRIP Model.

a. A review of insurance’s role suggests the presence of an “optimal point” of insurance markets’ development after which insurance might be available easily and there could be negative externalities linked with insurance. The optimum point is reached at about the GDP per capita level of about \$15,000 for life insurance, and at about \$10,000 for non–life insurance. At that point the income elasticity of the demand for insurance reaches its maximum.

Zheng, Liu, and Deng (2011) and Zheng, Liu, and Deng (2009) state that there are three insurance growth models: the simple linear model; the logarithmic linear model; and the logistic model. Carter and Dickinson (1992) and Enz (Enz, 2000) formulated the logistic model to illustrate the connection among penetration of insurance and GDP labeled “ordinary growth model.” Utilizing massive data amounts, the “ordinary growth model” permits estimation of insurance growth. Enz (Enz, 2000) identified the “S-Curve,” which is the relationship between insurance and GDP that constitutes a measure of acceptance by the public of a particular product of insurance and of insurance demand’s income elasticity. The Enz curve shows the relationship between penetration ratio (Premium/GDP) (Y axis) and GDP per capita (X axis) (Swiss.Re, 2012, pp. 10–12). Generally, the “S-curve,” predicts that income demand elasticity would be highest at approximately \$10,000 to \$15,000 of income per capita. Many countries do not exactly follow the path of the “S-Curve” owing to institutional arrangements, high catastrophe risk and insurance regulations. The expression of the ordinary growth model is the following:

$$Y = \frac{1}{C_1 + C_2 (C_3)^X} + e$$

Where Y is the insurance penetration (penetration ratio, Premium/GDP); X is GDP per capita; C₁, C₂ and C₃ being three parameters; and e being the residual. Enz (2000) utilizes this formula.

Against this background, insurance penetration, i.e., Premiums/GDP, or premium as a share of a country's GDP, constitutes the measures or degree that a certain insurance product is assimilated in the country (CEIOPS, 2010), i.e., usually insurance penetration ranges between 0.4% and 15.5%. In 2011, average insurance penetration worldwide for life insurance policies was at the level of 3.8% and for non-life at 2.8%. The level of penetration tends to rise as income increases, particularly in life insurance (Swiss.Re, 2012, p. 39).

Data on penetration show that access to insurance products fluctuates around the globe. Among the 4 billion people all over the world who earn less than \$2 per day, merely 10 million get insurance. According to Swiss.Re (2012), in 2011, global per capita expenditures on insurance, i.e., insurance density, calculated as the ratio of total premiums over population (or specific premium, e.g., life premiums, over population) was on average at US\$661, of which US\$378 was spent on life insurance and US\$283 on non-life insurance. The industrialized countries spent between US\$1,500 and US\$8,000 per capita on insurance, whereby the share of life insurance was often over half of the total expenditures. In the developing countries, the typical insurance expenditure in 2011 was less than US\$50, with, in most cases, more than 75% spent on non-life insurance, (i.e., around US\$30) (Swiss.Re and Swiss.Re Sigma Reports various Years).

As in Figure 2, insurance penetration is an increasing S-Curve as GDP per capita increases and then becomes asymptotic. This implies that income elasticity is initially on the up and then declines. The conclusion derives from Enz (2000) and can be interpreted

that the increase in insurance penetration (life insurance and non-life insurance) has a limit as GDP grows.

For the purposes of the study, the “S-curve” prompts the following considerations:

- i. the asymptotic behavior of the S-Curve might imply that we will not reach a situation where “uncertainty” is eliminated, which would make the function of the Knightian entrepreneur disappear.
- ii. It underscores that at low levels of GDP, insurance has no relevance. However, the S-Curve points out that insurance has growth potential, especially at lower income levels, that is precisely the poor segment’s demand in emerging markets.
- iii. Even so, with the increase of GDP, the need of insurance becomes more significant.

This raises the causality question: Is insurance resulting in economic growth? Or is the other way around? Or do the two forces, insurance and economic growth, reinforce themselves in a process that is endogenous?

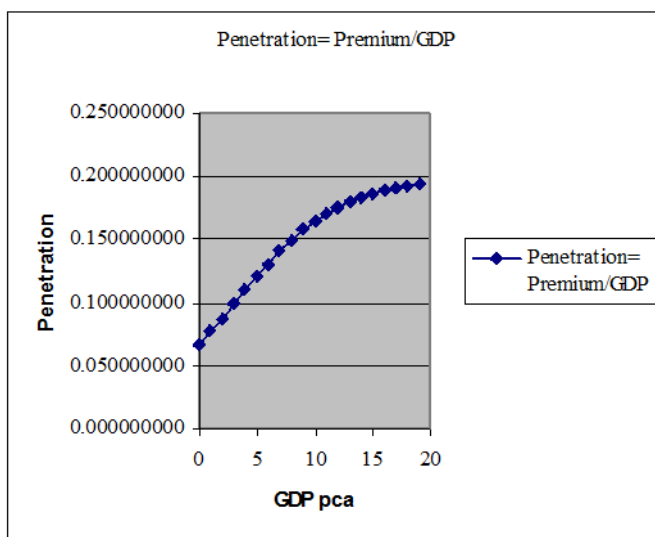


Figure 2 Insurance Penetration Curve

iv. The S-Curve connection between GDP and insurance helps in the identification of four insurance market development stages, which are followed by most markets of insurance: “dormant, early growth, sustained growth and mature growth”(USAID, 2006). One could visualize vertical lines that delineate the 4 development stages that most markets of insurance experience.

v. The S-Curve and the data on insurance penetration ascertain that there is a massive scope for the development of market of insurance to serve the low-income people particularly in emerging markets where poor’s concentration is high (Outreville, 2011; Swiss.Re, 2011b).

According to Munich.Re (2006, pp. 80–86–118), there are three reasons for an untapped world insurance market: a. low-income unable to get insurance; b.

infrastructure needed to give people access to insurance, especially in rural areas;
c. notion of insurance unknown in some cultures (Churchill, 2006, pp. 39–40).

b. In the context of insurance penetration at various levels of economic development, the Benchmark Ratio of Insurance Penetration (BRIP), whose calculation is based on the “insurance growth model” (Zheng, Liu and Deng 2009, 2011), presents a different approach to assess the role of insurance at different stages of economic growth. Insurance penetration measures the degree that a certain insurance product is assimilated in the country, the BRIP evaluates the relationship between a country’s insurance penetration and the world’s average penetration at an economic level equal to that of the country’s GDP per capita (Zheng et al., 2011, p. 4). The “world average insurance penetration at the same economic level” constitutes the “benchmark penetration”. BRIP can be calculated as follows:

$$\text{BRIP} = \frac{\text{Actual penetration}}{\text{Benchmark penetration}} \times 100\%$$

The denominator, “benchmark penetration,” refers to “the world average insurance penetration at a country’s economic level” and the numerator, “actual penetration,” is the country’s actual penetration, i.e., Premiums/GDP (Zheng et al., 2011, p. 4).

BRIP is a “benchmark” that adjusts insurance penetration to recognize that different levels of insurance penetration correspond to different stages of economic development. Therefore, the BRIP represents the comparable “economic-adjusted insurance growth

level” and constitutes an indicator for the international comparisons of insurance among countries more convincing than the traditional measures, i.e., premium, insurance density and insurance penetration (Zheng et al., 2011, p. 8). The calculation of the BRIP of a country follows three steps.¹³

The results of the exercise (Zheng et al., 2011, pp. 22–3) are quite interesting. Comparing the BRIP indicator to the traditional indicators (i.e., premium, density and penetration) the authors show that the level of development of insurance is overestimated in advanced economy and underestimated in emerging economies (Zheng et al., 2011, pp. 9–12). According to the new indicator “BRIP”, the rankings of the insurance industries of developed countries fall relative to those under traditional indicators. On the contrary, the rankings of emerging countries rise. The results for the USA are reported in the footnote¹⁴.

Also the BRIP model stimulates important considerations for the study (Zheng et al., 2011):

13 First, use an appropriate model to calculate the “benchmark penetration” for the country, which is the “world’s average penetration at a country’s economic level.” Second, calculate that country’s actual penetration. Third, divide the actual penetration by the benchmark penetration and obtain the value of BRIP.

14 (Zheng, Liu, & Deng, 2011, p. 10): “Taking the U.S. for instance, in 2006, its BRIP, premium income, insurance density, and insurance penetration are respectively ranked the 26th, the 1st, the 6th, and the 14th in the world. As is revealed from these numbers, although the premium of the U.S. is the largest in the world (the 1st), the insurance density (the premium per capita) is ranked lower (the 6th) due to the relatively large U.S. population. At the same time, the ranking of the insurance penetration (Premium/GDP) is even lower (the 14th) due to the high economic development level. Furthermore, if taking into consideration the rule that “the benchmark insurance penetration will be higher when the GDP per capita is higher”, the ranking of the BRIP descends further (the 26th). This is to say, for the U.S., the ranking of the BRIP declines compared with the rankings of those traditional indicators like premium income, insurance density, as well as insurance penetration. Japan and the U.K. share similar characteristics. Among the BRIC countries, the ranking of Brazil would be very similar under the BRIP indicator or the traditional ones (e.g., penetration and density).”

- It endorses the relationship between insurance penetration and economic growth. With respect to the factors that contribute to the increase of insurance, the authors stress the importance of factors specific to a given country (and the BRIP indicator allows considering the specificities of countries).
- It shows a quite important finding that the level of development of insurance is sensitive to economic factors in advanced countries and to institutional factors in emerging countries. Moreover, as countries develop, the importance of the institutional factors diminishes and that of economic factors increases.
- It confirms , in connection with the new ranking of individual countries, the potential for insurance in emerging countries and chiefly in Russia, Brazil and China (in that order), and also indicates that a potential for growth of the insurance industry exists in mature markets like the United States as well.

However, the main contributions of the study of (Zheng et al., 2011) are the following:

- A. “It is extremely important for the insurance industry in the emerging countries to upgrade its growth strategy to attain a sustainable development”(Zheng et al., 2011, p. 23). This conclusion supports the idea that insurance market needs to speed up their development to become responsive to the needs of the economy and reach a sustainable path.

B. Institutional factors – defined as social security system that affects life insurance; legal system that affects non-life insurance; culture; and religion- constitute the main obstacle to the development of the insurance industry in emerging countries.

Hence, public policy should make the development of the insurance market a priority and identify and implement appropriate policies.

IX. Considerations

Under the circumstances described above, individuals in emerging market economies lose on all fronts: they are more risk-averse than individuals in developed economies; they have to pay a higher risk premium with respect to their wealth; they have to resort to inefficient forms of insurance; and in the case of the event occurring, their wealth can be wiped out.

From the point of view of companies, the lack of sophisticated capital markets and the limited role reserved to stockholders suggest that companies as well are more risk-averse than risk neutral. From the point of view of entrepreneurs, start-ups, SMEs and micro-companies, the under provisioning of insurance creates negative “externalities” in terms of economic growth, jobs and formality and favors the use of inefficient forms of insurance. Also, transfers due to social welfare may reduce the incentives for entrepreneurs.

The relevant point is that risk aversion is greater in emerging market economies than in developed markets due to the unsatisfactory institutional setting and the lower level of wealth. This happens up to a level of income per capita as indicated by the penetration

ratio, or the new BRIP, which, however, also shows the potential those emerging market economies present for insurance development.

Against this background, it is expected that the development of insurance markets in Emerging Market Economies, i.e., more responsive, effectively and fairly priced insurance, would smooth the shape of the utility function with respect to risk (shifting of the line) and help to create the conditions to undertake business activities and initiatives and encourage entrepreneurship. This policy also constitutes a push for capital formation, as institutional investors like insurance companies would represent a potent instrument to transfer savings into productive purposes and also operate to discipline and monitor the functioning of the markets. These considerations are in line with Leibenstein (1968, p. 83), who suggests that developmental economists focus their attention on studying the gaps, obstructions and impediments to the initiatives—gap fillings, as he calls them—of the potential entrepreneurs.

The relationship among risk aversion, institutional setting, wealth, and entrepreneurship prompts the question (Evans & Jovanovic, 1989): does an individual have to be wealthy start a business?

Knight (2012) and Schumpeter (1982) held different views on this question (see Chapter 6 for the literature review). The empirical findings (Evans & Jovanovic, 1989) support the view of Knight that the entrepreneur must bear most of the risk inherent in his initiative. This also confirms the reasoning with the utility functions that risk aversion declines at higher levels of wealth. The data (Evans & Jovanovic, 1989) show that wealthier people are more inclined to take risks and become entrepreneurs, i.e., wealth is

an important determinant of business start-ups, and therefore wealthy people are more likely to undertake initiatives. Evans and Jovanovic (1989) stress the role of liquidity constraints: capital is essential for starting a business, and liquidity constraints tend to exclude those with insufficient funds at their disposal. Other authors (Cramer, Hartog, Jonker, & Van Praag, 2002) believe that entrepreneurship is associated with risk bearing. The data (Cramer et al., 2002) support the supposedly negative effect of risk-aversion on entrepreneurship choice and show that a high degree of risk aversion and lack of personal contacts reduce the probability of starting one's own business. According to Wagner who studied the German experience (Wagner, 2002), a favorable "regional entrepreneurial milieu" (proxied by higher levels of current start-up activity and larger shares of unemployed among the starters in a region) has a positive effect on the propensity of individuals to move from unemployment to self-employment, which Wagner finds statistically significant and economically relevant. Kamhon and Tsai (2006) empirically examine the effect of wealth on the transition into self-employment; and Ozer and Mitra (2012) the role of social and human capital and financial capital on entrepreneurship. Their findings confirm that wealth and social and human capital have a positive effect on business start-ups, allowing for the confounding effects of risk aversion (Evans & Jovanovic, 1989).

In this respect, as mentioned, if the argument of De Soto (2002, 2003) is pursued and "dead or hidden" capital is valued, the increased value would uplift wealth and then individual would become more predisposed to entrepreneurship and to use insurance products and increase the demand for insurance (Enz, 2000).

Moreover, looking at the U-shaped relationship between start-up rates of enterprises and levels of economic growth (GDP per capita), various authors (Wennekers & Thurik, 1999), (Acs & Amoros, 2008, p. 13) (Amoros, Fernandez, & Tapia, 2011), in different fashions, argue that particularly the most advanced countries in Latin America (i.e., Argentina, Brazil, Chile, Colombia, Mexico and Venezuela) are at the bottom or just over the bottom of the U-shaped curve and ready for an entrepreneurial drive.

Putting these analyses together, it looks that in Latin American countries there is a large and not exploited potential for entrepreneurship, and the existing insurance market does not satisfy the demand.

Following these considerations, there is some evidence that a link between insurance and entrepreneurship exists. Thus, public policies leading to an entrepreneurial society should include the support of the establishment of insurance markets with measures aimed at improving transparency and institutional setting for insurance; recognizing property rights and unleashing the value of properties that will in turn uplift wealth and lead to more supply of entrepreneurship and more demand of insurance products.

4. THE HISTORY OF INSURANCE: THE BATTLE TO CONTROL UNCERTAINTY

I. Introduction

The brief historical review of insurance gives a perspective of the industry; elaborates its development, stressing recent history; and deepens the analysis of the connection between insurance and entrepreneurship.

The analysis starts from the distinction between uncertainty and risk (Knight, 2012),¹⁵ with risk including circumstances where an individual who has to take decisions faces unknown outcomes but known ex-ante probability distributions. Instead, uncertainty encompasses situations where the probability distribution of an outcome is unknown. Hence, insurance covers risk but not uncertainty. It also highlights that insurance can take place in formal insurance markets or using self-insurance and risk avoidance (Mises, 2007, pp. 105–18; Rothbard, 2011a, pp. 552–57) .

Within this background, the review focuses on the evolution of insurance in advanced and emerging markets, with special attention to Latin America and Brazil. The historical review will investigate two major aspects of insurance: whether or not insurance and entrepreneurship are associated; and whether or not the availability of insurance implies a decline of uncertainty and favors entrepreneurship. Considerations linked to the two aspects form the foundation to test if insurance market development

¹⁵ Knight wrote *Risk, Uncertainty and Profit* based on his Ph.D. dissertation at Cornell University, in 1921.

provides support to and favors economic activity and entrepreneurship and ultimately economic growth. The related question has to do with the direction of causality, e.g., which comes first, insurance or entrepreneurship? (Chapter 8 - Research Questions and Hypotheses -reviews these issues in more details).

The framework of the analysis as developed in Chapter 2 follows the view that the emergence of market institutions such as insurance derives as an unintended consequence from human activity including entrepreneurship (High, 2009a, p. 5). Further, in line with Boettke and Coyne (Boettke & Coyne, 2003), the proposition to test is whether insurance markets lead to productive entrepreneurship and economic growth.

The history of insurance outlined here is a revised and updated version of an article by the author (Masci, 2011). The section refers to and draws from various authors (Bernstein, 1998; Ferguson, 2008; Franklin, 2001; Prudential Insurance Company of America, 2009; Hoover, 1945; Trenerry, 2009), Sachit (2009) and Klein (1995) and from Abreu and Fernandes (2010) and Bester, Chamberlain, Hougaard and Smit (2010).

Celebrating the importance of the bourgeoisie for American capitalism, McCloskey (2011, 8–9; 2007) argues that the role society attributes to markets, enterprise and invention affects growth. Equally, Landes and other authors (2010) focus on the role of private initiatives. Roberts (2011, pp. 2, 125–31) shows that the rise of an entrepreneurial market system together with modern models of markets, currency and business started in Athens, along with the emergence of banking practices, in an environment that was conducive to profitable economic activities. Then these practices expanded in the Mediterranean and the Middle East.

The literature on the economic history of emerging and Latin American countries is enormous. Bulner and Thomas (2003) cover the economic history of the continent from the 1820s when the countries got independent to modern times; they emphasize differences among the countries while at the same time recognizing influences from the Portuguese and the Spanish and also the French systems that shaped the social, political, cultural and economic development of the continent. Particularly in the 20th century, the North American systems influenced the countries of Latin America.

Several contributors give ground for comprehending economic growth and institution development in Latin American countries. Haber (2000) reviews the institutional changes and economic growth in Latin America in the 19th and 20th centuries. Other relevant work includes that of Williamson and Kuczynski (2003) regarding the economic policies of the Latin American countries after the “lost decade of the 1980s” (Fraga, 2004) that brought about crises, slow growth, skewed distribution of income and living standards. Teichman (2001) monitors the reforms in Argentina, Mexico and Chile, and their implications for democracy. Gwynne and Kay (1999) elucidate the continent’s economic, social, cultural and political changes and their links with globalization, modernity and the impact on people. Arias (Foreign Affairs, 2011 2–6) holds that cultural constitute the obstacles to the development of Latin American countries.

With respect to insurance, while the Portuguese and Spanish impacts were systemic, the British system also influenced the evolution of insurance in South America (Jones 1984). Nevertheless, insurance matters have not been completely addressed (Baughman, 1965); and not a lot of work has been done with regards to the insurance

industry's development in Latin America, with noteworthy exceptions, for instances Westall (1984) who highlights the advances of fire insurance in Argentina and British insurers' role; Consorti-Minzoni (2005, 2006) who reports the history of insurance and that of supervision in Mexico since 1789; Contador and Ferraz (2004), Bernstein (Bernstein, 1998), Levy and Pereira (2007), Cummins and Venard (2007), Abreu and Fernandes (2010) and Bester et al. (2010) who review the history of the insurance industry in Brazil. Comparatively the literature on social insurance programs and social security is larger (Kay & Kritzer, 2001; Mendelsohn, 1954; Mesa-Lago, 1978; Santiso, 2007; Uthoff, 2011) and registers a significant influence from Spain and also from fascism (Paxton, 2004).

Various studies provide a picture on Latin American entrepreneurship (Acs & Amoros, 2008; Amorós, 2011; Brenes & Haar, 2012; Tiffin, 2004). The business history group in Harvard Business School's Entrepreneurial Management Unit has developed a research program on Latin American business history, especially the Southern Cone countries. <http://www.library.hbs.edu/hc/laoh/research-on-globalization.html>

Various authors (Jara, Moreno, & Tovar, 2009; Rojas-Suarez, 2010; Rojas-Suarez & Montoro, 2012) show that the impact of the global crisis of 2007–8 on Latin American countries has been less damaging compared to that of previous crises, thanks to the resilience of the domestic capital markets and to better supervision and regulation of banks (IMF, 2009b).¹⁶

The considerations and findings on insurance are derived primarily from Western experience applied to Latin America. During the centuries, in particular three countries

¹⁶ IMF stands for International Monetary Fund (IMF).

have shaped up insurance development: Italy, in Middle Ages and Renaissance; the UK, from the 16th to the 19th century; and then the U.S.

The historical review illustrates that the development of insurance is connected to that of financial market and linked to entrepreneurship; and underscores how people motivated by innovation and entrepreneurship have fought to overcome uncertainty and shaped rules and institutions for insurance and finance. It is a battle of individuals to control uncertainty.

Contextually, the part of government in the economy is critical and especially important in Latin America.

The chapter covers the historical phase of insurance including its role in the financial crisis of 2007-8; provides considerations resulting from the review that help understand current practices; outlines motivations and factors for insurance development; explains the connection among uncertainty, human action, insurance, entrepreneurship and economic growth; highlights insurance's significance; and the features of Latin America and the role of public policy.

II. The Evolution of Insurance

The history of insurance and entrepreneurship evolved together and is a part of a journey into the KuU (Known, unknown and Unknowable) (Diebold, Doherty, & Herring, 2010, p. 18) to conquer uncertainty.

Insurance's history can be classified into 7 periods.

The first period can be regarded as the prehistory of insurance, stretching from ancient times till the 14th century. It shows at the outset that human action operates and

seeks to protect his/her work and the result of his/her work in various forms. The second period lasts from the 14th century until the end of the 17th century still shows how individuals operate and try to find appropriate forms of protection. This period witnesses the birth of the insurance policy. The third period, which includes the 18th century and first half of the 19th century, sees the extension of insurance products and the emergence of insurance companies to respond more effectively to an increased need of protection. The fourth period - from the second half of the 19th century until World War I - underscores the development of professional financial management, the first insurance groups, and the start of the intervention of government with programs of social insurance. The fifth period between World War I and World War II is an era of business rationalization and mergers. The sixth period -from the end of World War II until the end of the 20th century- is the period of big changes, revolutions and reforms in the World and in Latin America countries and Brazil. This period witnesses greater sophistication and globalization of financial services; closer integration of insurance, capital markets and banking; increasing significance of supervision and regulation in a global setting; larger government intervention in various activities of the economy and particularly with programs of social insurance; privatizations after the renaissance of the doctrines of the private sector and the crisis of the welfare state; appearance of new events and new uncertainties; and improved access to financial services.

The autonomous history of insurance in the countries of Latin America initiates during the third period, at the beginning of the 19th century, when countries of Latin

America become independent from colonial powers. The review of insurance history in the continent shows the government's intense role in market in various forms.

At last, at the turn of the 21st century, the current period begins with the September 11, 2001 attacks on the U.S. along with tragic natural catastrophes that led to an increasing government role for protecting against risks and uncertainties like terrorism and natural disasters. The global financial crisis of 2007–8 and its continuation in 2011–12 in Europe warrants attention because it provides uncontroversial evidence of the crucial role of financial and insurance markets to allow the operations of economic actors. It also reveals the limitations of rational expectations, “Efficient Market Hypothesis” and techniques of modeling of risk that are not able to define human and social behavior and hence transform uncertainty into risk. The crisis also highlights how wrong formulations of risk, shortcomings of supervision and regulation, and a general situation of uncertainty (e.g., determined by human and social behavior, terrorism, catastrophes, policy uncertainty) may break the working of financial and insurance markets, reduce initiatives and lead to more intervention of the government in the economy. In other words, the 21st century uncertainty in its various forms comes at the center stage.

III. Human Action: Entrepreneurship and Uncertainty

The idea of insurance is ancient; it is linked to the deployment of economic activities; and attempts to control uncertainty. As Ferguson (2008, p. 18) indicates “premodern agricultural societies relied much more on efforts to propitiate the gods who were believed to determine famine, plagues and invasions and explain uncertainties”.

The first records of insurance date several thousand years before Christ. Chinese merchants devised a system to shield a cargo from losses due to hurricanes, pirates or anything else that could go wrong at sea (E. J. Vaughan & Vaughan, 2007). The technique was to spread the cargoes among several ships, to make sure that whatever might sink a ship on a particular day would not destroy a fleet of ships sailing for numerous days. This is the first available case of risk reduction through diversification.

The roots of insurance originate in Babylon where traders extended loans for a caravan. These loans were repaid only after the safe arrival of the goods (Sachit, 2009) (Franklin, 2001, p. 259) (Buckham, Wahl, & Rose, 2010, p. 2). A record of risk sharing is found at the time of King Hammurabi of Babylon (ca. 2250 B.C.). This practice, called bottomry, was recognized in Hammurabi's code (ca. 2100 B.C.) and constitutes a clear evidence of insurance (Niekerk, 1999). According to Hammurabi's code, bottomry entailed a loan made by A (lender or insurer) to B (merchant or insured) on B's ship's content and security. The stipulation was that in case the trip successfully terminated, B would pay back the loan with a premium as contractually agreed; but A would have to forfeit the loan in case the ship was lost and A would be left with the ship's empty bottom (i.e., the bottomry). The premium A paid was to cover the risk of loss but also the interest. Bottomry was a system to handle events wherein it was not possible to identify the chance of occurrence. With bottomry, those who travelled by caravans organized themselves to share help against pillaging (i.e., a form of risk mitigation). Merchants gave some of the money to a venture's risk capital. In case the ship sank, the loss of the loan would be shared among several parties that constituted a form of diversification of

risk (Buckham et al., 2010). The significant feature of bottomry was the bundle of insurance and loan, which implies that bottomry is a form of maritime loan that is not a stand-alone contract of insurance. The bundle of loan and insurance requires that lenders and investors have to put managerial attention to peril, market and business risk. With bottomry, borrowers were able to obtain a loan and buy a form of property insurance at the same time. This old instrument presents the connection between insurance and finance that constitutes a topic especially in micro-insurance. Sophisticated versions of bottomry exist, e.g., the so-called cat-bonds linked to natural disasters for which the lender does not get the loan repaid if a natural disaster of a certain magnitude occurs.

Practices of insurance can be found in other civilizations. Phoenicians in their trades used an instrument comparable to bottomry. In ancient Egypt, survivors' legacies were organized cooperatively. In Greece, the owners of slaves could obtain an insurance of the departure or disappearance of slaves against periodic payments. The law of the Romans did not recognize insurance as distinct from loan. However, contingencies in relation to death existed as far back as two thousand years before. Romans utilized societies that made payments for the funerals and burial and to the survivors against the payment of a monthly premium (Millett, Pearce and Struck 2000; Buckham, Wahl and Rose 2010, 4–5).

Already in early times merchants and traders used to protect themselves against happenings that might generate damages and inhibit initiatives (Mises, 2007, p. 105). However, in ancient times an insurance contract did not exist. Also, the coverage provided was not based on probabilities of occurrence of the events (Krüger, Daston, &

Heidelberger, 1987). Despite these limitations, the concept of insurance existed and was operational (Franklin, 2001, p. 273).

IV. The Birth of the Insurance Policy

In ancient societal structures, the extended family was the place for the reduction of uncertainty and for the construction of associations that shared risks. During Middle Ages, the guild played that role; increased of importance; and permeated large part of medieval life (Sachit, 2009).

Following the expansion of European trade and towns, the guilds protected the members from losses, ransom, and burial. Membership to the guild relates to specific characteristic (Dasgupta, 2010). Guilds played a distinct role in the evolution of insurance, as an association created from the need of mutual assistance among people of similar characteristics (e.g., people from the same activity). For example, Danish and Anglo-Saxon guilds in the 11th century provided that losses from fire, shipwreck, or the theft of cattle were compensated by the organization and contributions were made accordingly. Slowly, it was normal to include provisions of “social welfare” to members’ benefit, for example, the operation of a fund for burial.

The guilds respond to the criteria already articulated (Boettke & Coyne, 2003, 2009; High, 2009a) of institutions that are created as response to human needs and in this case to support the initiative and the economic activities as well as the spirit of entrepreneurship. Institutions, like the guilds, evolve, change, and disappear.

Proximity among members is the guilds’ feature that allows people to be aware of each other’s dispositions and characteristics as well. Hence, there are not a lot of problems of

adverse selection. Proximity permits people to observe each other, so they can see what they are about, and hence moral hazard is not a substantial problem. Similar associations exist today for the coverage of micro-insurance, for example among people who are in a particular poor area in large cities mostly in emerging market countries (Vosburg, 2011). In these areas, individuals pay premiums jointly for coverage and obtain indemnities in favor of the people who live in that area.

During Middle Ages, Italy was where numerous arrangements with features of insurance took place, aimed to help economic activity. The first example of a marine insurance contract is dated 1347 and kept at “Genoa Records Office.” Early insurance policy samples are traced from Pisa (1384) and Florence (1397). An emblematic contract, like the one with Francesco Datini (ca. 1355–1410), stated that insurers had the agreement for the assumption of the “risks of god, of the sea, of men of war, of fire, of jettison, of detainment, by princes, by cities or by any other person, of reprisal, of arrest of whatever loss, peril, misfortune, impediment or sinister that might occur with the exception of packing and customs, until the insured goods were safely unloaded at their destination”(Roover, 1945, p. 18f) also see Franklin (2001).

Burglary insurance is a noteworthy contract available in early Middle Ages following Pope Gregory IX’s decree in 1170. It functioned on a restricted scale, limited to the area of Rodez in southern France, a place where that form of insurance survived up to 1789 (Manes, 1942). That contract of burglary insurance is an example of the separation of insurance from financing.

By the 14th century's, marine insurance was widespread among the European nations that had a naval and maritime interest (Winter, 2010). This insurance was the origin of other insurance branches and of the law of insurance. First rulings for marine insurance began in 1435 in Barcelona. In 1549, Emperor Charles V issued requirements for marine insurance. Spain and Italy were ahead in the law of marine insurance during the 15th and 16th centuries, while in the Northern European countries, insurance started to develop at the time of the great discoveries and overseas trade. Consequently, the leadership on insurance activities and legislation moved from Spain and Italy first to Netherlands, then France and in the 17th century to England, and then finally to the U.S. and Germany in the 19th century.

All these different types of agreements of insurance were considered legal during the Middle Ages (Brenner, 1996). Nevertheless, near the end of the Middle Ages, owing to the influence of religion (Franklin, 2001, p. 240), the rules contrary to gambling were stricter so that every insurance transaction was considered a gamble.¹⁷ The attitude was so vehement that insurance agreements were null and void unless the party insured had a veritable insurable interest. The centrality of the insurable interest represents the start of the present policy of insurance. To highlight the significance of the rule, refer to the “credit default swaps” that were at the heart of the current financial crisis. They are in contrast to the rule of insurable interest that disallows disinterested parties from benefitting from an insurance policy. In reality, anyone could purchase derivatives of credit and credit default swaps, which would result in the company's destruction, while

¹⁷ As indicated in the previous chapter, gambling introduces risk where none exists, while insurance mitigates risk where risk exists.

supervisors and regulators were not able to comprehend and supervise the intricacies of credit default swaps and derivatives of credit (Lowenstein, 2011, pp. 158–9).

The evolution of insurance from the first forms of coverage and protection to basic contracts and then to the definition of insurance policy can be regarded as the move towards establishing property rights and dealing with externalities (Demsetz, 1967). In fact, as the possibility of coverage becomes more widespread, insurers intend to delimit their responsibility in a way that is defined in a contract or policy. In addition, contracts and policies reduce transaction costs (Coase, 1937; Demsetz, 1967). Contracts and policies also imply setting prices to reflect the value of the service of insurance so that exchanges are mutually advantageous and are facilitated. Here the issue of the fair price of insurance arises, i.e., the price that assures mutual advantages from the exchange. The argument is that setting an unfair price – as happens in emerging country economies- will lead to under provision of insurance. This issue is discussed later.

Researchers have studied the early growth of insurance. Bernstein (1998, p. 95) argues that “the profit on an investment in goods that must be shipped over a long distance depends on many factors and forecasting was a necessity for the insurer (e.g., using statistical and mathematical models to assess probabilities)”. Nevertheless, history displays abundantly that insurance products do not wait for a model (Buckham et al., 2010, p. 5). Franklin (2001, p. Preface) indicates that “humans have coped with uncertainty without the benefits of advice of mathematicians before (and after) Pascal’s discovery of the law of probabilities.” Hence, insurance contracts are introduced before the support of researches and assessments of the risks, but depend on human action of

individuals who assess risk based on operational experience and opportunities of implementation (Krüger et al., 1987).

This shows that entrepreneurship relates to insurance as well, and people start a business like the provision of coverage. They do so following alertness of (Kirzner, 1985), grabbing market opportunities (High, 2009a, p. 25) and selling protection in favor of other peoples (Reinmuth & Lewis, 1970). Entrepreneurs act in the face of uncertainty, the source of their reward (Mises, 2007).

V. Organization and Transaction Costs: the Insurance Companies

In the 15th century, the action moved from the Mediterranean to North of Europe where economic activity and innovation flourished and businessmen found it easier and cheaper to undertake projects. A support structure for these activities started to shape up and insurance companies came to the fore.

The motivation of the further evolution of the insurance business and the creation of companies is found in the work of Coase (1937). In fact, in line with the reasoning of Coase, firms emerge in the insurance business to reduce the transaction costs -search and information costs, bargaining costs, keeping secrets- -that the individual players, e.g., brokers, merchants individually had to bear. These costs are handled better using a firm.

Before the corporations' formation devoted only to writing insurance contracts, numerous persons were underwriting insurance products assuming risk in an amount indicated below the proposal of insurance, leading to the term "underwriters" (Sachit, 2009). At an earlier stage, groups, loosely connected as the opportunity arose, or more

structurally united into companies, or societies, started to operate and offer policies. William Gibbons of London, in January 1536, was the first beneficiary of a life insurance contract, i.e., a 1-year policy that meant that Gibbons beneficiaries would get £400 sterling in case of his death for a £32 sterling premium (Buckham et al., 2010, pp. 1–7). Probabilities were not the bases for that contract, i.e., the initial tables of mortality were produced a century later. This circumstance supports the view that man acts under situation of uncertainty, i.e., “the uncertainty of the future is already implied in the very notion of action”(Mises, 2007, p. 105). Gibbons died and underwriters paid the indemnity. The example illustrates that insurance operations are complex and have costs that a firm could handle and manage in a more effective way than single individuals (e.g., merchants/traders) who underwrite the risk (Coase, 1937).

In passing, the example of the life insurance for Gibbons shows that the line demarcating insurance from gambling is thin, especially when the contract is not based on a clear understanding of the event and knowledge of the probability of its occurrence; and the insurance of life is not completely recognized on moral grounds (G. Clark, 1999; Zelizer, 1983). Sandel (Sandel, 2012) understands that the purpose of life insurance is to ease the economic consequences of death for the survivors. However, Sandel argues that in many European countries life insurance was not easily accepted and regarded as even illegal as it was held a form of betting against other people's lives and thus close to gambling (Sandel, 2012, pp. 131–62)¹⁸. A deeper analysis of various types of life

¹⁸ The Workmen’s Compensation Act of 1897 in Britain (see section below on Insurance Activities) required employers to insure their employees against industrial accidents. However, the beneficiaries were the survivors of the employee and not the company that in the cases cited by Sandel becomes the beneficiary of the death of its employee.

insurance policies even in contemporary times like "viaticals", "dead peasants insurance" or "janitor's insurance" (Sandel, 2012, pp. 144–9) shows that the insurable interest was missing.

In the UK, traders and owners of ships started to have meetings at a coffeehouse, in London, near the dockyards that Edward Lloyd named Lloyd's (A. Brown, 1987). They decided to divide gains and costs. There were people more interested and willing than other people to put more money on potentially dangerous trips. They would find a way to gauge the risk and then underwrite the trip. Even though insurance was first created for the cargo of a ship, merchants in London started to cover other activities and events, e.g., fire. These people were forerunners of the international insurance that nowadays provides coverage to almost everything. At the end of the 18th century, Lloyd's became a leader in the sector and hence a market of insurance started developing in London. Thus, the logic of Coase on the role of the firm was fully applied: as the complexity of the business of insurance increased, a more efficient approach was necessary.

Hence, in 1667, the first insurance company was created, in Paris. The Great Fire of London that the year before had destroyed some 13,000 homes and left hundreds of people homeless gave the impulse to make the business of fire insurance more efficient and responsive (Pearson, 2004). In the mid-18th century, the first company operating in the field of life started in England. Towards the end of the 18th century the development of agriculture motivated the emergence of the insurance of livestock. In Scotland, in 1745, two churches set up the first account grounded on financial and actuarial standards

and the calculus of death expectancy. A relevant circumstance was that premiums were invested and beneficiaries would be compensated based on the proceeds of the investment. This is the first case of investment of the premiums (Ferguson 2008, 191–95).

In the New Continent, in 1735, in Charleston (SC), the first insurance company was created in North America (Wertheimer, 2006). The company was an owners ‘association to share the losses to their houses due to fire (Cummins & Venard, 2007). The company stayed in business for five years. In 1752, Benjamin Franklin instituted the Philadelphia Contribution for the Insurance of Houses from Loss by Fire to spread the risk and develop perpetual insurance against fire. The company made several contributions on the area of prevention (particularly in the area of fire). The company did not provide coverage to houses and buildings that did not follow standards and where the risk of occurrence of the event (fire) was too high, like wood houses. In 1787, fire insurance was formed in New York and in 1794 in Philadelphia (Sachit, 2009). In 1759, the Presbyterian Synod of Philadelphia created the first life insurance corporation in United States, which operated in favor of the ministers of the Synod and their families (Sachit, 2009; Zelizer, 1983). Similar groups witnessed formations and split into several firms. Many were based in Hartford (e.g., Aetna, Travelers).

As these firms grew in resources, credibility and comprehension of the practices of sharing risk, they started to present insurance coverage in different areas. As insurance companies wanted to meet people around the county and sell them policies, they appointed agents to operate insurance on their behalf. This started the system of agency

for insurance, still operating in the US nowadays (McCosker, 1945). In addition, as the business of insurance was becoming more complex, the first regulations were issued. During this period, regulation of insurance emerged, for example, in 1681 the French Ordonnance was issued and constitutes the first government regulation in the field of marine insurance (Manes, 1942).

In Latin America, Spain imposed its system on the Latin American countries including its model for insurance (Oszlak, 1981). Maddison indicates that the “significant differences between the growth trajectories of Latin and North America are related to the impact of colonialism on institutions and social structure”. He adds: “Spain focused its colonial activity in Mexico and Peru, i.e., the most densely populated places at the time of the invasion. Aztec and Inca elites and their priesthoods were eliminated; old gods, calendars, records, property rights and indigenous institutions wiped out; churches and convents built on the ruins of Aztec and Inca temples. Land was assigned to the privileged elite of Spaniards who was given the control of the Indian population, which supplied labor to mines and agriculture. There were rigid social distinctions between the ruling elite and the indigenous population, which had no legal rights, access to education or land. The main aim of this tribute imperialism was to transfer a fiscal surplus (in precious metals) to finance government aspirations in Europe.” (Maddison, 2007, pp. 493–4)

By the year 1825, all Spanish-American colonies with a total of 14 million people became independent states. The new states got the deep inequalities of the period from colonialism.

Portugal had a more rational approach in Brazil, creating export agriculture dependent on plantations of sugar, with only loose imperial control. As there were few indigenous workers, slaves were shipped from Africa. Between 1500 and 1870, 3.6 million slaves arrived in Brazil. Towards the end of colonialism, 50 percent of the population was in slavery. Brazil ended slavery and became a republic in the year 1889.

The Netherlands and U.K. followed the same approach in the islands of the Caribbean they got from Spain in 17th century. The colonies specialized in production of sugar, and were importing most of the food. By the year 1820, 3.7 million African slaves arrived in the Caribbean islands. In the 17th and 18th centuries insurance developed rapidly along Dutch and British commercial expansion (Martin, 2010).

The expansion of insurance in Latin American countries started with insurance covering trade undertaken by sea with Europe. It was taking place with the creation of local companies connected with their counterparts in the European country.

Insurance as it stands today began around the mid of the 17th century, when the theoretical bases for insurance started and the importance of the support of research for insurance operations began to be recognized. Stigler (Stigler, 1990) underscores the role of research and measurement, and dedicates a large part of his analysis to how probabilities, throughout history, have been dealing with uncertainty. However, he also recognizes the intuition of the insurer.

Research and studies on mathematics, statistics, and probability and their relationship with insurance were developed by towering individuals that between 1650 and 1800 create the basis to define insurance policies and products based on assessments, expectations and calculations (Bell, 1986). In this respect, Franklin (2001), Ferguson (2008, pp. 189–201) and Bernstein (1998) outline several individuals and breakthroughs, especially in the areas of mathematics, statistics and probability. In the mid of 17th century, Blaise Pascal, together with the mathematician Fermat, constitutes a landmark in the discoveries of the theory of probability (Bell, 1986, p. 86). Another key individual, John Graunt (1620–74) (Graunt, 1975), created the science of demography, i.e., human populations’ statistical study. He analyzed critical statistics, especially the birth and death compilations in London between 1604 and 1661 that would result in the life expectancy tables. In 1693, following Graunt’s work, the astronomer Edmond Halley (1656–1742) formulated the first life expectancy and mortality tables, (<http://www.pierre-marteau.com/editions/1693-mortality.html>) (Henderson, 2009).

In 1756, Joseph Dodson (1696–1772) rectified the tables and made it possible to adjust the insurance premium according to the person’s age, while before people paid the same premium, irrespective of the age. Edward Wigglesworth (Vinovskis, 1971) - considered one of the founders of the actuarial science- prepared the first table of life expectancy in the U.S. The work of Jacob Bernoulli was very relevant as he presented the ‘Law of Large Numbers’ and then formulated a mathematical confirmation, included in *Ars Conjectandi* (The Art of Conjecturing), in 1713 and later was named the “Bernoulli’s Theorem”. Abraham De Moivre enunciated the normal distribution (“de Moivre,

Abraham,” n.d.) (Walker, 2006). Subsequently, De Moivre investigated infinite series, the application of probability to mortality statistics, and the creation of the theory of annuities (Stigler, 1990). Gauss defined the normal curve (Gauss 1809). Daniel Bernoulli (1713–1782) presented the theories of utility and risk. Thomas Bayes (Joyce, 2008) set the basis for further statistical development in the area of probability.

Against this background, while recognizing the role of research, Austrian economists consider that uncertainty is inherent in human action. Insurance is the transfer and pooling of risks based on a whole class of probability and insurance is undertaken even in situations of uncertainty (Mises, 2007, p. 109; Rothbard, 2011a, pp. 552–6, 2011b). In fact, history shows insurance policies were issued in absence of knowledge; it also shows that pioneers of insurance and entrepreneurship encountered failures and difficulties. This gives evidence that it takes some time before an insurance operation becomes widespread and accepted (High, 2009a).

However, during this time, key concepts of insurance appear: “the event of misfortune to a thing can be sold independently from the thing itself; the premium of an insurance policy represents the quantification of the risk involved; the profit can be made from estimating the risk correctly; the premiums are invested” (Franklin, 2001, pp. 273–4). It will take time for these practices to become principles.

VI. Growth, Management and Social Insurance

In the 18th century, Anne-Robert-Jacques Turgot (1727–81) and François Quesnay (1694–1774) — labeled the physiocrats (Buck, 2010) - reassessed the role of the individual in opposition to the dominant mercantilism. The disappearance of guilds led to

a revaluation of the role of the individual. The realization of the individual became a driving force that encouraged people to trace new protections and insurance forms. Increase in activities that were insured encouraged the necessity for a management approach that was more professional. By the 19th century's end, political and social issues became evident and the greater role of workers prompted the intervention of government in the economy with special provisions and social programs.

In this period, substantial developments took place around the world, and economic activity and insurance advanced together.

The experience of the last decades of the 1700s and during the 19th century, particularly in the U.K. and also in the United States, provides an opportunity to researchers to monitor the relationship among financial services including insurance, economic activity and growth (Lee 1987; Barras 1986, 1990; Cain and Hopkins 1993; Rubinstein 1994; Lee 1990). Huge capital amounts would not have been invested without removing some of the risks by recourse to insurance. Hence, large-scale industry, insurance and finance have been interacting in their way ahead and the insurance policies' availability facilitated investments. In the 19th century, the expansion insurance firms kept up with the rise of banking. Large increases in insurance amounts, an amazing capital asset growth and development of trade were the main characteristics, particularly towards 1875 (Manes, 1942, p. 43). The advance of insurance favored the expansion in transportation and industry while better communications and knowledge speeded up the process. Under these circumstances, for the insurance business, the model of the joint stock company became more apt than that of the private company.

i. Expansion of Insurance Activities

During the 18th century, there was a further expansion of the role of insurance.

Around 1830, risks started to be better defined and classified (Manes, 1942).

After 1840, several factors including less attention to religion helped the boom of life insurance. At about the same time in relation with the development of railroads, accident insurance acquired popularity in Europe. Cuthbert Heath (1859–1939) formulated non-marine insurance at Lloyd's and is given credit for as the father of non-marine insurance (A. Brown, 1980). He went on to bolster Lloyd's reputation in the U.S through the payments of all claims coming from the San Francisco's earthquake and fire of 1906, regardless of how the policies were written.

The year 1876 saw the introduction of liability insurance. Damage insurance to plumbing and plate glass followed, and then other branches emerged. New types of insurance coverage were added, primarily for the protection against losses due to acts of people, like burglary. The 'Workmen's Compensation Act of 1897 in the U.K made compulsory for employers to cover employees against accidents. Public liability insurance appeared in the 1880s, and got major significance with the diffusion of the car. Hence, insurance products were issued for natural calamities, and actions related to human choice like negligence. These policies prompted the coverage of a great number of risks.

Insurance activities also grew in Latin America. According to Levy and Pereira (2007), "insurance is one of the oldest fully regulated economic activities in Brazil, beginning among the Jesuits in the 16th century with Father Jose de Anchieta, who

funded “means of assistance” without a proper policy by using mutualism” (A. Levy & Pereira, 2007, p. 782). The first published insurance law was a document dated 1791 by the Portuguese king that officially began the activity of insurance in Brazil submitted to Portuguese regulation.

Even so, the “independent” history of insurance in Latin America begins in the mid-1800s. According to Abreu and Fernandes (2010), “the history of insurance companies in Brazil began in 1808, when two insurance companies were founded in the province of Bahia: the Companhia de Seguros Boa Fé and Companhia de Seguros Conceito Público. The development of the insurance business was slow, due to limited economic opportunities and political and institutional instability, e.g., Brazil became independent from Portugal in 1822, and inherited a weak institutional and political framework from Portugal. The first activities were in maritime insurance linked to the traffic of coffee and also related to the traffic of slaves, which were very popular in Brazil” (Abreu & Fernandes, 2010, p. 6).

During the 19th century, insurance expanded in Latin America and foreign companies could open and operate through the agency system. In that form, British, Swiss and German firms began operations in South America. This was owing to the promising Latin American market, and to the trade with European Continent; e.g., Argentina was a fertile ground for U.K. commerce (Daudin, Morys, & O’Rourke, 2008). Local insurance companies, like Estrella in Argentina, reacted negatively against foreign insurance companies.

At the beginning of 1900, following independence, Latin American governments took nationalist attitudes and in the insurance sector imposed restrictions and limitations on foreign insurance firms, e.g., purchase and deposit of local securities. At the root, there were local companies that lobbied congress (C. A. Jones, 1984, p. 114).

Furthermore, following the interventionist attitude that was ubiquitous in the continent, many governments of Latin America decided to control insurance firms. For example, in 1924 the 'National Insurance Bank' was formed in Costa Rica as a monopoly of the state for the provision of insurance and banking services.

At the end of the 19th century, governments had assumed a bigger role in insurance. In Brazil, tight regulations were issued to limit insurance operations and hence profitability, e.g., obligation of retention of funds in the country. Regarding government intervention in the economy, the example of Argentina is illustrative. Despite modeled after a free country¹⁹, the political reality moved Argentina as well as other Latin American countries toward protectionism and state intervention, which did not support development (C. A. Jones, 1984, p. 120).

The expansion of insurance and the new requirements and demands move the insurance industry and governments into two main directions: better management and more programs of social insurance.

ii. Management

Development of the industry of insurance needed a robust professional management from operational and financial viewpoints, i.e., insurance firms began to

¹⁹ The 1854 Argentinian Constitution was formulated along the lines of the U.S. Constitution.

organize themselves in a sound way to react to the requirements of an expanding economy.

From a financial viewpoint, New York Fire Company stresses the prerequisite of adequate reserves to meet needs and liabilities (1835). Following that move, Massachusetts is the first state where firms were required to post reserves for losses (1837) (Sachit, 2009). The 1871's Great Chicago Fire caused destruction and highlighted the fires' costly nature in compact cities and hence the significance of prevention and appropriate reserves. In those years, reinsurance constituted a growing activity (Gastel, 2004) that was crucial to the further expansion of insurance. Reinsurance began in several insurance lines and was introduced to avoid financial problems in case of catastrophes and disasters (Doyle & Ericson, 2004, pp. 35–6).

From an operational viewpoint, associations among insurers and the reorganization of firms intended to put the industry in position to satisfy the demand. The main forms were insurance trusts that often operated globally (Manes, 1942). Moreover, insurance business's rationalization takes place in various ways: under the two alternatives of the agency and the branch systems, standardization, specialization and stock firms.

With respect to the operational transformation, two different systems are: the insurance brokerage and the insurance agent (or branch-office system). The insurance brokerage system is the so-called system of canvassing that was initiated in the U.S. and foreign companies introduced it in Latin America. The broker is not linked to an insurance company but represents the customer.

The agency system implies that the insurance agent is an insurance company's representative by way of agent-principal link. The agent's primary loyalty is with the insurance carrier. The system of agency or branch-office system basically assumed two forms: big firms (mostly European reinsurance firms) established branches engaged in the business of insurance; or numerous organizations, apparently different but connected by personal bonds, came to the fore to work on different insurance branches. The two forms of organizations of the insurance business have established themselves during this period and supported the growth of insurance. In United States as well as in other Anglo-Saxon countries both systems operate and increase competition. In European and in Latin American countries the agency system prevails.

During this time, insurance firms moved towards a progressive specialization through combination of several products, and also through the combined working of different divisions of insurance, and the result was a noteworthy overhead cost reduction. Along these lines, one sees the customers' progressive classification in line to the social status, and as a consequence insurance firms specialize to particular professional categories. Rates of premium and other conditions differed from firm to firm, depending on the category of people served.

As insurance firms were managed more efficiently, they started the standardization of provisions for the premium level, including periodic payment (Manes, 1942). This gave incentives to insurance firms to cater to certain professional categories, which were thought to have the similar needs. However, standardization of insurance was not widespread, which made it difficult to compare prices and services that various

companies offered. Standardization is still relevant among the “mutual”, cooperatives and organizations that are community-based operating in the field of micro-insurance and strive for standardization. Stock firms started to adopt some principles of mutual firms, e.g., paying dividends to policyholders (Manes 1942), while incorporating into their statutes some of the advantages offered by stock firms.

Coase and Desmetz (1937; 1967) help to explain the transformation and rationalization of insurance companies in this period. Given several technological changes, and a greater demand for coverage, insurance companies reduced transaction costs in the delivery of their products. In addition, they delineated property rights around the insurance contract and hopefully arriving at offering coverage at fair price.

iii. Social Insurance

Toward the 19th century’s end, the rise of the working class and its expanding political significance created more standard requirements; thus, programs of social insurance started with the support and resources of the public sector. At the same time, insurance plans suitable for small businessman were introduced. During the 19th century, “friendly” and “beneficence” organizations materialized to protect health and lives of members, and several of these organizations provided members-only, low-cost insurance (Bernstein, 1998; Sachit, 2009). Nowadays, labor organizations and friendly societies continue offering insurance coverage and many employers back policies of group insurance for employees, including life insurance as well as health, and other forms of coverage.

In Germany, the first chancellor, Otto von Bismarck formulated the first welfare state operations. Bismarck implemented social legislation to preempt socialist programs (Eghigian, 2000). The goal of Bismarck was to approve the minimum features of the programs, tolerable to the German government, without any visible socialistic pieces, suitable to increase productivity and achieve political consideration. These programs involved health insurance, accident insurance (workmen's compensation), disability insurance and old-age retirement pensions. The Reichstag approved legislation to deal with health insurance (1883); accident insurance (1884); and retirement pensions and disability insurance (1888) (Ferguson, 2008, p. 203). With the legislation of social insurance of Bismarck set the stage up for greater state intervention.

However, while Germany started government intervention in social legislation, it was the Japanese who generated an enormous welfare state (Shibata, 2008).²⁰

Social programs in Latin America were modeled after those of Portugal and Spain, which had influences from the French system.²¹ In 1819, Simone Bolivar strongly advocates social security as a way of achieving happiness, social security and political stability and influenced substantially the social programs of Latin American countries.

With insurance becoming more established, there existed a trade-off between the benefit of uncertainty reduction and promoting economic initiatives, and the people's tendency to become less active and entrepreneurial and instead depend on the

20 Cutler and Johnson (Cutler & Johnson, 2004) identify key factors (e.g., strain from expanding capitalism; need for political legitimacy; increased wealth; and the outcome of leviathan government) that led to the adoption of national old-age insurance and health insurance programs. They find weak evidence that these factors explain the adoption of old-age and health insurance and conclude that social insurance can be politically expedient for many different reasons.

21 As mentioned, the English influenced the development of insurance markets in Caribbean countries.

government: “There is nothing to gain by idleness Men must be active persevering and energetic” (Hunt, 2003, p. 775). However, it is interesting to know that the social security programs of Bismarck and the ideas of Bolivar (Ferrara & Tanner, 1998) were politically driven and there is little concern and opposition (except some opposition inside Bismarck’s party quickly dismissed) to the introduction of social programs similar to what comes almost 200 years later, i.e., the possibility of obtaining low-cost insurance, e.g., Social Security, reduces the incentive to pursue entrepreneurial activities (Ilmakunnas & Kanniainen, 2001).

VII. Rationalization and Internationalization

From 1919 to 1923, the years of hyperinflation were destructive for the business of insurance (Evans, 1987) that cannot properly function if the currency of reference is not trusted. Devaluations hit hard insured and insurer: they faced an impact on claims paid and on accumulation of reserves. As a matter of fact, the period associated with reimbursements for the war was less disruptive than one could have thought (Butt, 1984, pp. 155–72). Despite the massive number of deaths, none of the life insurance firms postponed payments. The difficult situation created a series of impacts: insurance firm combinations to increase funds available and reduce costs; realization of research as a relevant field and also as a tool to increase funding. These constitute powerful motivations for rationalizations in the form of mergers, combinations and integrations (Barr et al., 2006; Bouwens, 2007; Cheffins, 2003; Lipton, 2006).

Combinations intended to achieve rationalization of insurance operations produced (Pearson 1997a, 2004): (a) an increasing tendency toward risk specialization

and individual judgment gradually substituted the collective experience of insurance companies; (b) an inclination toward integration of several insurance branches within one firm; and (c) an attractiveness for group policies. The same process of rationalization with integrations and combinations was taking place at the global level.

In most countries, as Barr and other authors (2006) indicate, the wave of integrations was such that the control of the financial apparatus became concentrated in the hands of few people who had multiple functions (e.g., with finance and with the industry). According to Barr and other authors (2006) those who achieved an extraordinary level of power and prestige, for instance, the Rothschild family, included multiple interests: bullion brokering and refining, commercial bills, commodity trading, foreign exchange trading and arbitrage, insurance, personal banking, in more than one country.

Progresses in research and studies of insurance continued and started to complement the improvement made in the operations of insurance particularly during the second half of the 20th century. Discovery especially in the natural science, statistical and mathematical fields increasingly influenced the operations of insurance. The German Insurance Association (Gesamtverband der Deutschen Versicherungswirtschaft) – with members from more than 40 countries- promoted the role of science for the insurance sector since 1900 and established a link with universities where new findings were announced. Japan took a similar strategy of linking research and insurance operations (Pearson 1997a, 1997b).

The continuous expansion of insurance companies required more government intervention.

VIII. The Era of Big Changes: the Second Part of the 20th Century

A. Role of Government: Overview – Advanced Countries

Since late 19th century, government has kept on entering the insurance field, especially with the goal of safeguarding workers with respect to sickness and disability, unemployment and old age (Sachit, 2009). Political motivations were behind this intervention that had also the goal of reducing uncertainty. The First World War and The Great Depression government intervention in the economy amplified the amount of governments' securities that insurance firms among others subscribed. In World War II, the US government gave life insurance to armed forces, pensions for government employees and veterans. Government tried various forms of crop insurance, until Congress introduced the 'Federal Crop Insurance Act of 1938' (Kramer, 1983).

From World War II through the early 1980s, intervention of government was widespread, resulting from Keynesian policies (Pugh, 1996). Private-sector doctrines of the early 1980s and the tumble of communism of late 1980s started a new era.

Social insurance and reinsurance were the main forms of the direct intervention of Government in the insurance markets. Indirect intervention involved supervision and regulation. Direct intervention was typical in European and emerging markets, while indirect intervention distinguishes Anglo-Saxon countries. Governments also intervene

by means of the tax code with tax deductions for particular policies. Social insurance constituted the main area of intervention, especially in Latin America and Continental Europe.

In the 1980s, the application of private-sector doctrines led to a progressive reduction of the role of government in the economy (Cerny, 2008; Giddens, 2000) and to the formulation of private alternatives that gave a fresh foundation to capitalism (Doyle & Ericson, 2004, pp. 6–7). The policies started in Great Britain and in the U.S., and then spread into other countries, including emerging markets. In the financial markets, the 1980s saw a theoretical revolution (Fama, 1965; Lintner, 1965; Markowitz, 1991; Sharpe, 1964) that stimulated deregulation, and liberalization (Cassidy, 2010, p. 86). Efficient market theories created innovation and owing to technological advances sophisticated models to operate especially in financial markets.

Following the devastating crises of the 1980s, the privatization policies reached Latin America in the 1990s. To recuperate for the “lost decade” (Fraga, 2004; Korzeniewicz & Smith, 1996), many Latin American governments went at the forefront in the liberalization and privatization of their economies. In that context, it took place the introduction of pension plans based on personal contributions, with limited government cost.

B. The Intervention of Government: Latin America

The government intervention in the economic activity in Latin America took place in various forms since independence and basically lasted till the end of the 1980s (Santiso, 2007). “The political theory of the state and the role of government in Latin

America derive from colonial countries, i.e., Spain and Portugal and Continental Europe in general, which regarded government as good, natural and necessary for the welfare of society” (Wiarda & Kline, 2010, pp. 59–61). This is in stark contrast to the American and Anglo-Saxon viewpoint that government is an evil that is necessary, but must be limited (H. L. A. Hart, 1982).

The intervention of the government on the economy was in line with the policy recommendations of CEPAL (Comisión Económica para América Latina)²²: “Many Latin American governments adopted policy recommendations of CEPAL in an attempt to speed industrialization ...protection and subsidies for local industry and political representation and welfare for the masses” (M. Reid, 2008, pp. 78, 118–20). Government intervention reached its peak in the 1960s. Protectionism, heavy government interventions along with a weakly diversified export sector dependent on primary commodities and the swings of their prices, made Latin American countries also dependent on foreign savings. However, the economies were always fragile and volatile and foreign loans could drain at the first signs of crisis. Moreover, the recurrent crises made low-income people to suffer significantly more (Miguel Braun & di Gresia, 2004).

The countries of Latin America have always been inclined to introduce programs of social insurance to safeguard the population’s poor segments. The programs were enacted primarily for political reasons after the European models, with no attention to the financial impact on a region exposed to economic crises. In this regard, Brazil is a relevant example of government intervention that influences market development.

²² In English, CEPAL’s name is the Economic Commission for Latin America (ECLA), which was established by the United Nations Economic and Social Council Resolution 106(VI) on February 25, 1948, and began to function that same year.

Public policies toward insurance fluctuate between direct intervention and regulation and supervision.

i. The End of the 19th Century

The Brazilian economy, highly dependent on coffee and exports, suffered recurring crises in the world markets. However, from 1850 and until the 1920s the Brazilian development was quite substantial. Significant industrialization occurred in the 1890s, urbanization and modernization of the infrastructure and diversification of coffee planters.

With respect to insurance, despite the dependence on coffee, insurance of crops did not occur in Brazil at that time (Graham, 1972, p. 91). The price of coffee was volatile owing to the conditions of the weather and the characteristics of the crop, and insurance was used only for coffee trade business, i.e., maritime insurance. According to Abreu and Fernandes (2010), Joaquim Murinho played a significant role as finance minister of Brazil (1898–1902) with relevant impact on the insurance sector. At the end of the 19th century, he implemented a program of stabilization that arrested the devaluation of the currency and led to the recovery of external credit; introduced the first comprehensive legislation regulating insurance.

Among the crucial parts of the legislation was the establishment of the General Superintendence of Insurance Companies (Superintendência Geral de Seguros), under the Finance Ministry, which was split into the Superintendence of Maritime and Non-Maritime Insurance (Superintendência de Seguros Marítimos e Terrestres) and the Superintendence of Life Insurance (Superintendência de Seguros de Vida). The

superintendence supervised insurance firms, gave advice to the ministry on charter issuance (*cartas-patentes*), i.e., all insurance firms must apply for a license. Fees paid by the insurance firms are the primary sources of funding.²³ The legislation envisioned to make the operations of insurance safe by instituting a supervisory body; establishing limits to the issue of insurance products (i.e., up to 40% of the company's capital); and ascertaining that funds would not be drained to other markets. Insurance companies could not enter reinsurance activities. The specific goal was to maintain funds in Brazil. However, the provision reduced the possibility of spreading risks and was discriminatory vis a vis foreign insurance companies. Abreu and Fernandes (2010, pp. 22–3) argue that the domestic financial market was not developed enough to absorb all funds from insurance companies.

The negative attitude toward foreign companies was widespread in Latin America. The dominant view (Abreu & Fernandes, 2010, p. 10) was that overseas firms kept “impenetrable secret about their processes, reserves and capital”—a sentence attributed to Joaquim Murinho, the Brazilian finance minister. Foreign companies were accused of tax evasion, and unlawful transfers of funds. In addition, there was the lobby of domestic insurance companies and many believed that the departure of foreign companies would leave more room to Brazilian companies, e.g., in this respect, during 1901-02 as overseas firms exited the market, Brazilian firms enhanced their capital. Following the introduction of the new regulations, overseas firms restarted working in Brazil; their

²³ Companies were also asked to deposit 200 Contos de Reais—the local Brazilian currency at that time—to guarantee compensations from possible losses.

overall market share was 8.6 percent, and the size was smaller than that of Brazilian companies.

ii. The First Half of the 20th Century

Up until 1925, the Brazilian economy performed relatively well. Then the Great depression and War World II came and had negative impact on the economy. After 1942, an era of high economic expansion started (GDP growth of 7 per cent per annum, population expansion of 3 per cent per annum) and lasted for two decades.

Inflation has always been a problem; it rose in the last War years to touch twenty percent annually, followed a decrease in the period immediately following the War, and became chronic in the 1950s and 1960s. The lack of independence of the Central Bank of Brazil from the government and the ensuing printing of money to finance government's deficit constituted the structural problem at the root of the massive inflation.

The other relevant point for Brazil was that despite its strategy towards manufacturing, the economy was based on agriculture with little export diversification. Balance-of-payment's issues were aggravating the situation as the cyclical fall of coffee prices resulted in difficulties of balance-of-payments, grave debt service payments during the years 1961 and 1962 and subsequent rescheduling (Abreu & Fernandes, 2010).

The Great Depression of 1929–32 had a severe impact on Brazil. Loans to Brazil plunged in the middle of the year 1928 after the financial squeeze encompassed by FED of the United States, which ended in 1930. Exports of Brazil plummeted as price of

coffee dropped. The end of the gold exchange standard had negative repercussions on devaluation, foreign exchange availability, public accounts and coffee prices.

During the Great Depression, a new wave of nationalist rules favored autarky and intervention of the government in regulation and supervision and also in the market as direct provider of goods and services. As part of the escalating nationalism, and following the Constitution of 1934 and that of 1937, foreign firms in water resources, mining concerns and mineral were nationalized. Shareholders of insurance firms and banks had to be of Brazilian nationality.

The government started to intervene in the market for foreign exchange, setting an “official” overpriced rate of exchange and rationing foreign exchange access by establishing foreign exchange controls. The policies of intervention in the foreign exchange markets remained in place for more than 60 years, into the ‘90s.

In line with government intervention in the year 1953, the new Banco Nacional do Desenvolvimento Econômico (BNDES) was partly funded by transfers from an increase in social insurance institutions’ technical reserves and the reserves of saving societies (caixas econômicas), and insurance firms.

With respect to insurance, using data from (Abreu & Fernandes, 2010), Table 2 shows the evolution of the insurance activity in Brazil between 1900 and 1925. Table 2 displays the prevailing role of maritime insurance and the relative few number of life insurance companies. Table 2 also illustrates that foreign companies were not relevant in Brazil until the first quarter of 1900. The trend of the level of premium until 1925 confirms that maritime insurance constituted the core of the business.

Table 2-Development of Insurance Activity in Brazil

Development of Insurance Industry in Brazil (1900-1925)												
Type of Insurance	Total Companies			of which Brazilian			of which Foreign			Total Premium US\$ Millions		
	1900	1918	1925	1900	1918	1925	1900	1918	1925	1900	1918	1925
Life Insurance	8	31	19	7	30	18	1	1	1		6	6
Maritime and non Maritime		57	74			45			29		5	12
Total		88	93	7	30	63	1	1	30	5.85	11	18
Overall Market Share					78.90%	76.80%					21.1%	23.2%

Source: (Abreu & Fernandes, 2010). Values converted from Contos de Reais into US Dollars.

There was no contraction of insurance business in the whole period until 1942. After 1942, Premium to GDP was moderately moving up ((Abreu & Fernandes, 2010, pp. 20–1).

During World War I, the government issued the Civil Code that came with an entire chapter devoted on insurance. It covered all insurance branches, i.e., “maritime and non-maritime insurance,” “life insurance” and “mutual insurance”, and constituted an improvement over the previous 1850 “commercial code,” limited to maritime insurance. In 1919, insurance received a boost with the introduction of work accident insurance.²⁴ In 1920, foreign and domestic insurance companies were placed on an even ground without discriminations; and the control over the insurance market was lessened.

²⁴ Employers’ judicial responsibility for work accidents was legally defined to protect mostly urban workers. The legislation defined the type of policies insurance companies could offer: “death,” “total or permanent handicap,” and ‘total or permanent handicap for work; compensations for “death” and “total or permanent handicap” was equal to the sum of three years of the employees ‘wages.

The nationalist attitude led to the creation of the state-owned Instituto de Resseguros do Brasil (IRB; Brazilian Re-Insurance Institute), which had hegemony over the reinsurance and the insurance business for more than 50 years. The government's intervention in the market of insurance was aimed at containing the outflow of funds abroad due to payments for reinsurance (Abreu & Fernandes, 2010). In 1939, Decree Law 1186 of 3.4.39 gave IRB the total domination on reinsurance and redistribution of business; imposed operational limit to insurance companies; established that the tables of retention needed the approval of the Departamento Nacional de Seguros Privados e Capitalização (DNSPC).²⁵ In early 1940s, it became mandatory to reinsure with IRB part of the coinsurance business. The decree also imposed limits and restrictions on insurance companies operating in Brazil.²⁶ Restrictions to acceptances of insurance depending on assets were discriminatory toward foreign firms.

iii. Stabilization and the Economic “Miracle”: 1964–Early 1980s

The coupling of inflation and the downfall in the economic activity in a politically unstable situation led to 1964's coup. The new military regime remained in power more than 20 years and implemented bold economic reforms: reorganization of the public sector and public finances; reduction of expenditures; financial reforms with creation of government debt denominated in domestic currency. Important legislation was issued concerning housing, job stability, social security and foreign exchange regime simplification. Despite reduction in anti-export prejudice and lesser restriction over

²⁵ The IRB was not under the DNSPC's supervision since it was a government-controlled institution.

²⁶ The criteria to classify an insurance company as foreign were not made public.

Foreign Direct Investments (FDI), Brazil remained a closed economy with considerable intervention by the government.

In the insurance business, various institutional changes were implemented, with the primary objective “to avoid the drain of foreign exchange.” In 1996, the legal framework was changed with the creation of the Private Insurance National System (Sistema Nacional dos Seguros Privados, SNSP) comprising the National Private Insurance Council (Conselho Nacional dos Seguros Privados, CNSP), the IRB, the Private Insurance Superintendence (Superintendência de Seguros Privados, SUSEP), and insurance companies and brokers.

CNSP’s duties include definition of insurance and reinsurance policies, regulation, and oversight of entities operating inside the SNSP. SUSEP is in charge of implementing policies set by CNSP’s, supervising firms, processing applications and approving coverage of premiums and contracts. The IRB remained responsible for reinsurance both domestically and abroad and the placement of overseas insurance.

Table 3 Development of Insurance Industry in Brazil

Development of Insurance Industry in Brazil (1940-1990)				
Companies	Years			
	1940	1960	1980	1990
of which Brazilian	73	158	161	172
of which Foreign	32	35	29	18
Total	105	193	190	190
Premium/GDP Ratio	0.44%	0.77%	1%	1.3%

Source: (Abreu & Fernandes, 2010).

Table 3 above provides a picture of the development of the insurance industry in Brazil during the period after World War II until 1990. It shows the slow but significant development of the insurance activity in Brazil as the penetration ratio indicates. Table 3 also suggests that after World War II there was a limit to the role of foreign insurers in Brazil.

The business of insurance in the 1980s was skewed toward the Southeast—the area with the most dynamic economic activity—with about 81 percent of premiums. More recent data (2007) say that Southeast's share GDP was 56 percent (see http://www.ibge.gov.br/home/estatistica/economia/contasregionais/2003_2007/tabela02.pdf). The premiums/GDP ratio was in the 0.9–1.0 range, with the growth of GDP at about 8% yearly in 1964–80.

Compulsory automobile accident insurance began in the year 1966, and had a lot of influence on total premium. Auto insurance share more than doubled, to 32.4 per cent, whilst insurance of fire dropped to 23.9 per cent and insurance of life stayed at about 18 per cent. In 1995, Mercosur – Mercado Comun del Sur- countries introduced a mandatory auto insurance called Carta Verde, a third party liability coverage of cars for accidents occurring in any of the Mercosur countries (A. Levy & Pereira, 2007).²⁷

The IRB in Brazil constitutes an example of the typical Latin American pattern of intervention by the government in the economy. (Abreu & Fernandes, 2010) report that the continuous negative insurance account in the balance of payments (outflow of about US\$10 million yearly from 1947 to the mid-1970s) determined to put IRB in charge to seek international reinsurance operations abroad. An IRB office was opened in London, and the United Americas Insurance Company, controlled by the IRB, conducted business from New York. This allowed a significant rise in the IRB's revenues and outflows related to insurance. However, the initiative led to severe losses in the early 1980s and brought down the IRB.

C. Economic Stagnation and High Inflation: 1980–93

The 1980s and early 1990s were periods of inflation, stagnation, high debt and financial crisis in Latin America. Following 1979's oil shock and the ensuing rise in global interest rates, inflation accelerated from 40 per cent annually to 80 per cent monthly in the early part of the 1990s that several plans of stabilization did not correct.

²⁷ There are maximum coverages for the various events. In order to proceed to payment, there should be a cross-border agreement among insurance companies so that payments are in local currency. In Brazil, only five insurers offer this coverage. Their written premiums are R\$1.1 million in 2004 and they have a 0.02% loss ratio.

The economic stagnation prompted serious objections regarding the economic and social strategy followed for more than 60 years centered on a prevailing role of government in the economy. Following brilliant performance in terms of economic growth until the 1970s, i.e., Brazil was in the same league than Japan and South Korea, the Brazilian economy witnessed stagnation in the 1980s. During 1980-93, average annual GDP growth dropped to 1.6 per cent; the annual inflation jumped to 426 per cent.

In insurance, regulations pertaining to price indexation were critical for figuring out insurance profitability owing to the asymmetrical revenue and expenditure indexation. In 1987, SUSEP made it mandatory to use monetary correction to adjust payment of claims.

Towards the end of the 1980s, the losses of IRB became unbearable, i.e., the IRB suffered massive losses due to its London and New York offices. In addition, there were other losses pertaining to export credit insurance. In the month of February in 2000, the government returned 900 million US\$ owed by Seguro de Crédito à Exportação, under IRB's operation, to Finex (Fundo de Financiamento à Exportação).

FDI in insurance rose gradually in the period 1980–93, doubling to 160 million US\$ as cumulative FDI tripled. The increase of FDI in insurance was related to the regulations, in 1986, opening to more foreign participation.

Due to the problems with the country's balance of payments, the 1988 Constitution restricted foreign access to Brazil's insurance market further²⁸ i.e., the incorporation of new branches and subsidiaries of foreign insurance companies and the increase in the percentage of the participation of foreign persons and firms in the capital stock of

²⁸ Regulation of the financial system was to be defined by constitutional amendments.

Brazilian insurance institutions with headquarters in Brazil were not permitted. Imports could be insured only with companies established in Brazil; exports had to be insured in Brazil when the sale included the insurance cost (Trade Compliance Center, 1996).

D. The Reforms of the 1990s

In the 1990s, Latin American countries reexamined the role of government, and a number of radical reforms took place following a neoliberal agenda: privatization, liberalization and deregulation were enacted in efforts to create more competition; improve efficiency by transferring the state-owned sector into private hands (Kent, 1987); obtain cash for the national Treasury; strengthen financial markets, among them the insurance market. In 1994, Brazil launched the Real Plan (named after the real, the country's currency) to reform the economy. It incorporated a conventional macroeconomic policy approach embracing fiscal discipline, a floating exchange rate and inflation targeting. After the Real Plan, the East Asian financial crisis in 1997 spilled over into Brazil in the following year and in the whole Latin American continent. Since then, there have significant economic improvements (OECD, 2011).

i. Privatization

In 1990s, government reduced substantially the market enterprises directly owned. Although going for more efficiency and cash relief, privatization was viewed as a way of jump-starting markets by broadening the ownership of securities. The privatization of social security systems deepens capital markets and social security's privatization created private saving pools that would finance investments. Individual regimes of capitalization were supplanting regional pensions, starting with Chile (1981);

Peru (1993), Colombia and Argentina²⁹ (1994), Uruguay (1996), Mexico and Bolivia (1997), El Salvador (1998), Costa Rica (2001), and finally the Dominican Republic in the year 2003. Pension reforms may have not produced universal coverage, but they permitted a better integration between pension and life insurance and fostered the development of annuity markets—particularly in Chile—allowing retirees to take out life insurance as annuity rather than pension benefits.

In the insurance sector, other than the Colombian state-owned insurer La Previsora and the IRB's Brazilian reinsurance hegemony, not a single major player in the region's insurance markets remained owned by the state. Moreover, private insurers in Colombia and Argentina provide workers' compensation; and the private sector in Chile runs unemployment insurance (Swiss.Re, 2005).

If insurance in Latin America is juxtaposed with East Asia, a prominent feature – until the year 1990 at least – is the incredibly smaller share of life when compared to non-life counterpart in Latin America and to the shares of life and non-life in East-Asia.

ii. Liberalization

Latin American financial markets' liberalization and that of the capital account had lagged in the 1980s but they were very strong in the 1990s (Figure 3) (Lora, 2006). Figure 3 shows how in the 1980s Latin American countries were underperforming with respect to the index of financial liberalization (vertical axis) and then were at the top in the 1990s. The aim was to open up the gate to foreign capital to sponsor local investments that in turn would give more efficiency and discipline to local markets.

²⁹ In 2008, the president of Argentina announced the renationalization of private pensions, which implies the automatic transfer of the subsidiaries of the Pension Fund Administration Company (AJFP) to the state system.

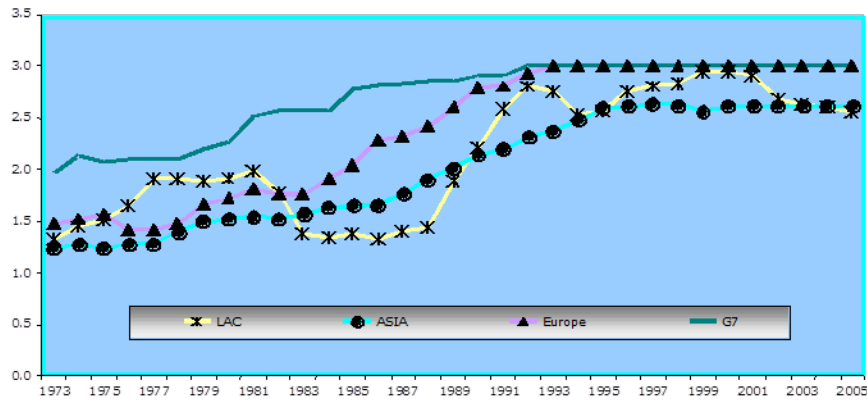


Figure 3 Financial Liberalization 1973-2005

Source: (Lora, 2006)

With respect to insurance, foreign global insurers contribute capital, know-how and proficiency and more sophisticated policies and products as well as channels of distribution to reach more people. With the reduction of the barriers to entry, many global insurers got inside Latin America’s markets of insurance, mergers and acquisitions increased, and competition reinvigorated. By the mid of 2000s, foreign insurers had a market share of up to 75% in Latin America, as shown in Table 4.

Table 4 Market Share Foreign Ownership

State and Foreign Ownership, Tariffs and Entry Barriers -2004						
Country	Market share of State-owned insurers		Market share of Foreign-owned insurers		Obligatory Tariffs	Entry Barriers for a Foreign Insurer
Brazil	3%	1%	32%	43%	None	none
Mexico	0%	0%	75%	58%	None	No branch offices allowed; 100% foreign ownership allowed for NAFTA members (limited to 49% for non-NAFTA members)
Chile	0%	0%	62%	63%	None	No branch offices allowed
Argentina	0%	0%	53%	35%	None	none
Venezuela	0%	0%	39%	50%	None	No branch offices allowed
Colombia	1%	12%	38%	46%	Motor third party liability	No branch offices allowed
Source : Swiss.Re: Exploiting the growth potential of emerging insurance markets, 2004						

iii. Regulatory Reform

Significant and sweeping reforms in the functioning of various markets, infrastructure and supervision took place in the '90s (Figure 4). In financial markets, the goal was to strengthen the role of stock exchanges and increase the participation of investors, reduce transaction costs and create effective regulation and supervision that would favor investments. By 2003, the region looked much more market-oriented.

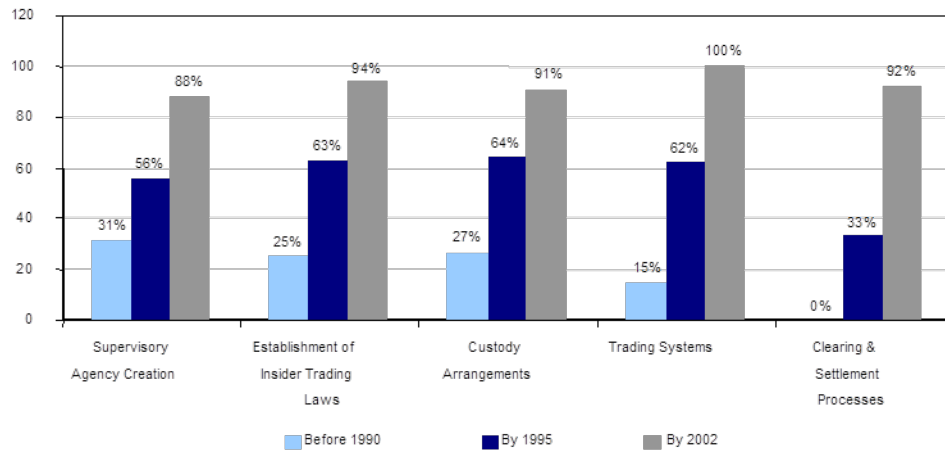


Figure 4 Percentage of Latin American Countries Implementing Reforms 1990-2002
Source: De la Torre and Schmukler 2007

Brazil was a latecomer to the market revolution, and after 1990 there were signs of some limited liberalization of regulations in Brazil.

The reforms introduced in almost all the Latin American countries proved to be initially effective. However, the crisis of 1998–2003 that hit most countries in the region showed that, with the exception of Chile, the reforms introduced had not benefited citizens and not created the conditions for growth headed by the private sector. In fact, the reforms facilitated new forms of oligopoly, greater government spending with little or negative impact on the population (Powell, 2007, pp. 201–5). This situation led many to criticize the so-called neoliberalism and evoke the old good days of economic nationalism. This outcry of public opinion led to the rise of a new populism that in some case became extreme.

iv. Global Regulation

Following the Second World War, the economic activity picked up and the world witnessed a tremendous period of economic growth. The economy expanded particularly in the 1980s and 1990s in a global environment. In the year 1999, the American Congress repealed the banking law that had prohibited banks from taking part in the business of insurance. That legislation – the Glass Steagall Act of 1933 – had been at the center of the financial system of the United States for 70 years. Its abolition meant that times had changed. The new legislation brought about a series of mergers and combinations that reinforced the need of regulation and supervision at global scale.

In the 1980s, insurance activities grew; combinations and mergers increased; leading companies provided multiple-line of businesses and operated in various parts of the world. In the late 1980s and 1990s the growth of insurance policies and products and the increase of failing insurers (Gardner & Grace, 1993) posed serious questions over the suitability of the regulatory oversight. Magnitude of the risks, costs, global scope of the operations and the spreading of activities in various countries forced governments to design a new regulatory framework. The undertaking started in an international context, within globally approved standards.

The global standardization emerged under the auspices, among others, of the IAIS - International Association of Insurance Supervisors- established in the year 1994. IAIS represents regulators of insurance in 190 jurisdictions in almost 140 states, and constitutes 97 percent of the global premiums of insurance. IAIS globally intervenes in

the realms of supervision of insurance and issues global regulations (IAIS, 2012; IAIS-MicroInsurance Network, 2010).

The objectives of the IAIS are to:

- Promote the development of well-regulated insurance markets;
- Favor improved supervision of the insurance industry on domestic and international levels to maintain efficient, fair, safe and stable insurance markets for the benefit and protection of policyholders;
- Contribute to global financial stability.

At the dawn of the 21st century, the activities of insurance had increased together with the economy; premiums had steeply gone up around the globe, but still leaving an unparalleled number of people uninsured (Community 2005;Community 2009).

Conversely, insurance companies had to face lawsuits that lead to big financial awards.

Even so, in a sophisticated, innovative competitive environment, the industry remains robust and provides products mostly catering to the needs of advanced economies.

Several insurance providers and 200 global reinsurance firms attest to the industry's health. Insurance is more and more becoming part of an interconnected financial sector.

IX. The Current Period

The September 11 2001 terrorist attacks, natural disasters, the global financial and economic crisis of 2007-8 and then the crisis of the European debt in 2011 and 2012 still unresolved in 2014 showcase that natural and human shattering events constitute the source of vulnerabilities and further uncertainties for the insurance industry (Doyle & Ericson, 2004).

i. Terrorism and Natural Catastrophes

There exist events that are unpredictable and result in massive losses. However, these events cannot be part of a rational model, and hence uncertainty is not converted into risk (Kunreuther & Pauly, 2010, p. 235). It is a market failure and insurance is not available. However, it happened that despite the damage's intensity from natural disasters and terrorism insurers were well prepared to counter the financial impact. Almost every one of the insurance firms was able to meet promises (Standard's and Poor's Rating Direct, September 2009), and government intervention has been pivotal for overcoming several problems (Barry, Doyle and Ericson 2003; Doyle and Ericson 2004; Dixon et al. 2004) . Hence, the role of government is crucial to introduce some form of incentives in the design of insurance products and operate as the insurer of last resort in case of unpredictable events.

ii. The Global Financial Crisis

The global financial crisis - here identified as the crisis of 2007–8 and its continuation with the crisis of the European debt of 2011–12 and still lingering on - started at the end of 2007 in the United States and prompted a series of government interventions in various countries to save the financial systems and stimulate the recovery.

Following the banking crisis of 2007–8 in the United States, a crisis about the sustainability of government debt erupted in Europe affecting various countries, i.e., initially Greece, Spain, Ireland and Portugal and then in 2011 and 2012 spreading to other major countries like Italy. The crisis has not been surmounted and is badly affecting

European countries, particularly those with a high level of government debt and slow or no growth so that the overall architecture of the European Union and the future of the euro is questioned.

The literature on financial crises is large and growing and Martin Wolf has recently published a book that constitutes not only an history of the crisis up to the days of this research but also an in-depth analysis of the many issues that the crisis has unleashed, e.g., the structure of the Euro, the debate of austerity versus stimulus, the role of finance, the rich political dimensions particularly important in European countries (Wolf, 2014). Given the perspective of this study, the relevant issues that emerge from the crisis are those that stress the role of the financial sector for the economic activity (Bordo, Eichengreen, Martinez-Peria, & Rose, 2001; Kindleberger, Aliber, & Solow, 2011; Reinhart & Rogoff, 2011).

The crisis presents various implications for the finance and insurance sectors.

iii. Financial Markets

The financial crisis showed its effects in the middle of 2007 and into 2008, when mortgages started to face large scale defaults, the U.S. housing market crumbled; world, stock markets plummeted; large financial institutions collapsed; and governments had to come up with rescue packages to bail out their financial systems as well as private companies (e.g., automobile sector in the USA). In turn, various governments in Europe deal with dramatic debt crisis and negative growth.

There are several views about the specific causes of the financial crisis of 2007–8 and the list is long: “accommodating monetary policy; excess savings with unbalances in

some emerging market countries; financial innovation; regulation and supervision failure; inability to deal with the so-called shadow banking, i.e., finance companies that were able to build huge liabilities without having the necessary capital and access to central liquidity or public-sector guarantees” (Cassidy, 2010, pp. 272–75; Frydman & Goldberg, 2011, p. chapt. 4–10; Overtveldt, 2009; Pozsar, Adrian, Ashcraft, & Boesky, 2010);³⁰ perverse incentives; lack of transparency; accounting rules, e.g., mark to market that reinforce the pro-cyclicality of Basel II;³¹ deregulation, role of credit agencies, housing lending and mortgage securitization with little scrutiny of creditworthiness; credit derivatives (Kroszner, Shiller, & Friedman, 2011, pp. 52–5). Posner (2010b, 2011) relates the crisis to excess savings from Asia and to the low US interest rates; public policies directed to facilitate house ownership fueled aggressive mortgage marketing and the housing bubble; deregulation of financial markets of the Bush era that exacerbated the relation between executive compensation, short-term profit goals, and risky lending; low savings rate of American people; and the highly leveraged balance sheets of large financial institutions.

With respect to the crisis in the United States, a report from the Financial Crisis Inquiry Commission USA (2011) identifies the causes of the crisis as an unprecedented confluence of multiple complex matters, including securities backed by subprime mortgages issued by Wall Street firms and speculators.

30 Just to give an order of magnitude, derivatives to insure against loans went from US\$866 million in 1987 to US\$454 trillion in 2007 (Fox, 2009, p. xiii).

31 Basel II is the second of the Basel Accords, initially introduced in 2004. The accord enacts recommendations on banking laws and regulations issued by the Basel Committee on Banking Supervision. The goal of Basel II is to establish agreed international standards for the capital of banks to face financial and operational risks.

A dissenting view (Wallison, 2011) puts the causes of the crisis mainly on government housing policies, in particular those of the Federal Department of Housing and Urban Development, which extended political housing goals to all lenders, including mortgage-backed securities, and open the gates to affordable housing lending to subprime borrowers. Fannie Mae and Freddie Mac boosted the availability of housing finance using the implicit government guarantee; bank regulators and supervisors that were unable to recognize the risks involved in the system of securitization with implicit government guarantee (Morgenson & Rosner, 2011).

About the root causes of the financial crisis, basically two main views emerge: the first believes that the financial crises of 2007–8 and 2011–12 are a “perfect storm” (Financial Crisis Inquiry Commission (FCIC) USA, 2011) *an unknown unknown* (Marsh & Pflleiderer, 2012); the second holds that the financial meltdown of 2007–8 and its extension to 2011–12 were no accident but the consequences of wrong policies. About the crisis of the subprime mortgage borrowers, senior regulatory officials around the world knew that their policies were destabilizing the global financial system (Barth, Caprio, & Levine, 2012).

With respect to the European debt crisis, wrong policies at the European and national levels, bad allocation of resources caused the high level of debt and the sluggish growth of several European economies, which in turn prompted the reaction of financial markets about the prospects of solvency of various sovereign borrowers (Zingales, 2011). The most recent dramatic events of the crisis focus on Europe and represent an offspring of the 2007–8 crises. In fact, the crisis of 2007–8 resulted in the further deterioration of

government budgets and finances as governments employed public expenditures to save the financial system and provide a stimulus to the economy. At the outset of the crisis, there were also European countries, e.g., Italy, with already an extremely high public debt and public expenditure. Under these circumstances, countries of the euro zone began to face very severe fiscal distress due to heavy borrowing practices, property bubbles, high political intermediation in economic sectors, living above their means and ultimately a lack of growth. The accessibility of easy credit led to an overreliance on external credit sources to fund domestic debt (Lim, 2012), and the atypical situation of the euro put great pressure on the spreads of government bonds of some major countries (e.g., Italy) that jumped to more than 400 basis points over the German benchmark. As one observer noted, “We are now experiencing severe tensions, which are coming after the events of 2007–2008. At that time, private institutions and markets were about to collapse completely. That triggered a very bold and comprehensive financial support by governments. And now we see the signature of some governments put into question” (Trichet, 2010, pp. 20–2).

A more general explanation of the financial crisis touches the fundamental principles and theory and articulates that risk was inappropriately modeled following the myth of rational markets (Fox, 2009; Kroszner et al., 2011, pp. 20–2). In addition, wrong incentives were in place to allow upfront fees and profits and shift long-term risk to other players and supervisory authorities have not been able to prevent or repress these practices. The history of crises over the last two centuries also show that financial crises occur when systems are designed based on political and partisan interests that influence

regulation and supervision of banks and also determine access to credit not on the basis of efficiency and market rules(Calomiris & Haber, 2014).

Once the first defaults appeared and the crisis started, uncertainty about the future became widespread.

The unraveling of the crisis takes us back to the distinction between risk and uncertainty (Skidelsky, 2010; Skidelsky & Wigstrom, 2010) in line with the insight of Minsky (1992, 2008) that uncertainty of cash flows from investments has negative repercussions for businesses. The global financial crisis of 2007–8 has strengthened “the distinction between risk and uncertainty helps explain the financial markets from the late summer 2007 onward” (Roubini & Mihm, 2010, p. 94). The crisis of 2007–8 and its continuation in 2011 and 2012 have verified that financially integrated markets have provided better access to capital and have contributed to risk management but have not fully capable to assess uncertainty, and reduce it (Tonveronachi, 2010).

Early on the International Monetary Fund (IMF) and the European Central Bank (ECB) as well as the European Commission (EC) intervened with special programs to restore the situation of some European countries (e.g., Ireland, Portugal) and reschedule public debt (Greece). Accommodating monetary policies in USA and then in Europe that include purchase of Government debt were undertaken to reduce interest rate and stimulate demand for credit (Labonte, 2014) and to circumvent skyrocket interest rates particularly for various European countries as well as avoid sovereign defaults.

Given the gravity of the situation, governments around the world coordinated interventions in two directions: for stimulus, and for regulation and supervision.

The first intervention - so-called stimulus (e.g., unemployment benefits, infrastructure financing, lower interest rates) - is intended to reduce individuals' uncertainty and restore consumers' and investors' confidence. The second intervention, i.e., better regulation and supervision, is needed to restore confidence and discipline in an integrated market and deserves attention. Claessens (2010, pp. 2, 18) indicates that the main lesson to emerge from the crisis is "the need to balance regulation with the role of self-governing markets and to establish a sustainable and effective financial architecture" and eliminate the excesses of financial markets and its participants so that financial markets maintain and reinforce their fundamental role of providing financing to economic and entrepreneurial activities. Globally, there is a need for greater cooperation. While developed markets have to restore their credibility and reputation, emerging markets need to complete the reforms of their financial sectors and create a reliable regulatory and supervisory setting in a global, competitive market.

A regulatory environment should favor healthy financial innovation. In fact, advances in computational science and increased freedom of action prompted a wave of positive innovations in the financial markets - a form of entrepreneurship in financial markets - of the 1980s and 1990s (F. Allen & Yago, 2010). However financial innovation played a key role in facilitating and transmitting the financial crisis of 2007–8. U.S. Federal Reserve chairman Bernanke acknowledges the role of financial innovation but cautions with respect to its implementation: "Innovation that is inappropriately implemented can be positively harmful." He later added: "the difficulty of managing financial innovation in the period leading up to the crisis was underestimated" (Bernanke 2009) (Blair, 2011).

Therefore, regulation and supervision play a crucial role. The chairman of the Financial Stability Board (FSB), Mario Draghi - appointed President of the European Central Bank- says: “regulation must not prevent innovation, which is necessary if we are to improve product choices for consumers and an expanded access to credit” (Draghi, 2009, p. 5). Furthermore: “The goal will be to strengthen the resilience of the system without hindering the processes of market discipline and innovation that are essential to the financial sector’s contribution to economic growth” (Financial Stability Forum, 2008, p. 6).

Of course, in the case of Europe, where the financial crisis continues particularly in the southern countries with an extremely high social and political toll, the main issue is that of incomplete political union among European countries that leads to the situation of one monetary policy of the ECB and many uncoordinated fiscal policies under the responsibilities of member states. This situation is such that the political institutions in some countries (e.g., the Southern countries) have incentives to run deficits and borrow up to the point where this behavior is not sustainable also because the inefficient use of resource compounds the problem with inefficient and uncompetitive economies with a strong political constituency opposed to any change that would eliminate rents. Only structural changes at the EU level and at the member states levels can fix the fundamental deal that holds diverse countries (Draghi, 2014; Ghani, 2011; Weisbrot & Jorgensen, 2013).

iv. Insurance Markets

The insurance industry has overcome the costs derived from recent natural and human events (e.g., terrorism and natural catastrophes and terrorism). Insurers had made correct reserves and have been able to fulfill their obligations and thus they have played their role properly. Of course, the support of government to the industry has been very valid.

The financial crisis of 2007–8 and the ensuing crisis of the European debt are related to the theme of this study and deserve consideration. Harrington (Harrington, 2009) and Cummings and Weiss (Cummins & Weiss, 2010) argue that the financial crisis of 2007–8 hit the insurance industry hard as it affected the American International Group, Inc. (AIG). However, while the credit default swaps of AIG Financial Products (Nissim, 2010, pp. 35–6) (Vereen, 2010) stimulated the crisis, insurance policies of regulated insurance subsidiaries did not. While AIG is certainly responsible for being highly leveraged and exposed to the value of mortgages securities, regulators and supervisors are equally responsible for bad regulation and supervision (Harrington, 2009).

According to the OECD, “Deteriorating economic conditions and rising corporate insolvencies resulting from the financial crisis have led to worsened conditions for some lines of insurance business, most notably director and officer liability and trade credit insurance. Trade credit insurance has been particularly hard hit, with retrenchment by insurers in this sector affecting business transactions and bank lending, further aggravating the business environment” (OECD, 2009b, p. 5).

Under these circumstances, the main point for the insurance sector is: does the insurance industry present a systemic risk? The FSB, the Bank for International Settlements and the International Monetary Fund has assumed the definition of systemic risk that the Group of Twenty's finance ministers and central bank governors³² supported. The FSB's definition uses three criteria to assess the systemic risk presented by an institution: size, interconnectedness and substitutability. The IAIS (2011b) has added a fourth criterion: time. The speed of the transmission of losses to third parties is particularly relevant because insurance claims, differently from bank debt, do not rapidly generate cash outflows (The Geneva Association, 2010a). The view of the insurance industry is that the activities of insurers and reinsurers do not cause systemic risk. Insurance activities are not relevant for systemic risk, for at least one of the following reasons:

- limited size, which would not have disruptive effects on financial markets;
- slow speed of their impact, which allows insurers to absorb them, e.g., raising capital over time or, in a worst case, engaging in an orderly shutting down;

In addition, the characteristics of insurance institutions' relations imply that contagion risk would be small.

Historically, insurance has never caused major financial crises. Only two, noncore, activities of insurers could have the potential for systemic relevance, if undertaken in large scale and with poor risk-control frameworks and mismanagement (The Geneva Association, 2010a):

³² This part draws from the documents of the IAIS (2011b, 2012) and of the Geneva Association (2010a, 2010b).

- derivatives trading on non-insurance balance sheets; and
- Short-term funding (commercial paper or securities lending).

Various experts (Bank for International Settlements, 2012; Ueda & di Mauro, 2011) favor the application of rigorous regulation and supervision for the “systemically important financial institutions” (SIFI) as the U.S. Dodd-Frank Act defines the financial institutions judged systemically important to the global economy in the sense that the failure of one of them could trigger a global financial crisis. However, the application of the SIFI rule to insurance companies is questioned (Harrington, 2009; The Geneva Association, 2010a). An additional question is whether existing regulation adequately mitigates potential systemic risk from noncore insurance activities or whether with new measures are needed (The Geneva Association, 2010a).

As mentioned, according to the Geneva Association (The Geneva Association, 2010a), banks and insurers played different roles in the financial crisis of 2007-8; e.g., banks and investment companies were the source of the crisis that affected them very hard. In fact, excluding insurers with large quasi-banking operations (e.g., AIG), insurance companies received less than \$10 billion in direct government support during the financial crisis, compared with more than \$1 trillion given to banks.

The Geneva Association (The Geneva Association, 2010a) argues that the insurance industry is strong and supports measures of the type of the so-called Solvency II, i.e., the prudential regime for insurance and reinsurance introduced in the countries of the European Union. Solvency II is a principle and economic-based regulatory and supervision framework, which constitutes the equivalent to Basel II for the banking

sector. In this context, insolvencies need not be avoided at any price. Faced with a very large event, an insurer can fail; but in contrast to the banking sector, closing down an insurer constitutes an orderly process that does not generate systemic risk (The Geneva Association, 2010a).

The experts and the insurance industry (Harrington, 2009; IAIS, 2011b; The Geneva Association, 2010a) argue that in closing gaps in the supervisory framework, regulators should not put burdens on insurance companies and distort the market and also create moral hazard in “too big to fail” institutions. In this regard, these measures recommended by the Geneva Association (2010a) seek to address gaps in regulation and industry practices (measures a and b), strengthen financial stability (measures c to e) and enhance cooperation (measure f):

- a. Implement comprehensive, integrated, and principle-based supervision for insurance groups;
- b. Strengthen liquidity risk management;
- c. Enhance the regulation of financial guarantee insurance;
- d. Establish macro-prudential monitoring with appropriate insurance representation;
- e. Strengthen risk management practices;
- f. Reinforce cooperation among supervisors for cross-border crisis management.

The measures constitute the insurance industry’s commitment and contribution to the discussion on systemic risk, to the stability of the overall financial system, and to performing its enabling role in the real economy. The issues of the insurance and banking industries are constantly reviewed and debated. The testimony of William J. Wheeler, President of Americas MetLife, Inc., expressed the opinions of the insurance industry in front of the United States House of Representatives Financial Institutions and Consumer

Credit Subcommittee and argued against the possible designation of systemically important financial institution for an insurance company (Wheeler, 2012).

The Financial Stability Board (FSB), following on the work of the G-20 to avoid future financial crises, identifies global systemically important financial institutions (G-SIFIs) as “institutions of such size, market importance, and global interconnectedness that their distress or failure would cause significant dislocation in the global financial system and adverse economic consequences across a range of countries.”(Financial Stability Forum, 2013) G-SIIs -Global Systemically Important Insurer- are one class of G-SIFIs. On July 18, 2013, IAIS designated nine large insurance groups as Global Systemically Important Insurers (G-SIIs), three from the United States-American International Group, Inc.; MetLife, Inc.; and Prudential Financial, Inc.-along with Allianz (Germany), Assicurazioni Generali (Italy), Aviva (U.K.), AXA (France), Ping An (China) and Prudential plc (U.K.).

The International Association of Insurance Supervisors (IAIS) established the G-SII criteria on July 18, 2013. The G-SII designation implies enhanced supervision and regulation of the companies and, eventually, significant changes to the capital structure of each company.

The IAIS framework is based on the position that IAIS articulated in November 2011 () concerning the role of insurance in the financial crises. The designation of G-SII for an insurer is based on the following criteria (IAIS, 2013, p. 12) :

- “Size: The importance of a single component for the working of the financial system generally increases with the number of financial services that the component

- provides. It should be recognized, however, that in an insurance context size is a prerequisite for the effective pooling and diversification of risks.
- **Global Activity:** The methodology is aimed at identifying components of the financial system whose failure can have large negative externalities on a global scale.
 - **Interconnectedness:** Systemic risk can arise through direct and indirect inter-linkages between the components of the financial system so that individual failure or distress has repercussions around the financial system, leading to a reduction in the aggregate number of services.
 - **Non-traditional and non-insurance activities:** as described in Insurance and Financial Stability paper (IAIS, 2011b), the IAIS considers that non-traditional insurance activities and non-insurance financial activities are potential drivers of the systemic importance of insurers and thus have the greatest impact on failure.
 - **Substitutability:** The systemic importance of a single component increases in cases where it is difficult for the components of the system to provide the same or similar services in the event of failure.”

Therefore, according to the IAIS, systemic risk in insurance is pertinent when insurers significantly deviate from the traditional insurance business model and participate in non-traditional insurance or non-insurance (NTNI) activities or interconnect with other financial firms. Thus, effective recovery and resolution will take into account plans and steps needed for separating non-traditional or non-insurance (NTNI) activities from traditional insurance activities.

The implications for an insurer designated as G-SIIs are:

- **Enhanced Supervision.** In order to focus on the unique risk profile and possible risk concentrations of G-SIIs and lessen the probability and impact of failure, enhanced supervision generally requires specifically tailored regulation, greater supervisory resources and bolder use of existing supervisory tools. This also means a direct approach to consolidated and group-wide supervision, including the holding company, the development of a Systemic Risk Management Plan (SRMP) and enhanced liquidity planning and management.
- **Effective Recovery and Resolution.** Included in this are elaboration of recovery and resolution plans (RRPs), establishment of Crisis Management Groups (CMGs), the conduct of resolvability assessments and, most significantly, the

adoption of institution-specific cross-border cooperation agreements by regulators.

- Higher Loss Absorption (HLA). Increased HLA capacity should reduce the probability of distress or failure and also the expected impact of distress or failure by making G-SIIs more resilient to low-probability, high-impact events.

http://www.martindale.com/banking-financial-services/article_Duane-Morris-LLP_1916644.htm

However, the process will be rather long. Recovery and resolution plans, including liquidity risk management plans, have to be developed and agreed upon by Crisis Management Groups (CMGs) in 2014. The implementation of the Systemic Risk Management Plans (SRMP) should be completed within 12 months after designation as a G-SII. The implementation of the SRMP should be assessed by national authorities in 2016. Finally, the Higher Loss Absorption capacity will begin to be implemented in 2019 for all G-SIIs designated by 2017.

It is important to underline as the NAIC – National Association of Insurance Commissioners- clarifies that the action taken by the FSB is advisory only and is non-binding. State insurance regulators and the NAIC have been engaged through the International Association of Insurance Supervisors (IAIS) Executive and Financial Stability committees in this work, and domestic state regulators have been involved on a company-by-company basis.

http://www.naic.org/cipr_topics/topic_global_sys_insurers.htm

In addition, U.S. Department of Treasury's Financial Stability Oversight Council (FSOC) designates Insurers as Non-Bank Systemically Important Financial Institutions (SIFIs). In June 2013, the Financial Stability Oversight Council (FSOC) designated three non-bank Systemically Important Financial Institutions (SIFIs): AIG, General Electric Company's GE Capital unit and Prudential Financial, Inc. AIG and GE have accepted SIFI status; Prudential is contesting the designation. On July 16, 2013, MetLife was alerted that it will move to Phase III of the SIFI designation process. The FSB's July designation of MetLife and Prudential as G-SIIs does not resolve whether those companies will be designated as SIFIs in the United States. In fact, while the G-SII and SIFI designations derive from the financial crisis, and FSOC and FSB share common interests, the SIFI designation process is independent of the G-SII designation.

There are open questions as to relationship of the G-SII designation and the potential SIFI designation. The enhanced supervision measures contemplate extensive cooperation between international insurance regulators, under the leadership of a group-wide supervisor, in cooperation with functional supervisors who regulate specific insurers. This will necessitate a high degree of cooperation by U.S. insurance regulators - operating at state level- many of whom have in the past evidenced reluctance to adopt international regulatory standards; non-U.S. insurance regulators; and the controlling regulator under the rules for SIFIs, which may have greater experience in banking than in insurance. http://www.martindale.com/banking-financial-services/article_Duane-Morris-LLP_1916644.htm

Designations as a G-SII and as a SIFI will have consequences for insurers and the insurance market generally. As pointed out by Steven Kandarian, CEO of MetLife, in a July 16, 2013 (Douglas, 2013) statement in response to MetLife being pushed to the third phase of consideration for designation as a SIFI: "If only a handful of large life insurers are named SIFIs and subjected to capital rules designed for banks, our ability to issue guarantees would be constrained. We would have to raise the price of the products we offer, reduce the amount of risk we take on, or stop offering certain products altogether." The statement argues that the G-SII and SIFI designations lead to competitive imbalances and/or market disruptions.

Following financial crisis of 2007-08 and the subsequent interventions, particularly in the United States, e.g. The Dodd- Frank act, as well as the decisions of the IAIS and then the FSB and the FSOC focusing on the designation of S-GIIs and SFIs, respectively, various studies and analysis have been undertaken with a focus on the status of the insurance industry and its regulation and supervision (Government Accountability Office- GAO, 2013; T. M. Vaughan, 2009). Daniel Schwarcz and Steven L. Schwarcz (Schwarcz & Schwarcz, 2014) highlights that correlations among individual insurance companies could contribute to or cause widespread financial instability and constitute a source of systemic risk. Daniel Schwarcz and Steven L. Schwarcz (2014, pp. 1, 62–4) show that there are often substantial correlations among individual insurance companies with respect to both their interconnections with the larger financial system and their

vulnerabilities to failure. As a result, the insurance industry as a whole can pose systemic risks that regulation should attempt to identify and manage. In this respect, Daniel Schwarcz and Steven L. Schwarcz (2014) argue that traditional state-based insurance regulation in the USA is not adapted at undertaking the mismatch between state boundaries and systemic risks and states' limited oversight of non-insurance financial markets. The uneven nature of state regulation often prevents regulators from seeing overall risk, e.g., the risks of an insurance holding company that operates through multiple out-of-state subsidiaries. States also have insufficient incentives to act against those risks. In this respect, Daniel Schwarcz and Steven L. Schwarcz (2014) suggests enhancing the power of the Federal Insurance Office – a federal entity currently primarily charged with monitoring the insurance industry – to supplement or preempt state law when states have failed to satisfactorily address gaps or deficiencies in insurance regulation that could contribute to systemic risk. It should be noted that the NAIC, in February 2009, adopted a set of principles for a nationwide system of insurance regulation. In those principles, the commissioners acknowledged the need for greater uniformity and reciprocity as well as the role of state regulators (T. M. Vaughan, 2009, p. 15).

5. STATUS OF THE INSURANCE MARKETS IN THE WORLD: DEVELOPED, EMERGING MARKETS AND LATIN AMERICAN MARKETS

I. Overview

Spence (2011) supports the view that developing countries constitute a progressively important driver of growth in the world economy. These countries bring about a global system with multiple centers and constitute evidence of convergence of GDP per capita and living standards.

Following the crisis of 2007–8 and the crisis of the European debt of 2011–12 and beyond, the International Monetary Fund (2011, 2012c, 2012d, 2014a) believes that the global economy expands asymmetrically, with projections for growth continuously reduced and with emerging market economies growing faster than advanced economies (Lanzer & Davidson, 2010). However, these trends, in 2013 and 2014, present signs of weaknesses also on the side of emerging economies. The situation is worrisome for European countries as a result of the sovereign debt crisis and a general loss of confidence, financial institutions unresponsive to the demand of financing and negative short-term effects of fiscal consolidation to ease the tensions on the government debt market (IMF, 2012d). In the United States and other advanced economies, production remains below the potential. Real GDP growth in the emerging market and developing economies was about 5.75% in 2012 and is expected to be less strong due to various factors including macroeconomic policies and foreign demand. In Latin America, the

recovery from the crisis in 2007-08 has been faster; commodity prices and financial conditions remain favorable in 2012 and 2013, but then the several countries of the region (e.g., Brazil and mainly Argentina, Venezuela) starting to show economic vulnerabilities (e.g., decline of commodities prices and FDI) as well as social and political problems and inflationary pressures.

With a long-term perspective, the IMF (IMF, 2011, 2012c, 2012d, 2014a) argues that emerging market populations are growing and maturing; becoming richer and more financially knowledgeable; banks and insurers are reasonably well-funded, well-capitalized and profitable, with loans, deposits, premiums and assets under management growing at significant rates compared to developed countries where deleveraging is under way, profits are low and growth is sluggish.

Under these conditions, two key growth drivers for the insurance industry particularly in emerging countries are identified: demographics and financial market development. These two factors are expected to facilitate the penetration of financial products including insurance.

II. World Insurance Drivers: Population

The overall demand for all goods and services is a function of the size of population. By 2050, the world will have more than 2 billion additional consumers, and 98% of that growth will come from emerging markets (United Nations, 2011b).

The main driver of growth of population is the rapid rise in life expectancy, which for the developing world as a whole has increased from 41 years to over 65 since 1950 and is estimated to rise to 75 by 2050 (United Nations, 2011c; United Nations

Development Program, 2011). Developing countries are also witnessing that the pyramid of age is becoming skewed towards older cohorts and birth rates are not the main component of a growing population. As a result, more people expect to live beyond retirement and this leads to higher saving (Kinugasa & Mason, 2007). Worldwide, the cohort 40-65 is expected to increase its share of the total population (e.g., the 40–65 cohort is expected to more than double in size for the developing world). These developments explain the growth of financial products, e.g., deposits, savings and investments, and insurance, especially life insurance.

Savings by this age cohort in developing countries will be growing due to the absence of well-developed pension systems and state protection against catastrophic health or long-term care costs. In many emerging market countries, private pension plans are encouraged, e.g., there are already voluntary plans in Hong Kong and Singapore; China is encouraging private pension savings, i.e., only a third of the population is covered so far (D. Bloom, Canning, & Fink, 2011).

III. World Insurance Drivers: Penetration of Financial Services

The different composition of population particularly in emerging countries influences the diffusion of financial products that are also expected to grow. In addition, urbanization, industrialization and the expansion of communications will prompt greater access to financial services; the growth of deposits will create the basis for more lending and expansion of the financial sector. These structural changes should lead to stronger financial sector development and economic growth.

As of 2012, penetration rates in Emerging Market Economies (Figures 5 – Insurance Penetration ratio on the vertical axis) are low for almost all financial products, the main exception being personal bank accounts. Markets for insurance (especially life), mutual funds, credit cards and mortgages are small with respect to developed countries. Lanzer and Davidson (2010) stress that penetration rates for insurance and loans constitute key factors.

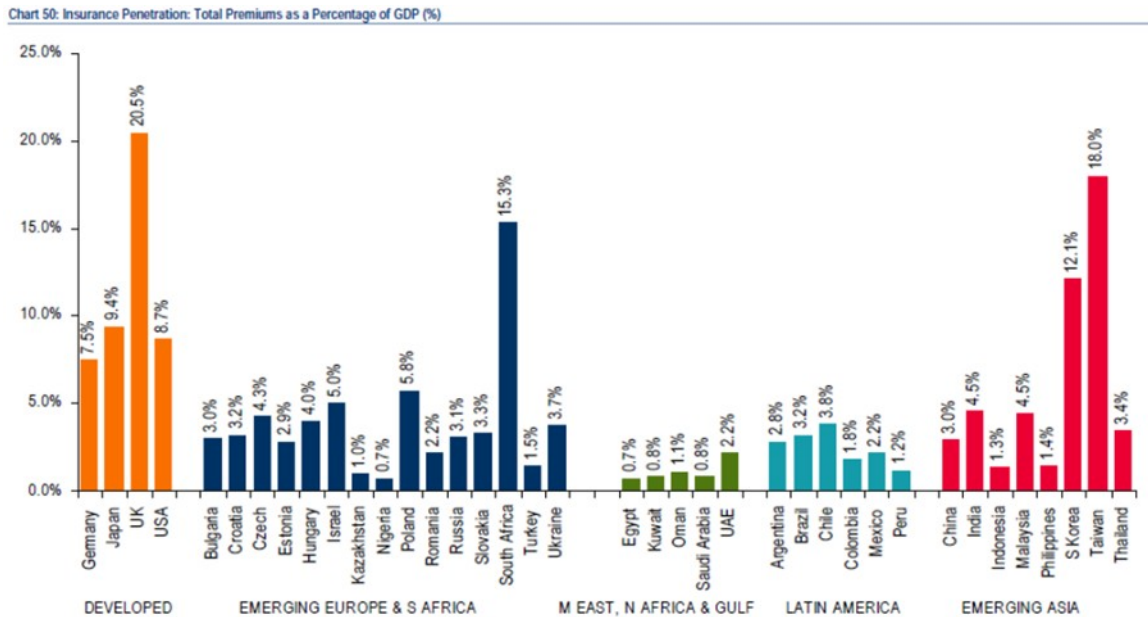


Figure 5 Insurance Penetration: Total Premium/GDP

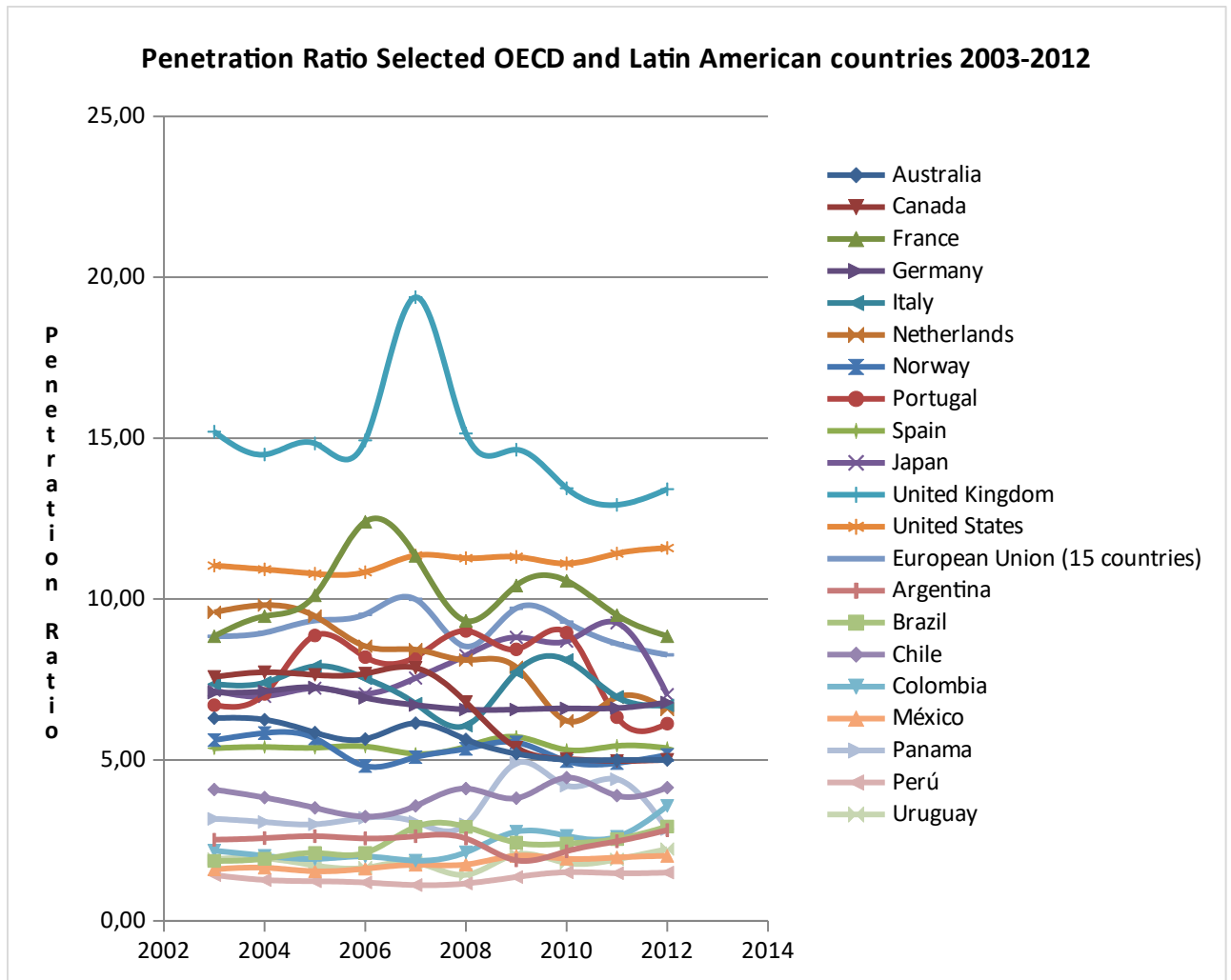


Figure 6 Penetration Ratio Selected Countries

Source: OECD and Asociación de Supervisores de Seguros de América Latina (ASSAL)

Penetration ratios in advanced economies are consistently above those of Latin American countries (Figure 6). However, penetration in most developing markets and for most financial products has optimistic perspectives. Because the denominator (GDP) is also growing, higher penetration implies the numerator (i.e., demand for financial services including insurance) increasing faster than the economy. GDP per capita is expected to

grow at around 6% a year in emerging market and developing countries, compared with around 3% in advanced economies (IMF, 2012c).³³ This suggests that insurance penetration should grow rapidly in a number of areas, with Latin America being a region where insurance penetration should outpace GDP per capita growth in coming years. Increased penetration is part of the evolution of the financial system (E. P. Davis, 1996): as countries get richer, the orientation towards financial systems increases, i.e., increase of stock market capitalization, ownership of financial assets, and consumer credit.

IV. Advanced Economies

According to the IMF's World Economic Outlook October 2012, April 2014 and October 2014 (IMF, 2012d, 2014a, 2014b), in most advanced economies, the average expected real growth of GDP in 2015 and 2016 remains at less than 1.5%, with greater growth for the United States above 2%. Output remains below potential; unemployment is substantial and growth is slow. However, structural reforms and policy uncertainty – mainly in Europe due to the crisis of the euro zone- characterize the outlook (IMF, 2011, 2012c, 2014a, 2014b) . are the two main obstacles to healthy economic environment The IMF's World Economic Outlook October 2012 (IMF, 2012d) articulates in a stronger-than-usual fashion that the risks of a delayed recovery are significant; stresses the need to pursue structural reforms, particularly in the countries affected by the crisis, i.e., the European Union member countries and the United States; and discusses the role of policy

³³ Emerging and developing economies tend to have faster GDP growth than advanced economies, but they also have higher population growth. The *World Economic Outlook* of October 2014 presents the most recent and sophisticated analysis and projections of economic growth in various regions of the world.

uncertainty³⁴. The IMF's World Economic Outlook October 2014 shows a similar but more somber view (IMF, 2014b).

The IMF's World Economic Outlook October 2012 (IMF, 2012d) as well as the IMF Outlook April 2014 and October 2014 (IMF, 2014a) underlines that structural problems contribute to global imbalances and intensify the crisis in the euro area (IMF, 2012d). Failure to undertake structural reforms will increase even more the reaction of markets. The structural changes that the IMF strongly advocates center on the creation of an open, competitive and entrepreneurial economic environment. IMF warns (IMF, 2012d) that the challenge for policymakers -especially in Europe and the United States - is to move away from an incremental approach and move aggressively with strong medium-term fiscal and structural reforms in order to rebuild confidence. The impact of structural reforms on economic growth is expected to be significant. The World Economic Outlook for October 2012, April 2014 and October 2014 stress various points very relevant for economic growth that are at the root of the present study: efficiency of the system; competition and competitiveness; innovation and entrepreneurship; and the role of a solid and responsive financial sector. France, Italy and Spain³⁵ are the countries that are expected to introduce radical reforms to boost free market, competition and competitiveness. The wording of the World Economic Outlook for October 2012 is extremely clear with respect the mix of policies to be followed: "For countries currently

34 According to the World Economic Outlook of October 2012 risks have risen appreciably and appear greater than in April 2012 and September 2011, e.g., escalation of the euro area crisis.

35 The IMF stresses that countries like France, Italy and Spain could realize gains from reforms that create a favorable business environment: favoring stronger competition and lower barriers to entry; reducing procedures and costs that weigh on businesses; streamlining bankruptcy proceedings; and facilitating the exit of inefficient firms to boost innovation and entrepreneurship. In the euro area, action is also needed to address the responsiveness of the financial sector to the real economy and complete the monetary union.

struggling with high public debt burdens, the historical record offers both instructive lessons and cautionary tales. The first lesson is that fiscal consolidation efforts need to be complemented by measures that support growth: structural benefiting from historically low sovereign interest rates. A second lesson is that consolidation plans should emphasize persistent, structural reforms over temporary or short-term measures. Belgium and Canada were much more successful than Italy in reducing debt, thanks to the focus on structural changes rather than short-term measures. Moreover, both Belgium and Canada put in place fiscal frameworks in the 1990s that preserved the improvement in the fiscal balance and mitigated consolidation fatigue” (IMF, 2012d, p. 126).

Under these circumstances, for the first time the World Economic Outlook for October 2012 articulates the issue of policy uncertainty, its measure and its impact (see Appendix 4 on policy uncertainty) and underlines that the elevated uncertainty constitutes an essential feature of the sluggish recovery. Policy uncertainty affects business decision and is regarded as the main, immediate cause of financial stress and recession in the euro area and labor markets in the United States. Policy uncertainties – mainly deriving from interventions or lack of in the area of unemployment and debt- in Europe and the United States have remained high since the outset of the global financial crisis and the sovereign debt problems in the euro area. The continuous current high level of uncertainty is very different from the level of uncertainty during past recessions when uncertainty declined steadily and fast. The IMF estimates that the increased policy uncertainty between 2006 and 2011 has delayed growth in advanced economies by 2½ percentage (Baker, Bloom, & Davis, 2013; IMF, 2012d; Kose & Terrones, 2012).

The inaction of policymakers may have negative effects on economic activity and the World Economic Outlook for October 2012 stresses: “policy uncertainty is unusually high, and it contributes significantly to macroeconomic uncertainty. By implementing bold and timely measures, policymakers can reduce policy-induced uncertainty and help kick-start economic growth”(IMF, 2012d, p. 53; Kose & Terrones, 2012).

V. The United States

In line with the overall assessment for the advanced economies, the United States has to deal with fiscal issues that contribute to policy uncertainty. The outlook for the United States (IMF, 2012d) for 2014 and beyond is moderately favorable, with signs of recovery in the housing market and in the labor market and a declining deficit. The IMF Outlook of April 2014 see a decline of the debt-to-GDP ratio given that deficit is expected to be below nominal GDP growth (IMF, 2014a, p. 7). In October 2014, the IMF sees that growth in the United States and Canada is getting stronger still with some significant downside risks and “monetary policy normalization should be gradual to sustain the recovery and avert negative domestic or global spillovers. Medium-term growth should be strengthened by upgrading infrastructure and human capital.”(IMF, 2014b, p. 45)

i. The Structure of the U.S. Economy

The U.S. is the leading industrial power: it has the more diversified service sector in the world, and the third-largest agricultural producer behind China and India. In the

United States, agriculture and the industrial sector make up 1.2% and 19.6% of United States' GDP in 2010, respectively. Services constitute 79.2% of U.S. GDP.

Agriculture is a vital part of U.S. economy and society. The last Census of Agriculture in 2007, states that there are 2.2 million farms in the U.S.—covering an area of 922 million acres and responsible for the country's food demands. The industrial sector is highly diversified and technologically advanced, comprising industries such as petroleum, steel, motor vehicles, aerospace, telecommunications, chemicals, electronics, food processing, consumer goods, lumber and mining. In the services sector, the U.S. is home to the largest and most influential financial markets in the world, including major stock and commodities exchanges like NASDAQ, NYSE, AMEX, CME, and PHLX,³⁶ i.e., the NYSE alone is more than three times larger than any other stock market in the world. The crisis of 2007–8 has been a major blow to the financial industry and to the real estate industry.

ii. Entrepreneurship in the United States

Entrepreneurship is among the most vibrant and important parts of the U.S. economy (Reynolds, 2007). The literature reviews the role of entrepreneurship (Chapter 6). In the U.S., entrepreneurship is particularly developed and constitutes part of the spirit in which the U.S. has been built (Lipset, 1997).

This section refers to the status of entrepreneurship in the United States and draws from Reynolds (2007), the Kauffman Index of Entrepreneurial Activity (Fairlie, 2012) and the statistics of the Labor Department (Bureau of Labor Statistics, 2012) that

³⁶ National Association of Securities Dealers Automated Quotations (NASDAQ); New York Stock Exchange (NYSE); Chicago Mercantile Exchange (CME); Philadelphia Stock Exchange (PHLX).

continuously provides a comprehensive picture regarding the dynamics of the activity of the entrepreneurs in the U.S.

As the main information source regarding the U.S labor market, the ‘Bureau of Labor Statistics’ (BLS) musters data on job creation and new businesses (Bureau of Labor Statistics, 2012). BLS ‘Business Employment Dynamics’ (BED) program provides understanding regarding the contribution of businesses to jobs. BED series on the establishment age monitors cohorts of latest business establishments with same year birth and provides insights on related employment.³⁷

Figure 7 shows new businesses in the U.S. economy. New business establishments’ (i.e., establishments that are less than one year old in any given year) number rises and falls in synchrony with the overall economy business cycle. In this respect, the number picked in 2006–7 and then declined due to the financial crisis, and in March 2010 the number of new establishments was lesser as compared to any other years since the beginning of the series (Bureau of Labor Statistics, 2012).

³⁷ The BED data series on the age of establishments tracks cohorts of new business establishments “born” in the same year and reports on their related employment.

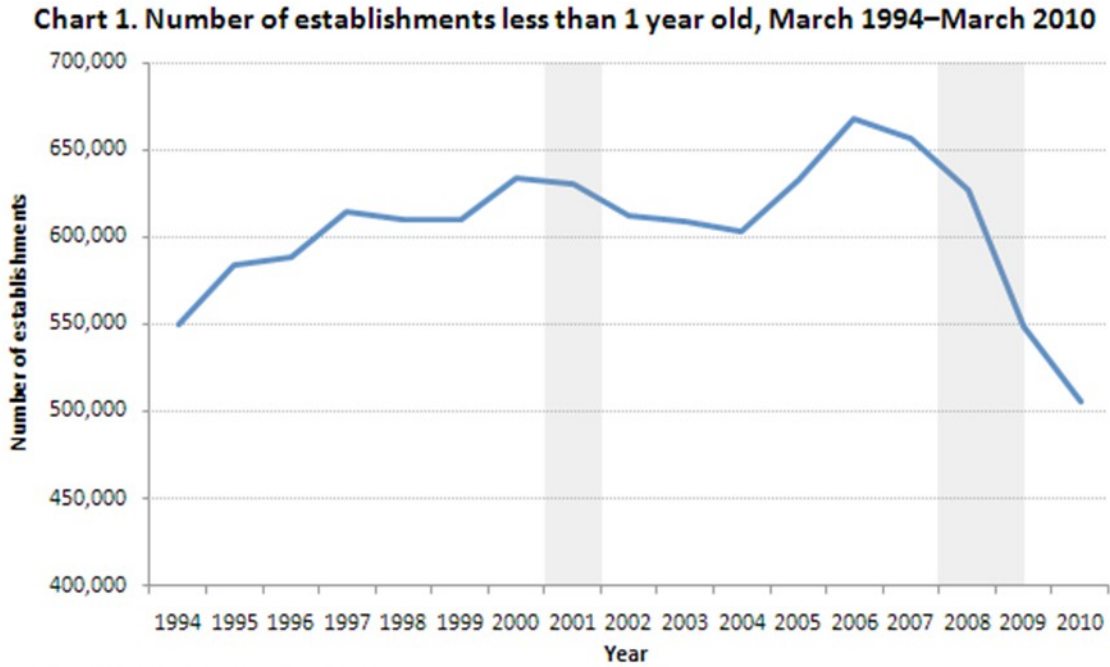


Figure 7 Number of Establishments Less than one Year Old, March 1994-2010

New businesses contribute significantly to job creation as Figure 8 indicates. The BLS Report of November 2012 (Bureau of Labor Statistics US Department of Labor, 2012) shows that from December 2011 to March 2012, gross job rises from opening and expanding private-sector establishments were about 6.9 million, an increase of 26,000 from the previous quarter³⁸.

³⁸ According to the Bureau of Labor Statistics and the Michigan Department of Technology, for the period December 2011- March 2012, gross job losses from closing and contracting private-sector establishments were 6.1 million, a decrease of 399,000 from the previous quarter. The difference between the number of gross job gains and the number of gross job losses returned a net employment change of 814,000 jobs in the private sector during the first quarter of 2012 (Michigan Department of Technology, Management and Budget 2013).

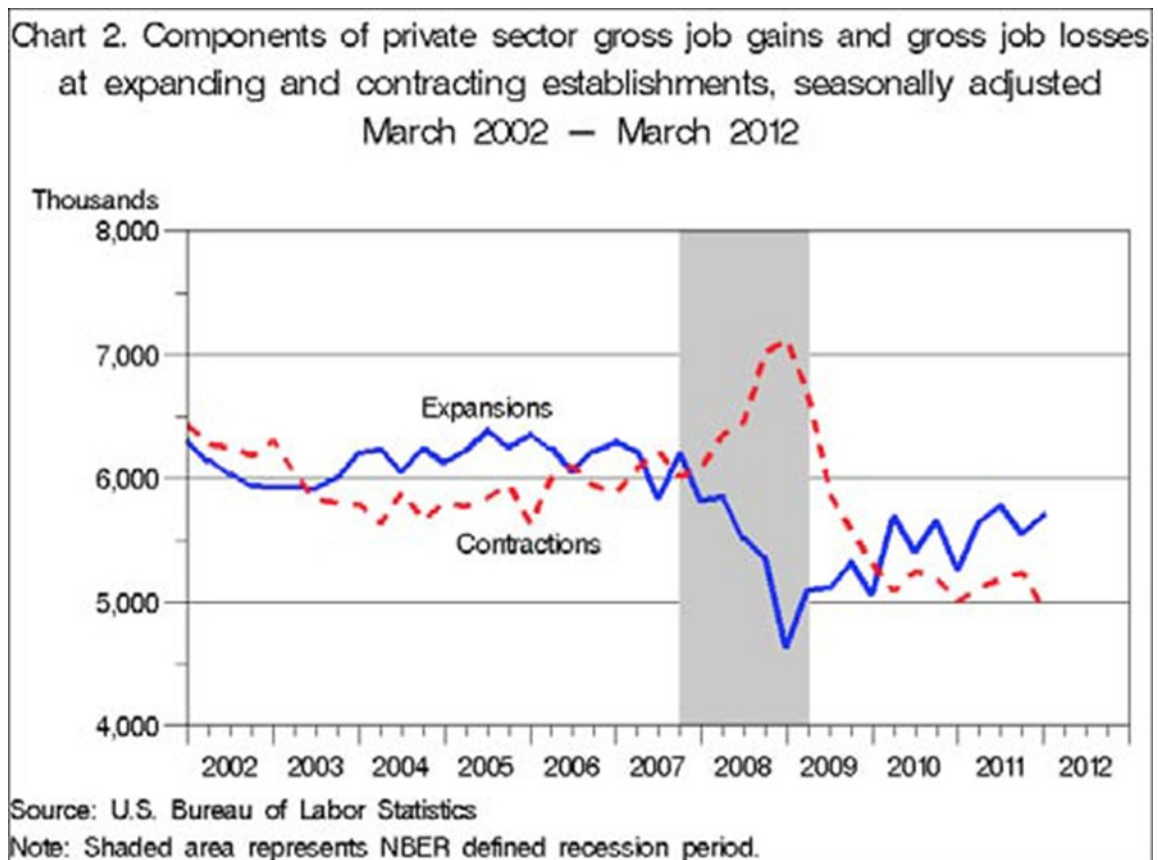


Figure 8 Components of Private Sector Jobs, March 2002-2012

Reynolds (2007) underlines the importance of new firms for job growth, productivity enhancements, and innovation, as well as for social mobility. Reynolds (2007) shows that a large portion of the U.S. population is involved in some form of new business activity in line with the entrepreneurial nature of the US society. Moreover, Reynolds (2007) links entrepreneurship with innovation and thus with investments in research and development (R&D) and underscores the importance for the United States to make investments in R&D and higher education to maintain the leadership in the world economy.

The Kauffman Index of Entrepreneurial Activity (Fairlie, 2012) complements the information of the Labor Department with a leading indicator of new business creation in the United States. The Index identifies new business owners in their first month of significant business activity, the earliest measure of new business development across the United States. The percentage of the adult, non-business-owner population that starts a business each month is measured using data from the Current Population Survey (Fairlie, 2012). The Kauffman Index provides the only national measure of business creation by specific demographic groups. The Kauffman Index reveals important shifts in the national level of entrepreneurial activity and the demographic and geographic composition of new entrepreneurs across the country³⁹.

Figure 9 shows the Kauffman Index during the period 1996–2011.

³⁹ Main findings for 2011 (Fairlie 2012, 3–4)

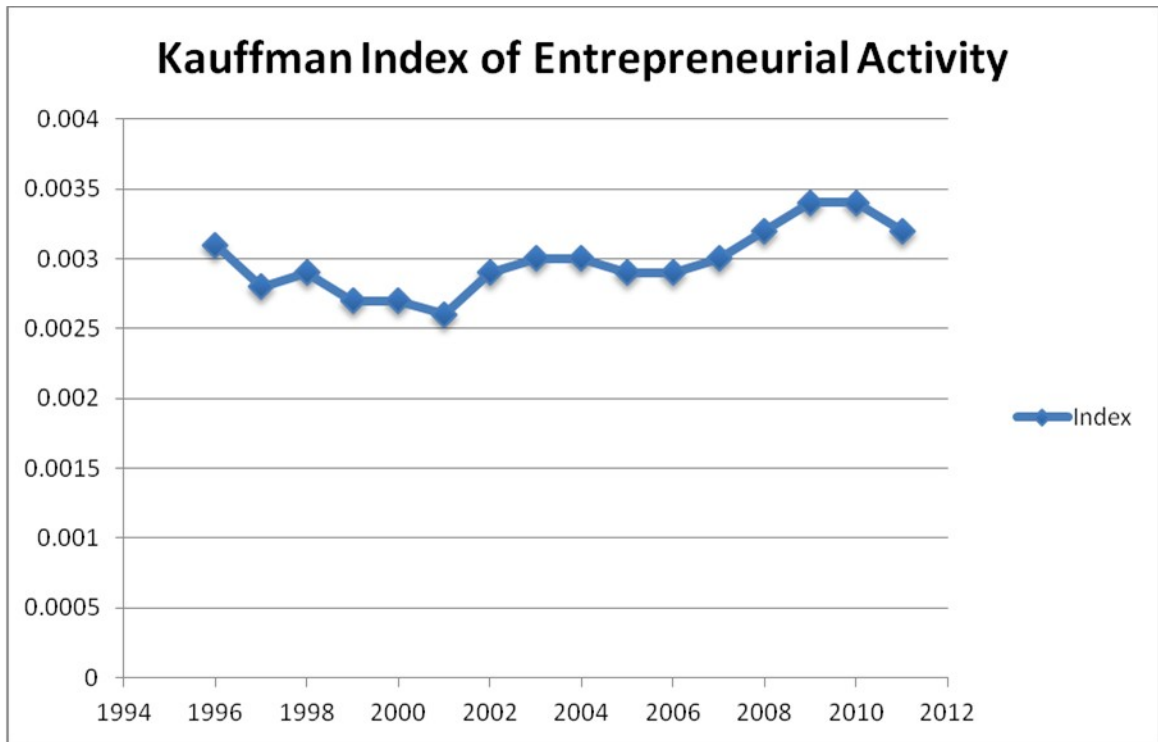


Figure 9 Kauffman Index of Entrepreneurial Activity in the United States

iii. The Informal Economy in the United States

Drawing from various authors (Blades & Roberts, 2002; Dell’Anno & Solomon, 2008; Feige & Cebula, 2011; Feige & Urban, 2008), the informal sector constitutes the part of an economy that is not taxed, monitored by any form of government or included in the GNP, (gross national product) differently from the economy that is considered formal. According to the International Labor Organization (ILO), the term “informal economy” refers to “all economic activities by workers and economic units that are—in law or in practice—not covered or insufficiently covered by formal arrangements. Their activities are not included in the law, which means that they are operating outside the formal reach of the law; or they are not covered in practice, which means that—although

they are operating within the formal reach of the law—the law is not applied or not enforced; or the law discourages compliance because it is inappropriate, burdensome, or imposes excessive costs”⁴⁰

There is growing sub-set of literature on entrepreneurship that looks at the informal economy and entrepreneurship (Guha-Khasnobis, Kanbur, & Ostrom, 2007; J. W. Webb, Tihanyi, Ireland, & Sirmon, 2009). Informal employment is negatively correlated with income per capita and positively correlated with poverty across countries. This suggests that as GDP increases and poverty declines across countries, workers become aware of legal and social protections and worker benefits (ILO, 2011). Schneider, Buehn, & Montenegro (2010) look at the so-called shadow economy and use a Multiple Indicators Multiple Causes Model - a structural equations model - to analyze and estimate the shadow economies of 162 countries around the world.

The relationship between informal economy and entrepreneurship is complex and politically and socially sensitive; a number of entrepreneurs undertake activities in the informal sector; important variations exist from a social point of view (e.g., many different groups from professional to unskilled workers can be regarded as participating in the informal economy) (C. C. Williams & Nadin, 2010).

Although informal economy is often associated with emerging market countries, where up to 70% of the labor force (with as much 40% of GDP) work, informal economies -“underground,” “shadow,” “invisible” and “black” economies - exist also in some form in advanced market countries. A recent study reports that worldwide the

⁴⁰ <http://www.ilo.org/public/english/support/lib/resource/subject/informal.htm>

“informal economy” amounts to about \$10 trillion annually, or about 12.5% of the world economy (Neuwirth, 2011).

In 2007, the World Bank estimated that the informal economy in the United States accounts for 8.8% of GDP, one of the smallest shadow economies in the world, i.e., the World Bank ranks the United States 102nd, while Brazil ranks 33rd, with an almost 40% informal economy (see the next chapter), and Italy ranks 67th, with about 27%.

According to the statistics, the size of the informal sector in the United States is low. In the early 1980s, Tanzi studied extensively the problem of informal sector in United States (Tanzi, 1982, 1983, 2002). Currently, there are not many studies about the informal sector in the United States and informality seems associated with undocumented workers (Richardson & Pisani, 2012).

The size of the informal economy is relevant and it shows the potential for some form of independent activity and for entrepreneurship that is mostly income generating and with a low content of innovation.

The level of informality also constitutes an indicator of an underserved insurance market; see the section on Brazil and the analysis of Acs and Virgill (2009).

iv. The U.S. Insurance Market

In the United States, the charter for an insurer to operate is granted at the State level. State laws require insurers and insurance-related businesses to be licensed before selling their products or services. State legislatures establish policies for the regulation of insurance, i.e., they oversee state insurance departments, review state insurance laws, and approve regulatory budgets. The National Association of Insurance Commissioners

(NAIC) is the institution created by the State commissioners to coordinate their activities and share resources.(National Association of Insurance Commissioners (NAIC), 2010)

The Insurance Information Institute (2011) stresses that the insurance industry in the United States has a significant impact on the nation's economy that goes beyond collecting premiums and settling claims. Insurance companies employ professionals, invest in fixed income, bonds and other instruments and serve people in time of significant stress and need. The Insurance Information Institute (2011) presents the role of the insurance industry in the U.S. in 2009 as follows:

- The U.S. insurance industry's net premiums written totaled \$934 billion, with premiums for life/health (L/H) accounting for 55% and premiums for property/casualty (P/C) accounting for 45%.
- P/C insurance (auto, home and commercial insurance). Net premiums \$423 billion.
- The L/H insurance (annuities and life insurance). Net premiums \$511 billion.
- 2,737 P/C insurance companies and 1,106 L/H insurance companies in the United States.
- Insurance carriers and related activities totaled \$464 billion, or 3.2%, of U.S. gross domestic product.
- The U.S. insurance industry employed 2.2 million people with a wide variety of careers.
- Total P/C cash and invested assets were \$1.3 trillion. L/H cash and invested assets totaled \$3.1 trillion. The majority of these assets were in bonds (69% of P/C assets and 75% of L/H assets).
- P/C and L/H insurance companies paid \$14.7 billion in premium taxes, i.e., \$48 for every person living in the United States.
- P/C insurers paid out claims for \$10.6 billion in property losses related to catastrophes.

Tables 5 and 6 present the details of the insurance industry's contribution to the GDP of the United States, which reached the level of 2.8% in 2009 and about 2.6 % in 2011. The insurance industry (property/casualty and life/health) is a key player in the

capital markets, with holdings of nearly \$5 trillion in corporate and foreign bonds, corporate stocks, municipal securities and U.S. government securities in 2009.

Table 5 Contribution of the Insurance Industry to the GDP in the United States

Insurance Sector' Share of Gross Domestic Product (GDP)- 2007-2011 (\$ billions)			
Year	Total GDP	Insurance carriers and related activities	
		Insurance Contribution	Percent of Total GDP (%)
2007	14,028.70	388.8	2.8
2008	14,291.50	345.6	2.4
2009	13,973.70	388.1	2.8
2010	14,498.90	383.8	2.6
2011	15,075.70	397.6	2.6

Source: Insurance Information Institute and U.S. Department of Commerce, Bureau of Economic Analysis

Source: “A Firm Foundation: How Insurance Supports the Economy” (Insurance Information Institute, 2011, p. 3).

Table 6 Insurance Industry Participation in the U.S. GDP

Insurance Employment and Activities in USA - 2003-2012 - (Annual averages, 000)									
Year	Insurance Carriers				Insurance agencies, brokerages and related services			Total Industry	Insurance and Employees benefits funds
	Direct Insurers		Reinsurers	Total	Insurance, Agencies and Brokers	Other Insurance related activities	Total		
	Life, Health and Medical	Property/Casualty							
2003	789.0	710.0	31.0	1530.0	628.5	208.9	837.4	2367.4	47.1
2004	764.4	678.5	29.8	1472.7	643.3	216.8	860.1	2332.8	47.0
2005	761.9	639.0	28.8	1429.7	650.1	223.5	873.6	2303.3	46.4
2006	787.4	635.4	28.0	1450.9	659.9	230.9	890.8	2341.7	47.8
2007	784.0	633.2	27.0	1444.1	675.3	234.5	909.8	2353.9	48.6
2008	797.6	632.7	27.9	1458.1	669.1	239.4	908.5	2366.7	49.0
2009	799.7	619.1	27.5	1446.3	650.8	236.0	886.7	2333.0	49.1
2010	801.0	600.9	26.8	1428.6	639.9	235.3	875.2	2303.8	48.7
2011	785.9	598.3	25.6	1409.7	646.8	243.4	890.2	2299.9	46.9
2012	807.9	591.3	25.6	1424.8	658.4	253.8	912.3	2337.1	47.4

Source: Insurance Information Institute and U.S. Department of Commerce, Bureau of Economic Analysis

Insurance companies account for 7 of the 50 largest corporate foundations in the United States.

The insurance markets are open and competitive; table 7 and table 8 show that in the United States there is no dominating company in the two main segments of the insurance markets (life and non-life, or property and casualty (PC). In addition, the market is open to foreign companies, e.g., Zurich is the second most important player in the property and casualty insurance. However, US insurance companies have a very large part of the market.

Table 7 Top Insurers in the United States

TOP TEN WRITERS OF PROPERTY/CASUALTY INSURANCE BY DIRECT PREMIUMS WRITTEN (1), 2009 (US\$ 000)			
Rank	Group	Direct premiums written	Market share (%)
1	State Farm Mutual Automobile Insurance	51,063,111	10.60
2	Zurich Financial Services Ltd	28,979,692	6.00
3	Allstate Corp.	26,153,440	5.40
4	American International Group	26,108,637	5.40
5	Liberty Mutual Holding Co.	24,772,894	5.20
6	Travelers Cos.	21,409,548	4.50
7	Berkshire Hathaway Inc.	16,056,324	3.30
8	Nationwide Mutual Group	15,405,668	3.20
9	Progressive Corp.	14,200,294	3.00
10	Hartford Financial Services	10,473,026	2.20
(1) Before reinsurance transactions, excluding state funds. (2) Based on U.S. total including territories.			
Source: SNL Financial LC, Insurance Information Institute. 2011.			

Source: Information Institute

Table 8 Top Insurers in the United States

TOP TEN WRITERS OF LIFE/HEALTH INSURANCE BY DIRECT PREMIUMS WRITTEN (1), 2009 (US\$ 000)			
Rank	Group	Direct premiums written	Market share (%)
1	MetLife Inc.	88,003,977	16.70
2	Prudential Financial Inc.	48,359,584	9.10
3	Manulife Financial Corp.	25,704,483	4.80
4	New York Life Insurance Group	25,096,306	4.70
5	American International Group	24,196,141	4.60
6	ING Groep NV	22,455,707	4.20
7	AEGON NV	19,288,714	3.60
8	Lincoln National Corp.	18,371,493	3.50
9	Hartford Financial Services	15,083,712	2.80
10	Jackson National Life Group	14,483,672	2.70
(1) Includes life insurance, annuity considerations, deposit-type contract funds, other considerations; excludes accident and health insurance from life/health insurers. Before reinsurance transactions, excluding state funds.			
Source: SNL Financial LC, Insurance Information Institute. 2011.			

Source: Information Institute

The penetration ratio in the United States, according to the OECD, is at about 12% in 2011, <http://stats.oecd.org/Index.aspx?QueryId=25437>

VI. Emerging Economies

In 2012, according to the IMF (IMF, 2012d), emerging market economies find themselves in a favorable situation with high commodity prices and available and inexpensive global financing and are in position of leading the global recovery. The IMF's World Economic Outlook of April 2012 (IMF, 2012c) and that of October 2012 (IMF, 2012d) stress that in many emerging market economies, including in Latin America, the recovery has been much faster than in developed countries, even though the

World Economic Outlook of October 2014 indicates that the prospects for emerging markets and for the so-called BRICs (Brazil, Russia India and China) have worsened since April 2012. In 2014, the situation of emerging economies appears less promising with decelerating economic growth in Asia; commodities prices falling, new fears of inflation, and with countries that have not diversified their production and exports and present a number of social, political and institutional problems particularly for various Latin American countries (IMF, 2014a, 2014b).

In any event, as has already been pointed out, emerging markets are expected to have a significant economic growth and favorable prospects particularly for the banking and insurance sectors.

The banks in emerging market countries are well capitalized and will benefit from higher savings that will provide funding for loans in support of economic activities. In addition, economic growth will improve asset quality and profits should be retained to enhance capital ratios. Banks that issue credit cards have good prospects as technology and penetration expands in a situation where transactions (85% in China, over 70% in Brazil) occur in cash or barter (Lanzer & Davidson, 2010, p. 5).

Insurers are expected to benefit from strong penetration based on the S-curve and also from diversification in household asset holdings, with life insurance particularly significant as retirement savings increase.

i. Insurance in Emerging Markets

The sustained public-sector investment in infrastructure and trade have been the two main factors of the growth of premiums in Asia, the Middle East (2010: +7.7%) and

Latin America (+4%) (Swiss.Re, 2011c).

From a financial point of view, (Fenton, Scanlon, & Iver, 2011) indicate that improving investment yields, despite low interest rates, have benefited insurance companies, particularly life insurers. Low inflation has also helped the profitability of Non-life insurance. Under these circumstances, the capital base of insurance companies of emerging market insurers is at pre-crisis levels.

In 2010, premiums of non-life insurance in the emerging markets increased by 7.4% (2009: +2.9%) to US\$243 billion, compared to a long-term trend rate of 8.9% (Table 9). Growth is strong in Asia (+17.7%), particularly in China (+22%), Vietnam (+13%) and Indonesia (+8.6%). Over the next decade, non-life insurance premiums in emerging markets are expected to increase more rapidly than those in industrialized economies and the share of emerging markets in global non-life should increase to 24% (from 16%).

In 2010, emerging markets life insurance premiums in emerging markets expanded by about 17%, to US\$361 billion, compared to a growth rate of about 13.5% of the previous decade. Strong growth is reported in Asia (+21.7%). Moderate growth took place in the Middle East (+7.0%) and Latin America (+8.5%). In life insurance, the projections of growth for premiums are almost three times those of the mature markets. The share of emerging countries in the global life insurance market is expected to increase from 15% in 2010 to 27% by 2020.

Looking forward, strong economic performance and rapid growth of per capita income will ensure that the growth of premiums in emerging markets outperforms that of

industrialized countries (Table 9). Emerging market countries in Asia are expected to outperform all other regions in absolute and relative terms (Table 9). Swiss.Re (2011c) reports that in 2010 the market share of emerging markets moved from 10.5% to 16.7%. In an assessment of the prospects for insurance market in 2014/15, Swiss Re' Report for 2014 and 2015 concludes that "global economy is gaining strength, but very slowly", which will in turn support premium growth in the non-life primary market, as well as reinsurance (Swiss.Re, 2013, p. 2).

However, in absolute terms, over the next 10 years, industrialized countries will have a larger share of the additional premiums generated worldwide.

Life insurance and personal non-life insurance are expected to benefit from strong economic and income growth, urbanization and aging populations. The so-called longevity products (e.g., annuities, retirement products linked to insurance) are estimated to rise. In life insurance, the Asian region is expected to expand by an annual average real rate of about 10% within the next 10 years, superior to the corresponding increases in other emerging regions (Swiss.Re 2011b, 2011c).

In the non-life sector, higher incomes are supposed to push the demand for property and car insurance. Increasing formal employment should prompt more health, accident and liability coverage to employees. Demand for commercial lines insurance should continue to increase thanks to government-sponsored infrastructure project. In this respect, there is a strong pipeline of infrastructure projects of about US\$900 billion per year to support of insurance products, e.g., engineering and surety lines and trade-related lines of business. In non-life insurance, Asia will also outperform the rest, but by a smaller margin.

Table 9 Worldwide Premiums

World Wide Premium Forecast		
Regions	Premium growth in life and non-life insurance by regions, forecast 2010–2020	
	Life	Non Life
Emerging Markets	9.20%	6.80%
Emerging Asia	10.30%	9.70%
Middle East	8.30%	7.30%
Latin America	8.00%	4.60%
Africa	0.00%	4.80%
Central & Eastern Europe	7.50%	0.00%
Industrialized Countries	3.10%	2.60%
World	4.20%	3.30%
Source: Global Insurance Review 2010, Swiss.Re Economic Research & Consulting, 2011		

The resilience of the insurance industry in emerging markets during the financial crisis and the positive outlook are stimulating the interest of international insurers. In fact, many international insurers pursue opportunities in the fast-growing emerging markets; local insurers are likely to face strong foreign competition; and banks will use their branches to penetrate local insurance markets.

The financial crisis (e.g., AEGON, AIG, AXA) has prompted some international insurers to restructure their global operations and domestic insurers in emerging markets have taken the opportunity to increase their market shares. Thus, mergers and acquisitions activities expanded in emerging markets and should continue, e.g., in Brazil,

Itau merged with Unibanco, creating one of the largest financial conglomerates in Latin America.

The global financial crisis has also triggered a renewed focus on solvency and supervision of group activities (O'Brien, 2010) International Association of Insurance Supervisors 2011a, 2011b).

Within this logic, emerging markets have been upgrading their supervisory standards to international best practices (International Association of Insurance Supervisors 2011a, 2011b), i.e., in Asia and Latin America, and there is a trend toward higher minimum requirements, the adoption of risk-based-capital-solvency systems, the introduction of dynamic stress tests and scenarios. Solvency II in the European Union has influenced countries in Eastern Europe; Mexico is implementing a version of Solvency II that will increase solvency capital to take advantage of growth opportunities.

Regulators are pushing for better consumer protection, e.g., establishment of policyholder protection funds and simplified sale processes.

VII. The Latin American Economy

In the past, inflation has afflicted Latin America countries (Bernanke, 2005). Today, most countries in the region have the single-digit inflation even though various countries witness a recurrent danger of inflation (e.g., Argentina, Venezuela and to a certain extent Brazil). The countries in the region have been reforming their political and governmental institutions and recovered from past dictatorships, and almost all Latin American countries are now democracies. A process of integration is slowly under way; i.e., Latin America countries have two regional associations: (1) the Mercosur, which

includes Argentina, Brazil, Paraguay and Uruguay; and (2) the Free Trade Area of the Americas, which includes all the countries in the Americas except Cuba. Both associations are intended to improve the business environment, encourage free trade and economic cooperation, and foster political integration, including a possible single currency for its member countries (Cummins & Venard, 2007) (Levy and Pereira 2007). In addition, various Latin American countries that look the Pacific are part of the Trans-Pacific Partnership (TPP), a proposed regional [free-trade agreement](#) among Asian and Latin American countries facing the Pacific. As of 2014, twelve countries throughout the regions have participated in negotiations on the TPP (Australia, Canada, Chile, Japan, Malaysia, Mexico, New Zealand, Peru, Singapore, the United States, and Vietnam).

With respect to the financial crisis of 2007–8 and the crisis of the European debt of 2010-2012 and beyond, some authors (Pineda, Pérez-Caldentey, & Titelman, 2009) believe that the impact of the financial crisis is not going to be different from that of past crises. A common view, e.g., Jara, Moreno and Tovar (2009); Rojas-Suarez (2010); Porzecanski (2009); and recently (Rojas-Suarez & Montoro, 2012), however, is that the impact of the global crisis on Latin America has been less severe than in previous crises. This is mainly due to the development of domestic financial and bond markets, which have provided an incentive to retain local savings issuing bonds in local currencies and attract external financial inflows; and to the reform of supervision so that banks - foreign and domestic – operating in Latin American countries are aligned to standards in line with the international norms (IMF, 2009b) shielding the financial system against external

shocks. The World Economic Outlook of October 2012 (IMF, 2012d) recognizes that almost all the Latin American countries have undertaken significant reforms in the economic and financial arenas that put the region in a position to overcome the global crisis. The World Economic Outlook of October 2012 (IMF, 2012d) had a positive stance for Latin America with the prices of commodities (Yu, 2011)⁴¹ and domestic demand driving growth. The risks for Latin American countries are: spillovers of the euro area crisis (e.g., related to Spanish banks); and uneven global growth prospects. Policy uncertainty that affects European countries and the United States is of limited concern for Latin American countries (IMF 2012b). The positive macroeconomic scenario attracts foreign capital, i.e., private capital flows have somewhat declined due to the global situation but remain strong in the sector of raw material.⁴² However, the IMF Outlook of October 2014 shows GDP of Latin America as a whole grew at around 4.5% in 2010, 4% in 2011 and about 3% in 2012 and 2.5% in 2013 and it is expected to be little above 1% in 2014 and 2% in 2015 (IMF, 2014b, pp. 6–7, 2014b, pp. 56–8). High commodity prices and easy external financial conditions have given good prospects for growth in the last 10 years, but could be reversed in the years ahead with stagnant commodity prices, reduced capital inflows and still uncompetitive economies with limited efficiency and innovation. Some Latin American countries (particularly Mexico, Colombia, Peru, and Chile) present also weaker growth with respect to the previous outlook of April 2014, but strong fundamentals, robust fiscal accounts and contained inflation (IMF, 2014b, pp. 2, 8, 56–58). In this

41 Export receipts are expected to remain strong over the next five years and beyond.

42 Despite the dramatic positive changes and reforms, due to the still high level of debt, past economic and financial crises, bureaucracies that do not facilitate to open and operate local businesses, and relatively low levels of education, Latin American countries do not attract foreign investors to the same extent as the Asian countries do.

respect, Talvi (2014, pp. 27–8) argues that there are three Latin Americas: the first one includes Argentina and Venezuela with bleak performances and uncertain political and social situations; Mexico, Chile, Colombia and Peru (countries that face the Pacific) are in the second group and present a much better picture and favorable perspectives; and the third one, Brazil, with a great potential, but with a critical need of undertaking reforms to improve the functioning of the economy and the society.

Overall, the perspectives of growth and improvement of the standards of living in Latin American countries remain uncertain. The 2014 Macroeconomic Report of the Inter-American Development Bank indicates that “growth rates are insufficient to meet the many social demands in the region and reflect low underlying productivity growth that will not allow the countries to maintain relative income levels with other emerging economies or close the income-gap with advanced economies. A key priority going forward is to find ways to enhance potential growth” (Inter-American Development Bank, 2014, p. 55). Along this lines also the analysis of experts of the International Monetary Fund stresses that “fostering TFP (Total Factor Productivity) growth would remain a key challenge and priority for the LAC region”(Sosa, Tsounta, & Kim, 2013, p. 15). In addition, the imperative of Latin America remains export diversification (in products and markets) to reduce dependence from the prices of commodities. Also structural reforms to support growth are necessary, e.g., investments in infrastructure to ease bottlenecks; changes to favor technology innovation and entrepreneurship (Brenes & Haar, 2012).

In this context, the region's strongest and most resilient economy – namely Brazil, a world player with the largest country in terms of population and GDP in Latin America – has still positive prospects, but several hurdles to overcome (e.g., inequality, inflation, institutional reforms, corruption).

VIII. The Latin American Insurance Markets

High inflation experienced in the region in previous decades is one of the reasons for the low level of insurance penetration⁴³ especially life insurance (e.g., the demand for life insurance is more sensitive to inflation than the demand for non-life insurance) (Swiss.Re, 2009).

However, over the last few years, favorable economic developments have permitted the expansion of middle class and entrepreneurs. Insurance companies contribute by developing simple products at lower costs and by using cost-efficient distribution channels such as banks, retail stores and the Internet (Swiss.Re, 2011c).

With respect to life insurance, given the strong economic performance and good fundamentals, life insurance market has been growing significantly in the last few years and presents a favorable outlook. Despite the recession, in 2009, life insurance premiums grew by 7.8%, to US\$44 billion. Mexico and Brazil are the two largest regional markets (Swiss.Re, 2010) that witness solid growth. The expansion of VGBL6 (Vida Gerador de Benefícios Livres, or Redeemable Life Insurance), which offers group life and credit insurance, has lifted the Brazilian life market. Similarly, in Mexico, individual and collective life insurance has balanced the reduction of group life business. In the

⁴³ Corporations, upper-middle-class households and high-income individuals are the buyers of insurance in Latin America.

remaining markets, growth slowed in Argentina due to the nationalization of the pension system. In Chile, the annuity business fell sharply. In Colombia, sales of life products slowed while annuities performed well. Life premium's growth in Peru has been increasing. The devaluation of the bolivar fuerte in early 2010 penalized the volume of premiums in Venezuela. In 2011 and 2012, as the economies in the region recovered, life premiums returned to large double-digit growth, while non-life premiums slowed due to the financial crisis (Swiss.Re, 2010).

With respect to non-life, after a 10-year period of robust growth, in 2009, the growth of premiums for non-life decelerated to 4.3%. The Brazilian insurance market, which accounts for more than 35% of the region's non-life premiums, declined slightly as a result of decreases in transportation and credit insurance, due to the global recession. However, this decline was partially offset by the double-digit growth of premiums for financial, rural and special risks. Auto insurance premiums fell as sales of new cars slowed, except in Brazil due to tax breaks for the purchase of new cars. Chile's non-life market was affected by the economic crisis, falling by 8.4%. Instead, the non-life markets in Mexico, Colombia and Peru accelerated. In Colombia, the transfer of public workers' risks to private insurers and sales of surety insurance related to anti-cyclical fiscal spending on infrastructure determined a double-digit growth in 2009. Argentina grew at double-digit rates in the last 5 years.

In the future (IMF, 2012c, 2014a), positive growth is expected for Latin American countries, and insurance penetration should grow faster than GDP per capita.⁴⁴ Data from

⁴⁴ As seen in Chapter 2, GDP per capita and insurance penetration are not related linearly, e.g., penetration increases slowly in countries in an early stage of economic development, and moves faster in emerging economies, but again slowly in developed economies.

Assal (Asociación de Supervisores de Seguros de América Latina, <http://www.assalweb.org/>) and Swiss.Re (Swiss.Re, 2004, 2011b, 2011c, 2013) show a steady improvement of the penetration of insurance in most Latin American countries (Figure 10). Insurance premiums are expected to outperform economic growth due to the demand for insurance related to infrastructure and energy investments. Personal lines of insurance are also expected to grow as insurers develop simple products and use cost-efficient distribution channels to reach untapped markets, e.g., low- and medium-income households.

According to Swiss.Re (2013) , the figures of the growth of insurance (life and non-life) for emerging markets in recent years (2011-2013) have been robust and this trend is expected to continue. In Latin America, in life insurance there has been about 18% growth in 2011 - 2013 and 10% growth is expected for 2014 and 2015. In non-life, the growth in Latin American countries has been above 5% in the years 2011-2013 and is expected to grow slightly below 5% in 2014 and 2015.

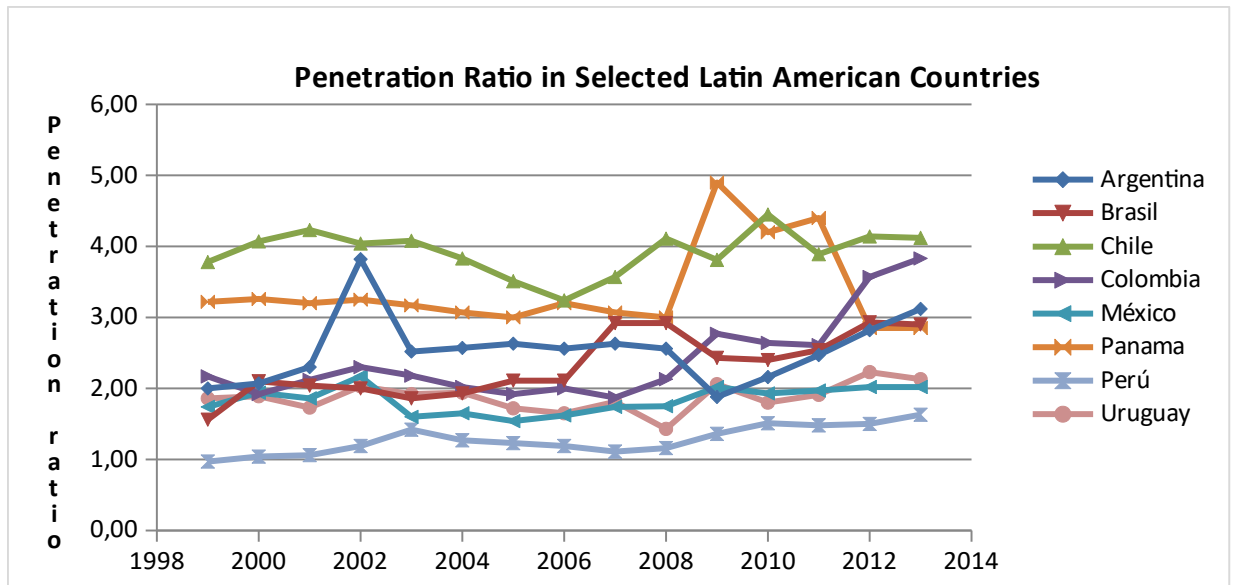


Figure 10 Insurance Penetration in Latin America

Source: Asociación de Supervisores de Seguros de América Latina (ASSAL)

The report of Swiss.Re (2011c) argues that greater insurance awareness, enforcement of compulsory covers and opening of the Brazilian reinsurance market (i.e., Brazil’s reinsurance market opened to direct competition in 2007, see below) constitute additional drivers of the growth of insurance in Latin American countries. Given the size of the Brazilian insurance market (i.e., population of 200 million; GDP of nearly US\$2.5 billion; premiums written in Brazil constitute more than 40% of the insurance premiums written in Latin America), the opening of that market provides a competitive insurance field. Mexico and Colombia present similar potential.

Under these favorable conditions, the insurance industry in the Latin America region is undergoing a process of concentration, expansion, and competition for market share: foreign insurers put their bases for the region, or for the Mercosur in Brazil;

Brazilian insurers are opening subsidiaries in other Latin American countries where they can operate also as reinsurers. Marcela Abraham, Karla Estavillo and Mauricio Ruiz concur with the favorable prospects for insurance in many Latin American countries that present differences in many respects (e.g., regulation, mandatory insurance, literacy and awareness) and argue that “the Latin American insurance market has become attractive to new entrants. Nevertheless, insurance awareness, regulation, tax considerations and distribution challenges demand attention. A key challenge is lack of insurance awareness, a deficit that can be offset with financial education. Inadequate regulation hinders market development by failing to establish the necessary parameters and stability, but overregulation (e.g., high capital requirements) discourages new entrants.” (Abraham, Estavillo, & Ruiz, 2014, p. 22)

Under these circumstances, there is the expectation of a greater supply of insurance in Latin American countries.

IX. Brazil

Brazil’s population is around 195 million (2011); GDP of Brazil in 2011 is US\$2,476,651 million (World Bank); Brazil is the 5th-largest in the world (World Bank 2008; <http://siteresources.worldbank.org/DATASTATISTICS/Resources/POP.pdf>). The country’s growing, diverse and mostly urban population, i.e., 85% of all Brazilians live in urban areas, constitutes an amalgamation of settlers and immigrants, indigenous people and descendants of slave that have a common single Brazilian-Portuguese language. Brazil is a federal state. The majority of Brazilian people live in the wealthier South and Southeast regions.

In early 1990s, prolonged inflation was put under control with the execution of the Real Plan. As a consequence, financial stability and opportunities for long-term savings supported the development of private insurance industry. Under prudent fiscal and monetary policies, liberalization and privatization, the Brazilian economy overcame the crisis of 1998 (i.e., caused by the fall in commodity prices and crisis of the balance-of-payments). The introduction of policies to make the national currency a reliable value reference boosted economic stability. As the credibility of the system increased, economic agents were inclined to make investments including foreign investments. Greater openness and competition allowed companies to improve their efficiency. In addition to the sound macroeconomic policies, there were important new oil findings that make the country energy independent.

However, in 2002, at the time of Luiz Inácio *Lula* da Silva's election as President, Brazil was on the brink of failure. The country suffered speculative attacks against its currency, as the world feared that Lula might turn out to be a communist. The 2002 presidential elections subjected Brazilian economic policy to a crucial credibility test. With the date of elections approaching, uncertainty concerning future macroeconomic policy led to a sharp devaluation of the real. To avoid tensions, all the presidential candidates subscribed an agreement that there would be no sharp reversal of prudent macroeconomic policies whatever the elections' result. The IMF backed the agreement with a loan of US\$40 billion. This constituted a critical departure of Brazilian politics from old-fashioned ideologies to market discipline. President Lula's government continued the fiscal and monetary policies and the stabilization program of President

Fernando Henrique Cardoso. Privatization of the financial sector proceeded at a slower pace, e.g., the planned privatization of the IRB in 2000 suffered delays due to judicial disputes.

As Lula's government took office, the prices of mineral and agricultural commodities started to boom: the output remained almost the same, but its value increased by about 30% and so increased the budgetary revenues deriving from exports to the booming economies of China and India. Lula initiated a strategy based on financing infrastructure and domestic demand in both cases with significant reliance on Government intervention and resources. The revenues from taxes on commodity exports were generally directed to finance initiatives in infrastructure and welfare (e.g., the Bolsa Família). With taxation revenues in Brazil around 40% of GDP, government spending around 38% of GDP, and public debt to GDP about 36%, the government started to modernize the economy, spur domestic demand and employment as well as growth and reduce the population living below poverty and misery lines.

In the industrial sector, local manufacturing and services industries are relatively protected by the Government and also due to information asymmetries, e.g., language and culture, and therefore Brazilian companies captured most of the gains. As a result, local manufacturing companies of automobiles, computers, televisions aircrafts and other consumer goods have contributed to high employment levels, given also the flexibility of the country's labor legislation. Housing and construction boomed due to greater access to credit and mortgages; i.e., the share of domestic credit to GDP is at about 45%, which is still low compared with that of developed countries, but higher than 20% in the 1990s.

The industry has been suffering recently from the overvaluation of the Brazilian currency (e.g., in 2002, before Lula's election, the Real was at R\$4.5 to \$1 and at R\$1.5 to US\$1 at the beginning of 2012).

The Brazilian monetary authorities pursued successfully the policy of inflation targeting. Consumer prices reached the level of 5.25% in 2002, which is a dramatic achievement given past levels of hyperinflation (e.g., average inflation at 760% per year between 1990 and 1995, with peaks at 2,500%). The rate known as the Sistema Especial de Liquidação e Custódia (Special System of Settlement and Custody)—set by the Comitê de Política Monetária (Monetary Policy Committee)—constitutes Banco Central do Brazil, BACEN's benchmark for performing open market operations in the execution of monetary policy.

Starting in 2010, the economy becomes characterized by high real interest rates, though interest rates fell during the global economic crisis of 2007–8. The benchmark rate indicated above was reduced from 13.75% to 8.75% in January 2009 and then moved up to 9.75% in April 2012.

Brazil has a young population, with a low birthrate and growing life expectancy. There is also a significant inflow of human capital, e.g., from Italy, Portugal and Spain.

Under these circumstances, in the last 5 to 10 years, Brazil has grown significantly and has reached the role of world player. Some macroeconomic indicators illustrate the performance of Brazil: GDP per capita (PPP adjusted) as measured by the World Bank's World Development Indicators for 2011, US\$11,640. Real GDP grew at 5.4% (4.2% per capita) from 2006 to 2007, before declining slightly to 5.1% in 2008.

Next to China, Brazil is the emerging country with the highest FDI, totaling more than US\$45 billion in 2008 (Economist Special Report, 2009; Oliveira, 2010). According to the World Competitiveness Report (Sala-i-Martin, Dervis and Hausmann 2010), access to electricity as measured by the electricity rate is 97%. According to the National Sample Survey of Households of the IBGE, 98.8% of the population had electricity in their homes in 2009. Furthermore, according to the World Health Organization and United Nations International Children's Fund- UNICEF, 96% of Brazilians have access to water and 77% of Brazilians have access to piped water, i.e., at least 75% of Brazilian households receive utility bills and can be reached with insurance products. Many multinational companies intend to enter Brazil with new or expanded existing FDI, due to Brazil's market size and prospects. In terms of infrastructure, Brazil has achieved near-universal access to electricity.

The origin of the success of Brazil is the undertaking of the strategy to use the proceeds from commodities and raw materials to sustain and finance infrastructure building and to support domestic demand with transfers mainly directed to the poor segments of the population⁴⁵. This implies a relevant government intervention. In the last 10 years, there has been an enormous increase in the income of poor people⁴⁶, even though the most recent changes in commodities prices and the social revolts are questioning the strategy as well as the preservation of the achievements.

45 These measures also protect the local companies not ready to compete in the global markets yet.

46 There are two ways of considering poverty in Brazil: relative to the international poverty lines defined by the World Bank; i.e., \$1.25 per day (PPP adjusted) or \$2 per day (Bester et al. 2010). Using the national poverty line, 23% of the population is classified as poor. Absolute poverty is much lower when using the international poverty lines; only 5% of Brazilians live on less than \$1.25 per day and 15% below \$2 per day, which is low compared with some other large developing countries, but high compared with selected Latin American peers.

Given the favorable circumstances, the crisis of 2007–8 and the crisis of the European debt of 2011–12, had a mild impact on Brazil, i.e., the economy in Brazil shrank for only two quarters in 2009 with negative growth of 1.8% in the first quarter of 2009 (<http://www.bcb.gov.br/?english>; Banco Central do Brazil, BACEN). Brazil has been one of the first countries to emerge from the recession, and growth resumed in the second half of 2009 (Economist 2009).

Various authors have recently written about the rise of Brazil. Naiman (2010) gives credit to President Lula. Rohter (2012) argues that Brazil is becoming a great economic power, but is also a country with a long and complex history. Along the same lines, Roett (2011) tells the story of the largest country in Latin America and its evolution and the challenges it has overcome evolving from an isolated Portuguese colony into a regional and world leader. Both Rohter and Roett look at Brazil as one of the key BRIC countries that in this time of crisis constitute the only spots that provide growth for the world. Roett (2011, 2–14) indicates that Brazil “was one of the last emerging market economies to be affected by the 2008–9 world financial and economic crisis” and was the first to emerge with little harm. Brainard and Martinez-Diaz (2009, p. 4) reiterate that the rise of Brazil is due to the convergence of various elements: strong global demand—particularly from China and Asia—for the country’s major raw material products; successes for its major corporations (e.g., in agribusiness and energy); steady results from its economic policies, including inflation targeting and maintenance of an autonomous central bank; government debt management; and social investments that are building confidence and reviving dreams of the greatness that has proven elusive in the past.

Serrano and Summa (2011) report that since 1999, the strategy of Brazil has rightly focused on three main targets: low inflation; floating exchange rate regime; and primary budget surplus. The authors, however, underscore the weaknesses of Brazil, e.g., endemic inequality; ambivalence towards free market and global economic integration as opposed to Government intervention and protectionism; and a relatively high dependence on export of raw materials.

In fact, there are a number of challenges that the Brazilian authorities need to tackle to continue the economic expansion and the institutional development. A recent study by the World Bank (Canuto, Cavallari, & Reis, 2013) stresses that the terms of trade have been particularly favorable for Brazil. However, there are concerns about the competitiveness of the Brazilian economy not only due to a strong currency but also, and more importantly, to low productivity performance and real wage increase that significantly reduces competitiveness. Under these circumstances, the authors underline the importance to continue reforms, increasing the ratio of investment to GDP, and advancing toward better-skilled human capital, innovation and entrepreneurship (Canuto et al., 2013). Along these lines of great accomplishment but unfinished job, Matthew(2014) says:” Brazil fared well in the aftermath of the 2007-2008 global financial crisis. Due to the 2009 stimulus package and subsequent spending initiatives, economic growth was maintained, jobs were created, and poverty continued to decline. Stimulus spending has had mixed effects on the well-being of the underprivileged primarily because the quality of distributed services and goods has been overlooked. If established socioeconomic successes are to be sustained, attention must be turned

towards improving the quality of human capital building services for all members of society, including the underprivileged”(Matthew, 2014, p. 4). A critical point that Brazil has to undertake is the issue of corruption that many studies relate to the growth of government intervention (Ioan, 2009; Rose-Ackerman, 1999; Sahu & Gahlot, 2014).

Brazil is the largest and most powerful country in Latin America with a very strong economic performance. However, with respect to social indicators despite the efforts, Brazil remains one of the countries with the largest inequality, with a Gini coefficient of 0.56 at the same level that Guatemala; high level of poverty; and significant corruption (de Souza, 2012). The mass demonstrations in 2013 and 2014 and particularly those in early 2014 and in May and June before the Soccer World Cup against the cost of transportation, corruption, high taxes question the progresses attained and show the vulnerabilities of the country. Fundamental issues reduce the prospects of growth for the Brazilian economy (IMF, 2014b, p. xiii), e.g., competitiveness, corruption, efficiency and improvement of services including social services, productive investments including in infrastructure, education; and the government – in an environment less favorable than that of the early 2000 (e.g., declining commodities prices) - has to take action (UNCTAD, 2012b) and particularly the new President to be elected in October 2014.

i. The Structure of the Brazilian Economy

The structure of the Brazilian economy in 2010 (Figure 11) is moving toward the tertiary sector⁴⁷ (services), which accounts for 64.5% of GDP, industry and

⁴⁷ For comparative purposes, agriculture contributes 3.6% to GDP in Mexico, 4.1% in Chile, 10.5% in Colombia and 8.4% in Argentina. Brazil’s tertiary and services sectors have a much larger share in the economy than in other large emerging economies such as India and China, where agriculture contributes respectively 26.1% and 18.1% to GDP (World Bank, 2009—various “Country at a glance” factsheets).

manufacturing account for about 31%, and agriculture contributes about 5% (e.g., poultry, beef, sugar, coffee, paper, and iron). Agribusiness remains the core of the economy contributing about 40% to export earnings. Forests are the source of much of the world's pulp and Brazil could supply the world with ethanol to fuel cars.⁴⁸

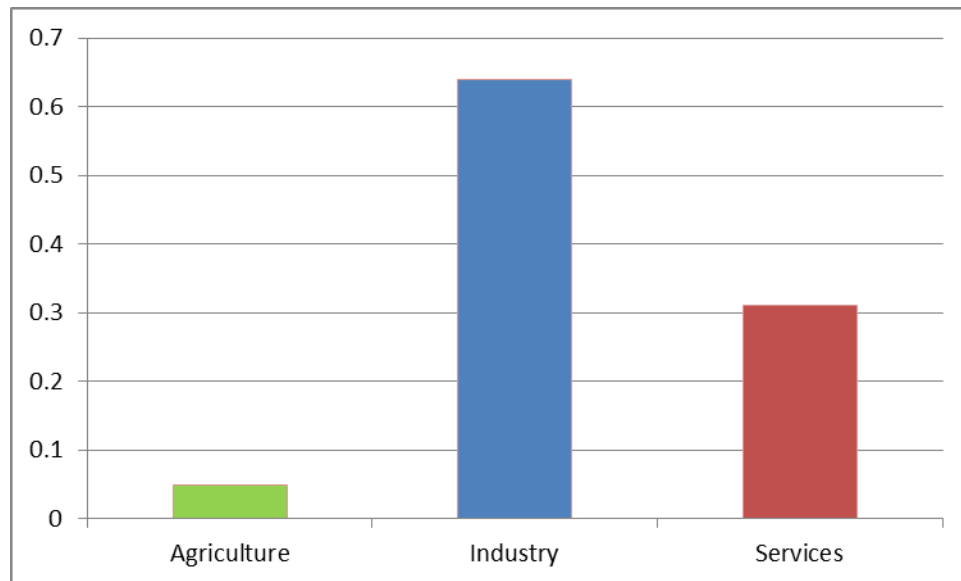


Figure 11 The Structure of the Brazilian Economy
Source: Bester et al. (Bester et al., 2010, p. 6).

The Brazilian economy has grown significantly over recent years generating employment, i.e., unemployment is at around 8%.

⁴⁸ See “Condemned to Prosperity: Brazil Has Learned to Love Its Commodity Sector,” *Economist*, November 12, 2009, http://www.economist.com/specialreports/displaystory.cfm?story_id=14829525.

ii. Entrepreneurship in Brazil

Under the macroeconomic strategy, since 2004 and up to 2010, the growth of the Brazilian economy was more than twice its annual growth during the period 1999–2003. According to the IMF Outlook of April 2014, in the last few years there has been a slowdown of growth rates in a few large emerging market economies including Brazil. For Brazil, economic growth is expected to be at about 1.8-2% in 2014 and 2015 (IMF, 2014a, p. 61). Despite the present perspectives, economic growth has allowed reducing poverty, extreme poverty and inequality significantly. In addition to effective macroeconomic policies, the Brazilian government has undertaken a series of actions in favor of business activity and entrepreneurship.

A 2008 report - released by the Planning Department and the Instituto Brasileiro de Geografia e Estatística (IBGE) under the auspices of the President of the Republic, Dilma Rousseff - underlines the importance of innovation and entrepreneurship for the economic growth and development of Brazil. IBGE and GEM have studied the case of Brazil (Global Entrepreneurship Monitor, 2013; Instituto Brasileiro de Geografia e Estatística, 2011).

The IBGE 2011 report considers the period 2005–9 and shows that high-growth companies (Global Entrepreneurship Monitor, 2011a) have been growing at an impressive 172.4%, on average. High-growth companies accounted for 57.4% of the generation of new jobs during the period 2005–8. High-growth companies created a gross value added of 18.0% in the sectors of industry, construction, trade and services.

The average age of high-growth companies ranges from 10.4 to 18.7 years for those companies in activity; the average age of the “gazelles” (i.e., companies that have an annual growth rate in revenues of 20% or higher), is from 4.1 to 6.9 years. The distribution by size is 51.6% of the high-growth companies are small, 39.0% medium-sized and 9.3% large. In terms of sectors, high-growth companies appear in all sectors, although their distribution is not uniform for all activities. The construction sector appears the main activity with 2.9% of high-growth companies, followed by industry (2.1%), services (0.7%) and trade (0.4%). In the construction sector 37.0% of revenues come from high-growth companies; services, 22.4%; industry, 18.4%, and trade, 14.4%. Geographically, high-growth companies seem to favor the Center-West region.

Recent GEM studies on Brazil (Global Entrepreneurship Monitor, 2011c, 2013) recognize the country’s progresses towards an entrepreneurial society: about 27 million adults between 18 and 64 years of age create or already run a business, which represents more than 25% of the adult population. Brazil has the third-largest entrepreneurial population, in absolute numbers, among the 54 countries that GEM has studied so far. The GEM study shows that TEA, i.e., total early-stage entrepreneurial activity for women (49%) is the fourth largest, among the 54 countries studied. With respect to the age of entrepreneurs, a high number of young people, between the age of 25 and 34, create a new business (established entrepreneurs’ range between 45 and 54 years of age). Brazil’s TEA is proportionally higher in lower-income groups, which reinforces the role of entrepreneurship in the process of social inclusion.

The GEM study gives a very encouraging picture and stresses that Brazilian people consider starting a new business a desirable and viable career option. Moreover, the substantial number of entrepreneurs implies that the country needs to have a permanent strategy aimed at creating an environment favorable to businesses and entrepreneurship. The number of entrepreneurs prompts the government to undertake of policies and actions towards an entrepreneurial society.

The GEM includes Brazil in the second level, i.e., in the group of countries that still need to improve efficiency as opposed to the next, third level, of those countries that have to focus on innovation (United States falls in this category). GEM recommends a series of policies and actions that would support the move to the innovation stage. The recommendations focus on reducing constraints and obstacles to innovation and entrepreneurship (tax system, acquisitions of new technologies); supporting education and training; facilitating institutional functioning; establishing a friendly cultural environment; and favoring access to financial resources and services.

A missing recommendation is that the analysis of entrepreneurship should also focus on data on each of the 27 Brazilian states and also on municipalities and set the basis for a future spatial analysis.

iii. The Informal Economy in Brazil

Figure 12 shows the structure of the population by economic activity and highlights the role of the informal sector in Brazil.

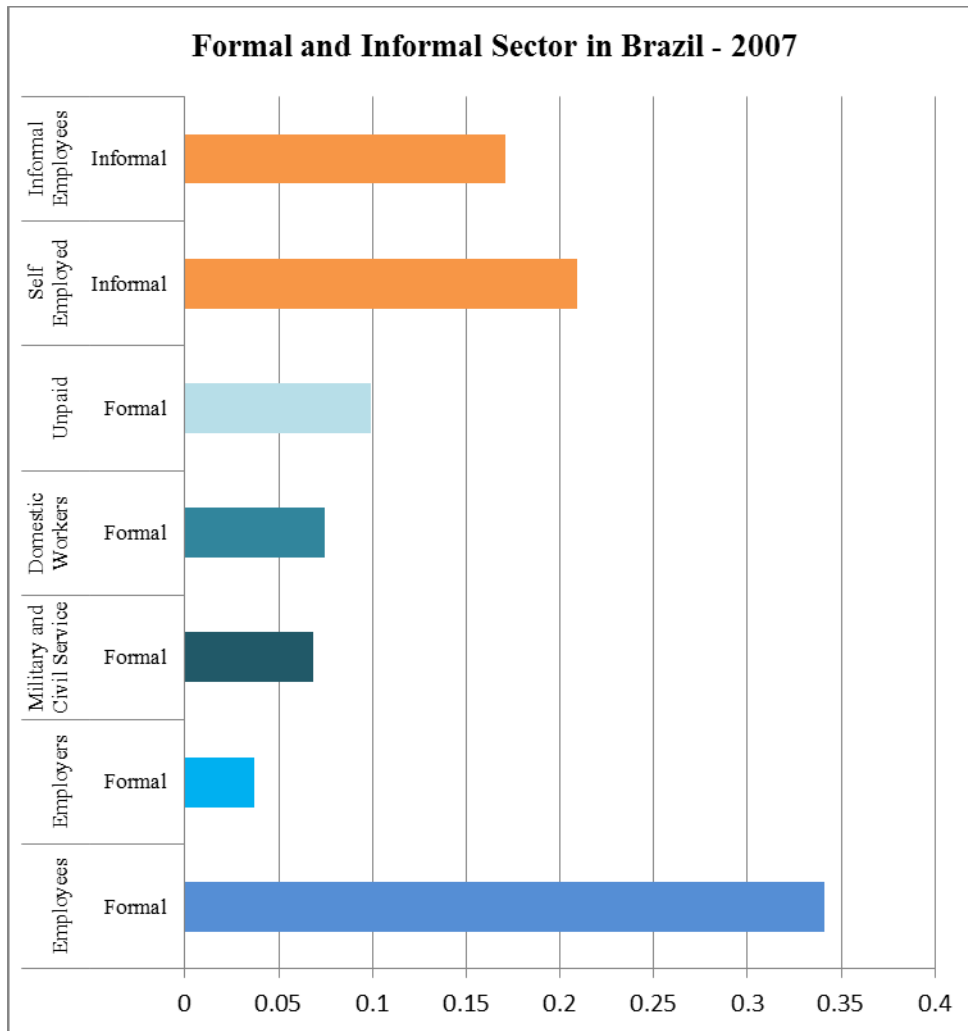


Figure 12 Composition of the Population in Brazil

The level of informality has important implications for entrepreneurship and insurance.⁴⁹

From the point of view of entrepreneurship, a high level of informality is related to entrepreneurship with a smaller content of innovation. In addition, high level of

⁴⁹ For a full review of the informal sector (Schneider, Buehn, & Montenegro, 2010) and the ILO Web site (ILO 2010, 2011, 2012).

informality implies greater difficulty in measuring entrepreneurship (Acs & Virgill, 2009).

From the point of view of insurance, Bester (2010) stress that operators in the informal sector have incomes less certain than those in the formal sector; and they are also more difficult to reach. The level of the labor force considered “formally employed” is 62%. However, from the point of view of the distribution of insurance, not all of them can be reached easily, e.g., through employee groups. For instance, domestic workers⁵⁰ and unremunerated employees cannot be targeted for insurance through their employers.⁵¹

The data related to access to electricity and water (see previous section) imply that a large majority of Brazilian people receive regular utility bills and has a profile and an account as a customer. That account constitutes a tool for effectively providing financial services including insurance. In this respect, the 2003 government’s Program Luz para Todos (Light for All Program), with the goal to provide free installation of electricity in the homes of 10 million rural inhabitants by the end of 2010, can be credited for the increase of the expansion of insurance product and insurance penetration.

iv. The Brazilian Insurance Market

This section draws heavily from various authors (Abreu & Fernandes, 2010; Bester et al., 2010; Deloitte, 2011; IMF, 2012b; A. Levy & Pereira, 2007) who have studied and updated the status of the insurance markets in Brazil and from the reports and data of the Brazilian Supervisor SUSEP (2013). Their work shows the strength of the

⁵⁰ Note, however, that not all domestic workers will be “informal,” as government actively encourages the registration of domestic workers and extending benefits such as pension plans to them.

⁵¹ Bester et al (2010, p. 201) report estimates of 30 million union members that represent only 34% of the employed market, suggesting that 66% of employees would be in the unorganized sector.

insurance industry in Brazil (IMF, 2012b) and the opportunities for insurance development in Brazil, prompted by a greater stability, a rising middle class as well as the need of the lower segments of the population and the incipient micro-insurance market (Deloitte, 2011). The government considers access to finance and insurance a priority and the market is implementing new products targeting low-income customers.

As mentioned in previous sections, government direct intervention and regulation - designed to favor domestic companies and crowd foreign firms out of the market - has characterized the development of insurance in Brazil. In the 19th century, the insurance business grew in importance and in the absence of regulation. However, as a result of the deficit of the balance of payments, there was a move toward stricter controls on the activities of foreign firms and legislation that discriminated against them was issued. The economic programs of the various governments were firmly rooted in old-fashioned nationalism and protectionism and state intervention. The interventionist stance lasted until mid-1990s.⁵² As Abreu and Fernandes (2010, pp. 27–34) indicate, in the early 1990s, the model of autarchy and heavy state intervention started to be revised. Measures undertaken include: reduction of protection, regulatory overhaul, deregulation and privatization of state-owned concerns (e.g., industrial firms and the providers of utilities); significant opening of the market to foreign competition.

These reforms derive from the commitments with which Brazil had to comply under the General Agreement on Trade in Services (GATS, a treaty of the World Trade Organization, WTO), which include access to foreign capital in insurance, reinsurance

⁵² On the other hand, the opposition was strongly aligned with the socialist ideology.

and brokerage activities. The Brazilian Congress approved legislation with some delay (WTO 1997, 157–63).

The expansion of the insurance industry in Brazil since the mid-1990s has been also the result of the combination of favorable macroeconomic and microeconomic factors and the intuition of insurance companies – including global insurers (Deloitte, 2011, pp. 17–20)- to expand their supply.

The economic reforms introduced in the last 10 years, i.e., economic stabilization plan, deregulation process, opening of the market to foreign insurers and privatization program, and the performance of the economy have had a profound impact on the insurance market. The ensuing stable economic conditions, growing business activities and good economic performances of the economy and the large Brazilian population (A. Levy & Pereira, 2007) offer a favorable environment for life and non-life insurance lines, e.g., the end of high inflation prompted the expansion to new areas of activity, e.g., private pension funds, and opened new opportunities for the insurance business. Under these circumstances, the insurance sector has evolved from a small participation rate of 0.8% in the GDP in 1994 to 2.55% in 2008, and the penetration ratio is at 3.2 % in 2008 (up from 0.7% in 1995)(SUSEP, 2007)⁵³ and 3.4 % and 3.5% in 2010 and 2011, respectively (IMF, 2012b, p. 15).

Following the reform of 1996, the Insurance Council (Conselho Nacional dos Seguros Privados, CNSP) constitutes the main authority in the insurance sector. SUSEP is in charge of implementing the policies that the CNSP established at the Federal level. In particular, SUSEP reviews the application to operate as insurer and grants licenses.

⁵³ However, insurance penetration in Brazil is smaller than in Chile.

Therefore, insurance companies, in Brazil, obtain the charter as insurer at the Federal level. The improved regulation and supervision and particularly the strengthening of the solvency requirements including the implementation of the capital surcharges make the industry stronger and consumers are more confident to buy insurance products

Following the opportunities of the period 2005-2010, the insurance industry in Brazil still presents good prospects, but still faces significant problems related to inefficiency and barriers to competition. In addition, several important issues remain to be tackled, e.g., complete liberalization of reinsurance(IMF, 2012b, p. 9); workers' compensation; reform of the public pension system, following the example of other Latin American countries (A. Levy & Pereira, 2007); low-income people that do not have access to financial services; big Brazilian commercial banks control the principal insurance companies(IMF, 2012b, pp. 6–7).

There are two developments that are expected to have a significant impact on insurance business in the longer term. First, in 2008, there have been major offshore oil discoveries in Brazil, which will transform the country - now self-sufficient- into a major oil exporter. Second, the impact of redistributive policies as well as the regulation of the micro insurance market issued in 2011 makes the market for “popular insurance”, i.e., micro insurance, more attractive.

- **Main Events in the Last 15 years**

Table 10 below shows the evolution of the Brazilian insurance market and its role in the economy across the 20th and 21st centuries.

Table 10 Main Changes and Events in the Brazilian Insurance Market 1995-2008

Measures of Insurance Market in Brazil 1995 - 2008											
Insurance Companies		of which linked to financial institutions		Concentration Measures		Premium/GDP		Share of Premium/GDP owned by foreign companies		Foreign Companies Direct Investments in Insurance	
1995	2008	1995	2008	1995	2008	1995	2008	1995	2008	1995	2008
122	130	70%	80%	10 largest companies concentrate 64% of all premium	10 largest companies concentrate 81% of all premium	2.15%	32%	17.9%	36.9%	0.5% of total investment, i.e., \$1120 million	0.9% of total investment, i.e., \$2472 million

Source : WTO Various Years

Table 10 shows that the penetration ratio doubled since the early 1990s. Moreover, the progressive opening of the insurance market to foreign companies not only has favored the growth of insurance in the country but also has significantly raised the participation of foreign companies in the Brazilian insurance market that in 2008 represents almost 40% of the market. In this respect, the FDIs in insurance even if a small percentage of the overall FDIs in Brazil almost doubled in the insurance industry since 1995.

The main reforms and events related to the development of the insurance markets in Brazil during the period 1993–2007 include the following (SUSEP, 2007):⁵⁴

- i.* 1993: the public sector contract insurance services through tenders opened to all insurers operating in Brazil.
- ii.* 1996: foreign capital can enter health insurance.
- iii.* 1996: IRB's reinsurance monopoly is ended.
- iv.* 1997: the IRB is part of the privatization program to be sold under an auction.
- v.* 1999: the PGBL—Plano Gerador de Benefícios Livres, or Plan Generator of Benefits, a private pension Plan inspired to the 401-k of the US, precursor of VGBL (Vida Gerador de Benefício Livre; see below) is introduced.

⁵⁴ These events are important to define the periods for econometric analysis.

- vi.* 1999: SUSEP becomes responsible for the supervision of reinsurance and retrocession operations previously undertaken by the IRB⁵⁵
- vii.* 2001: VGBL - a life surrender benefit product that unites the character of the annuity with the investment-oriented feature of the variable life insurance- is introduced.
- viii.* 2003: SUSEP starts a modernization process and introduces international standards adopted in the most developed markets, i.e., IAIS Core Principles.⁵⁶
- ix.* 2007: the reinsurance sector is opened to foreign-owned and foreign-based companies. IRB-Brazil Re (successor of the IRB) ceases to be the sole provider of reinsurance⁵⁷.

The events listed above are part of the commitment of the Brazilian Government with the WTO (2009a, pp. 9–13).

- **Market Structure**

Following the reforms of the 1990s and 2000s, the Brazilian national insurance system is composed of the National Council of Private Insurance (CNSP), the Superintendence of Private Insurance (SUSEP), reinsurers, private insurance companies and authorized brokers (SUSEP, 2007; WTO, 2009b, pp. 121–2).

The CNSP is the main policy setting body responsible for the private insurance industry, the definition of the characteristics of different insurance contracts; and the regulation of the national insurance system.

⁵⁵ Up to 1999, SUSEP was responsible for the control and supervision of insurance, open private pension funds—which had been created by new legislation in 1997—and capitalization operations, while the IRB supervised the reinsurance and retrocession operations. The main opposition party—which would win the presidential elections in 2002 and again in 2006—successfully argued in the Supreme Court that this was unconstitutional.

⁵⁶ Since the beginning of the modernization process, more than 500 rules were revised and a great number was published, focusing mainly on corporate governance and internal controls, accountability of directors, roles of actuaries and auditors and certification of employees. A great number of changes were made in order to stimulate saving plans' consumers.

⁵⁷ Consequently, at the end of 2008 there are 21 reinsurance companies operating and there is increased reinsurance capacity, more specialization in the reinsurance market, new products and potential price decreases due to greater competitiveness.

SUSEP is an autonomous body under the Ministry of Finance. SUSEP is the industry regulator; executes the policies of CNSP; it has the responsibility for control and supervision of insurance, reinsurance, private pension funds and capitalization operations. SUSEP adopts a risk-based supervisory regime in line with international standards and practices (IAIS, 2012; WTO, 2009a). SUSEP is also responsible for creation and development of insurance products directed to lower segment of population. Supervision of the health insurance business is the responsibility of the National Health Agency, under the Ministry of Health (WTO, 2009b, pp. 125–8).

As of 2008, Brazil's insurance market became the largest in Latin America, with total premiums of R\$64.6 billion (US\$29.6 billion) and technical provisions of R\$128.4 billion (US\$60 billion). The market is composed of almost 160 companies, i.e., 72% are insurance companies; 17% are entities that provide private pension plans; and 11% are companies devoted to capitalization plans. Few life insurance companies may also offer open private pension plans (SUSEP 2009; <http://www.susep.gov.br/>). A number of banks own both insurers and capitalization companies. The top 10 insurers (some of them from the same group) account for 52% of all industry premiums. Figure 13 shows the top insurer ranked by market share.

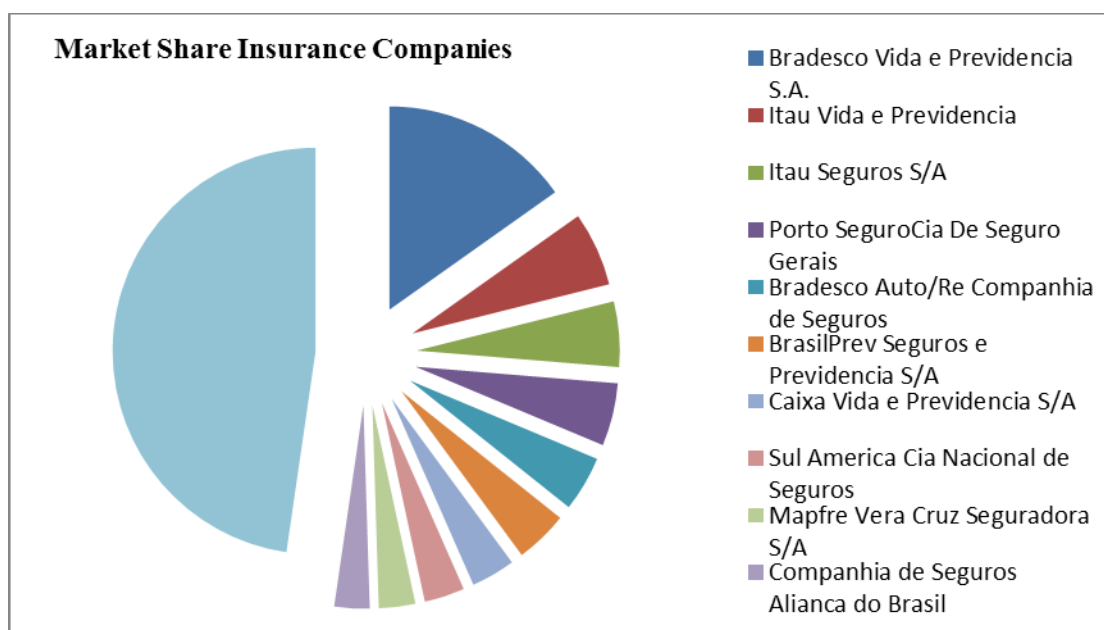


Figure 13 Market Share of Insurance Companies in Brazil

Figure 13 illustrates that there are four large insurance providers in Brazil -(Bester et al., 2010) - (i.e., Bradesco, Itaú, Brazil Prev and Porto Seguro). However, the 10 largest companies serve less than 50% of the market. Small insurance companies serve a large part of the market, over 50%. In this respect, the market for insurance in Brazil can be considered competitive and is similar to the insurance market in United States (see Tables 7 and 8).

Bank-led groups dominate the insurance market, i.e., Banco Bradesco and Itaú Unibanco are the largest private banks in Brazil and are the parent companies of insurance companies and/or other entities that collect 32% of the gross premiums paid in the Brazilian insurance market.⁵⁸

⁵⁸ The largest companies concentrate on life insurance and sell VGBL; e.g., Bradesco Vida e Previdencia sells individual (71%) and group VGBL (8%); Itaú Vida sells individual VGBL (83%); and Brasilprev Seguros E Previdencia sells individual VGBL.

There are big independent insurers—like Mapfre, a Spanish insurance company—that do not have direct relationships with banks. Mapfre is interested in the low-income market and in using alternative distribution channels. There are also small insurance companies focusing on niche products and channels to compete with the larger companies, e.g., SINAF Seguros focuses on door-to-door sales of funeral policies. Funeral parlors and cemeteries make up another category of informal providers (Bester et al. 2010). Corporate brokers, e.g., AON and Marsh, sell insurance through utility companies, telephone networks, call centers, etc., and control more than 90% of this specific market.

Various authors (Abreu & Fernandes, 2010; Bester et al., 2010; A. Levy & Pereira, 2007) report the evolution of premium, claims, costs and insurance products in Brazil. This information illustrates the recent evolution of the insurance market in Brazil and provides evidence of how insurance products are offered to be responsive to existing or latent needs of potential clients and particularly the lower segments of the population; and how a favorable response creates a compounding positive effect for further development of the insurance market in Brazil.

- **Low-Income Insurance Market**

The Lula and the Rousseff governments have given priority to the issue of access for low-income people and micro-insurance is a specific topic on the agenda. Against this background, in the last 5 to 10 years, an increasing number of players have been focusing on the low-income market to provide various insurance products, i.e., personal accident; life insurance (including funeral coverage) (e.g., the VGBL and the PGBL are expanding in the low-income population); health; extended warranties; credit life;

property insurance; fire; burglary and theft; bundled products. However, the largest insurers follow a “wait and see” attitude as far as micro insurance is concerned, given that opportunities for growth exist in the higher end of the market (e.g., traditional corporate, employee group and high-end retail market).

Bester and other authors (2010) offer a complete analysis of the micro-insurance market in Brazil, including the objectives of public policies, development of the market, regulation, failures and opportunities.

The realization of untapped opportunities in the low-income market is increasingly taking root. However, a concern for the micro-insurance in Brazil is that providers could focus on short-term profit rather than meeting the needs of the clients, i.e., a typical trade-off in microfinance. The profit motivation would develop a push towards selling insurance products and policies rather than meeting the needs of micro-entrepreneurs (Bester et al., 2010, p. 39). On this issue an important literature is developing, e.g., the experience in India (Akula, 2010, pp. 162–64) enlightens this point. In this respect, organizations and entities close to the clients such as member-owned entities, e.g., cooperatives play an important role given that their motivation is aligned with the traditional model of microfinance and micro-insurance, i.e., meeting the needs of the clients rather than profit motivation. However, these organizations have a low penetration in the Brazilian insurance market and with low-income people. Under these circumstances, to assure that the original nonprofit motivation grows and develops, it is necessary that in some way there is a governmental subsidy or a government program. This is the strategy that the government of Brazil intends to follow:

provide support and subsidy to nonprofit organizations and entities to experiment and to establish themselves as effective providers of micro insurance in Brazil.

X. Insurance and Entrepreneurship in U.S. and Brazilian States

The status of insurance and entrepreneurship in advanced countries and particularly the United States represents a benchmark for emerging market economies and especially Brazil. At the end of this chapter, it is important to provide a comparison between the insurance sector in the U.S. and the insurance sector in Brazil.

In this respect, two comparisons are made: **a.** the comparison between salient features of insurance in the two countries; and **b.** the comparison at the level of states of the U.S. and those of Brazil between measures of entrepreneurship and measure of insurance;

a. The more relevant aspects of the US and Brazilian systems are the following:

- From the institutional point of view the most important difference is that in Brazil the authorization to operate as an insurer is granted at the federal level. Regulation and supervision are performed at the Federal level. In the United States, the State grants the charter for an insurer to operate and regulation and supervision is at the State level. Coordination among states occurs at the national level with NAIC, the National Association of Insurance Commissioners.
- The share of the insurance industry over GDP is similar between the two countries (in 2011, the share of Insurance industry/GDP is 2.6% in USA and 2.5% in Brazil).

- Both the U.S. and the Brazilian insurance markets are open and competitive with several players. However, in Brazil, insurance companies and banks are very much connected and the largest banks control the main insurance companies. The situation in the U.S. is much different and insurance companies are pretty much independent from banks. The association between banks and insurance companies reduces competition and also threatens the independence of the insurance and the possibility of insurance companies being involved in financial crises.
- The participation of foreign insurance companies in the domestic insurance market is significantly greater in Brazil than in the U.S.
- Penetration ratio in the United States is much greater than that of Brazil, i.e., 12% vs. 3.3% in 2011. This suggests that there is an uneven distribution of insurance products in Brazil, which also implies that an untapped market exists.

With respect to entrepreneurship, comparing the findings of the Kauffman research on entrepreneurship in the United States with the GEM findings related to Brazil (see Chapter 5, below), it is interesting to note similarities across the two countries. For instance, it appears that construction and services are sectors that worldwide attract new entrepreneurs; necessity entrepreneurship, particularly in times of crisis, constitutes a feature increasingly important for developed economies like the United States as people who lose a job start some form of business activity as the best alternative. During the recession of 2008–12 many individuals decided to start a business, i.e., individuals have started sole proprietorships and other non-employee firms.

b. The comparison at the level of states of the U.S. and those of Brazil between measures of entrepreneurship (new establishments) and measure of insurance (penetration ratio) is based on figures 14 and 15.

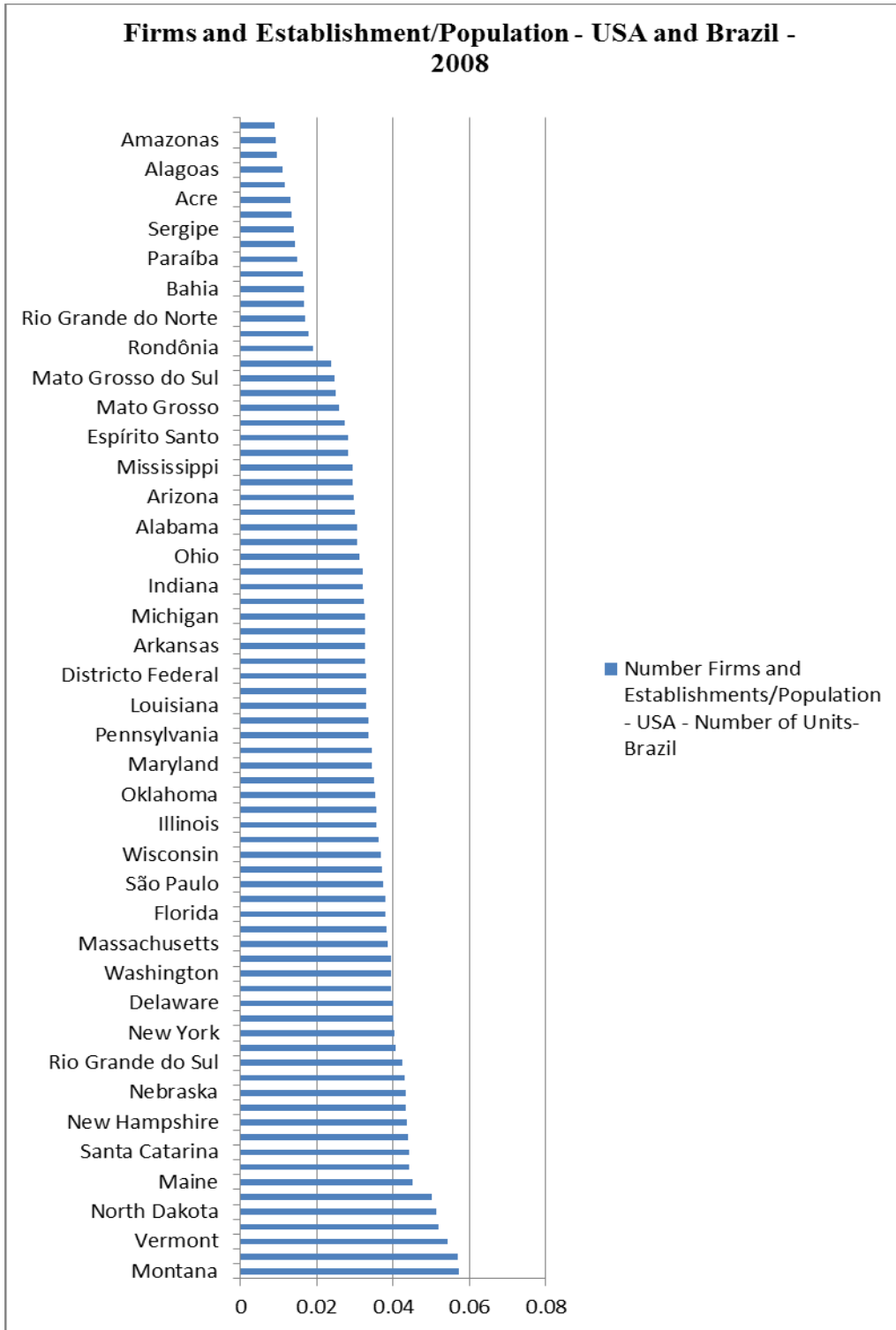


Figure 14 Establishments as Percentage of Population in USA and Brazil (2008)

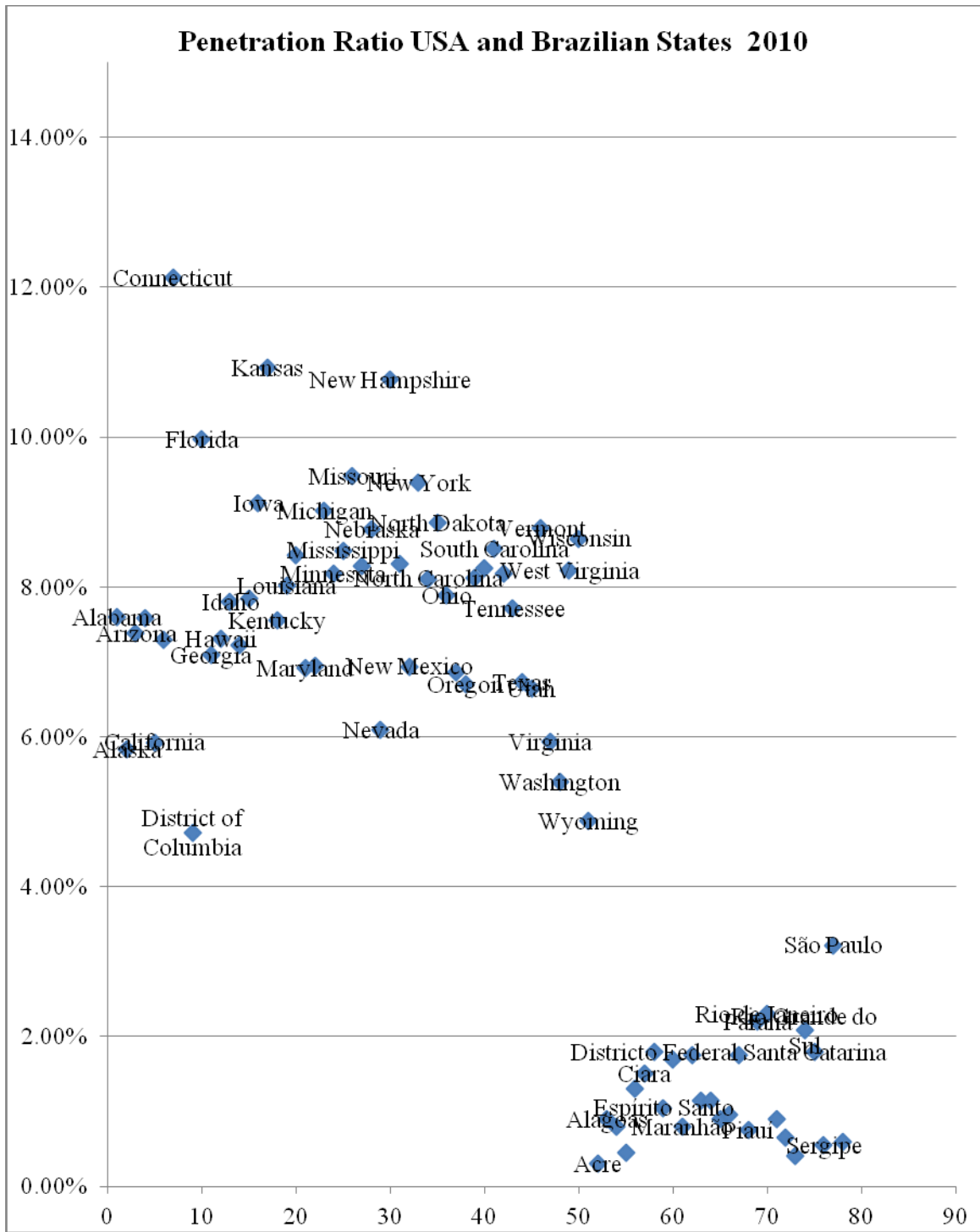


Figure 15 Penetration Ratios of U.S. and Brazilian States

With respect to entrepreneurship, the Figure 14 shows the percentage of business establishments over the population for the 27 Brazilian states and the 50 States of the United States in 2008. There is some caution to provide a complete interpretation of the data. However, the dynamic Brazilian states of the South of the country have a share of business establishments over the population similar and at times higher than that in many states of the United States. However, the poorest Brazilian states of the North have the lowest percentage of business activity.

With respect to the insurance markets, Figure 15 compares insurance penetration in the various states of Brazil and of the United States in 2010. The data show how the Brazilian states rank in terms of insurance penetration with respect to the U.S. states. Even the best Brazilian states in terms of penetration ratio, e.g., São Paulo, rank well below the lowest U.S. states, e.g., Wyoming and the District of Columbia. In addition, there are states in Brazil, e.g., Northeastern states and the Amazonia region states, at the bottom, with an extremely low penetration ratio. The figure provides evidence that the insurance industry in Brazil is scarcely developed and presents a significant potential.

The joint analysis of Figure 14 and Figure 15 and particularly the differences in penetration ratio in Brazil allow making some considerations.

- The most important difference between USA and Brazil is less with respect to entrepreneurship than in insurance.
- Brazil is a country with one of the highest levels of inequality and where significant portions of the population still live in poverty. Inequalities are mainly related to some states and areas of the county (e.g., North-East) as the right figure shows and are reflected in the low penetration of insurance.
- Better insurance markets would favor economic activity and entrepreneurship and reinforce the argument that the availability of insurance is a supply problem.
- Public policies should favor open access to financial services particularly for poor people, promote the availability of insurance products directed to the lower segment of the market and provide opportunities for growth.

6. LITERATURE REVIEW

The literature on insurance and entrepreneurship is vast and encompasses various interrelated fields. The following sections review various aspects of the literature: entrepreneurship; uncertainty and risk; entrepreneurship, uncertainty and risk; entrepreneurship in emerging market countries; factors of entrepreneurship; insurance; insurance in Emerging Market Economies; economic growth and economic development; financial markets and economic growth; insurance and economic growth; insurance and financial markets; entrepreneurship and economic growth and development. These aspects constitute relevant blocks for the study of the relationship between insurance and entrepreneurship.

I. Entrepreneurship

In the last two decades, with the realization that the private sector is the engine of growth, there has been an explosion of studies and research on entrepreneurship. Entrepreneurs —and their innovations—have an enormous influence on the growth and prosperity of nations, and thus studies of entrepreneurship have blossomed worldwide.

The study of entrepreneurship has been mostly focused on structural changes and development within economies. Economic historians have concentrated on the reasons of the transformation of the economies. The concept of entrepreneurship played a relevant role in the field of economic history. Economic historians have critiqued the static

classical and neoclassical theories illustrating how the economic structures changed over time. This historicism has stressed the ways in which capitalism and industry have evolved (Hodgson, 2001). Economists, social scientists have developed the links and the casual effects between entrepreneurship and economic and social variables especially economic growth and development.

This section concentrates on: a. the definitions of entrepreneurship; b. the contributions of Schumpeter and Knight; c. the role of institutions; and d. definition of entrepreneurship appropriate for this research.

a. The concept of entrepreneurship can be traced in the history of economics (Hisrich, 2014, pp. 3–22). It is a complex concept, and different theories and definitions have emerged. The various definitions of “entrepreneur”— coming from various authors (Congregado, 2010; Iversen et al., 2007)— derive from knight and Schumpeter (2012; 1982) and the Austrian School and are mostly based on the environment of developed countries. As the role of entrepreneurship became widespread, theories and definitions also covered Emerging Market Economies. In this regard, various authors (Audretsch 2006; Iversen, Jorgensen and Malchow-Moller 2007; Desai 2009; Acs and Virgill 2009; Acs and Szerb 2009; Naudé 2011) provide contributions in the area of theory and definitions, to which they attach various measures to reflect different aspects of entrepreneurship, with the aim of defining relevant and effective policies to support entrepreneurship.

As mentioned in the introduction, the framework of defining entrepreneurship in relation to different types of companies does not fully incorporate the idea that not all

forms of entrepreneurship produce growth (Sorensen & Chang, 2006; Wong et al., 2005). In other words, the question to address is: what types of entrepreneurship prompt economic growth? The literature seems to suggest that only innovative entrepreneurship makes contributions to economic growth. Following these considerations, measures of entrepreneurship that emphasize entrepreneurial performance, e.g., sales and sales growth, revenues and revenue growth, and the tenure of a firm, to name a few (Sorensen & Chang, 2006), would be reliable measures to assess the contribution of entrepreneurship to economic activity and economic growth. Another possibility is to capture the distinction between entrepreneurship by necessity and entrepreneurship by opportunity (Wong et al., 2005). Along these lines, the measures of TEA (Total Early-Stage Entrepreneurial Activity) and the related measures of opportunity TEA and necessity TEA - developed by GEM - are important for the study of the relationship between insurance and entrepreneurship. However, GEM's measures for entrepreneurship by necessity and opportunity are available at the country level (i.e., in a global database), but not at the state and subnational levels, i.e., in a Brazilian database constructed with the states of Brazil as the unit of reference.

Acs (2010) and Acs and Szerb (2010) constructed a Global Entrepreneurship and Development Index (GEDI) that captures the contextual feature of entrepreneurship across countries on the findings that the relationship between entrepreneurship and economic development is mildly S-shaped, not U-shaped or L-shaped. Their main findings are: "the stages of development are more varied at the innovation-driven stage than at either the factor-driven stage or the efficiency-driven stage. Implications for

public policy suggest that institutions need to be strengthened before entrepreneurial resource can be fully deployed” (Acs, 2010, p. 1; Acs & Szerb, 2010, p. 1). The findings suggest that public policies directed to the development of insurance - principally for emerging countries at an advanced stage and those like Brazil that are entering the innovation stage- contribute to the full deployment of entrepreneurship.

b. On more theoretical grounds, various authors - (Blaug, 1997; Cassis & Minoglou, 2005; Congregado, 2010) - review the concept of entrepreneurship from Cantillon (1730) to Say, Smith, Marx, Marshall, Von Thunen and Mill; the concept encompasses risk and uncertainty (Knight, 2012), economic development and financial markets (Schumpeter 1947, 1982, 2008), and discovery (Kirzner 1978, 1985, 1997).⁵⁹

The theoretical work of Schumpeter is centered on the entrepreneurs as agents of change. The idea of Schumpeter ascertains entrepreneurship as among the substantive areas of research and deepens the relevance of the work of economic historians by connecting entrepreneurship to economic change. Schumpeter (1947, 1982) argues that the essence of entrepreneurial activity lays in the creation of “new combinations” that disrupt the competitive equilibrium of existing markets, products, processes and organizations (Schumpeter, 1947). These new combinations constitute the source of change in the economies. “Creative destruction” replaces old forms of interactions with new arrangements (Schumpeter, 2008). Subsequently, Schumpeter stresses that entrepreneurship’s empirical study represents a fundamentally historical effort and that entrepreneurship makes a crucial element in the process of industrial and economic

⁵⁹ The study of entrepreneurship dates back to the work of Richard Cantillon and Adam Smith in the late 17th and early 18th centuries, but it was ignored until the late 19th and early 20th centuries, until a rebirth in the 1960s and 1970s.

change (G. Jones & Wadhvani, 2006). Hence, the entrepreneurship's investigation needs to study not only businessmen and their companies but also the changes in markets, industries, societies, political systems and economies in which they operate. In other words, it requires a wide-ranging approach and history could provide it (McCraw, 2006).

Schumpeter's contribution is fundamental in many respects. He links entrepreneurship to change and to economic development, advocating a "supply side" approach, in the sense that more entrepreneurial activities imply greater supply in markets: "Producers as a rule initiate economic change and consumers are educated by him if necessary. . . . The entrepreneurs' function is to combine the productive factors and bring them together" (Schumpeter, 1982, pp. 65, 76). He stresses that the capitalist is the banker who provides financing and assumes the risks and does not address the institutional constraints of access to credit.

Knight (2012) holds different views on entrepreneurship, uncertainty and risk. Knight stresses that the entrepreneur bears uncertainty, while Schumpeter assumes that financial markets deal with risk and the unknown. Evans and Jovanovich (1989) go with Knight, as their findings are that constraints of liquidity bind, and the businessman bears the largest share of the risk. The authors also ascertain that at greater wealth's levels, risk aversion goes down. The data that Evans and Jovanovich (1989) assemble show that richer people have more inclination toward risk taking and becoming entrepreneurs; i.e., the results of Jovanovich and Evans are strong, and illustrate that richness has a positive influence on start-ups, allowing for the confounding risk aversion effects.

Along these lines, Cramer et al. (2002) find that greater aversion to risk and dearth of contacts lessen the chance of initiating one's own business (Wagner, 2002). Kamhon and Tsai (2006) examine wealth's influence on the decision to enter the category of self-employment, while allowing for the risk aversion effect. Along this reasoning and going beyond risk, some scholars showcase that entrepreneurship is pivotal to the survival and growth of firms in volatile environments, in that entrepreneurial judgment is a must for success in making complicated decisions amidst uncertainty (Casson & Godley, 2005). On an Austrian perspective, McMullen and Shepherd (2006) and Kirzner (1978, 1979, 1985, 1997) construct a model that links entrepreneurial initiative with uncertainty. Harper (2007, 2008) gives a definition of entrepreneurship as a problem-solving, profit-seeking process operating under uncertain conditions. He further adds that cases of bounded structural uncertainty lead to entrepreneurial action in agreement with other people and the creation of entrepreneurial groups.

Hence, the main difference between Knight and Schumpeter on entrepreneurship is that the latter believes that the entrepreneur does not bear the risk—"the entrepreneur is never the risk bearer" (Schumpeter, 1982, p. 137), which is taken by the capitalist. Knight believes that the entrepreneur bears the uninsurable business risk, i.e., the uncertainty associated with the business venture.

Knight distinguishes between "risk" and "uncertainty"⁶⁰ (Bernstein, 1998, pp. 219–23). Risk, being measurable, may be insured against and thus incorporated as a cost of production; uncertainty cannot be measured since it relates to unique events.

⁶⁰ The reasoning of Knight is that uncertainty is the dominant factor because a priori reasoning cannot eliminate the indeterminism of the future.

Therefore, uncertainty can be regarded as exogenous but with a number of interactions with other variables that are difficult to capture. Knight assumes that entrepreneurship operates under uncertainty, which differs from risk and therefore cannot be insured; it can be assimilated to ambiguity when there is not enough information to define a probability distribution and therefore decision is based on intuition, "gut feeling", heuristic decision making (Gigerenzer & Gaissmaier, 2011). Profit, in the Knightian logic, constitutes the entrepreneur's compensation for bearing uncertainty. Knight also assumes that entrepreneurs operate in a stable and reliable milieu and that uncertainty is limited to "business risk" and not to the functioning of the institutions. According to Knight, the main function of the entrepreneur is to assume the uncertainty associated to certain events, and sheltering all other stakeholders against it. Therefore, the entrepreneur exercises judgment over these unique situations, the uncertainty in the economy, and functions as a sort of insurance agent.

c. The work of Knight and that of the Austrian School make it possible to relate institutions to the activities of the entrepreneur. The institutional perspective focuses on the role of economic and legal institutions in fostering or restricting entrepreneurship. The institutional setting has to do with credit constraints (Banerjee & Newman, 1993), the security of property rights (P. Chen, Lee, & Lee, 2011; Frye & Zhuravskaya, 2000; Johnson, McMillan, & Woodruff, 2002), the burden of regulations (Djankov, Qian, Roland, & Zhuravskaya, 2007; Johnson et al., 2002; Soto, 2003), and with the influence of credit in financing the initiatives of the entrepreneur, i.e., when credit is lacking,

owners cannot become entrepreneurs unless they have sufficient wealth (Casson & Godley, 2005, p. 37).

Acemoglu and Robinson (2012) show that are human-made political and economic institutions that lead to economic development, and in many cases extractive elites political powerful develop institutions, norms, rules and policies to maintain their own power. Those policies are contrary to sustained economic growth and prevent the development of a level playing field, violate others' rights and frustrate innovation incentives.

d. Having in mind that different theories and definitions of entrepreneurship imply different measures and different public policies, a definition of entrepreneurship that is relevant for the research relies on the “creative destruction” of Schumpeter (1982) and looks at the concept of entrepreneurship along the lines of Knight (2012) and the Austrian School, focusing on the relationship of entrepreneurship with uncertainty and economic growth and the role of institutions.

A definition of an entrepreneur that fits this study and captures the situations of Emerging Market Economies is that of someone who in a given institutional setting takes on business risks, uses insurance markets to transfer various risks, and secures financing to create a new organization and exploit an innovation. This definition is close to Knight's view of “business risk,” but it recognizes the contribution of Schumpeter in identifying the entrepreneur as the key actor to obtain resources from the financial sector and sustain economic growth. It is also in line with the work of Baumol (1990, 2002a, 2002b, 2010) on productive and unproductive activities and of High (1992, 2009b; also

see Coppin and High 1999) who indicates how institutions and regulation and incorrect incentives can misguide economic activity and the potential entrepreneur. At the same time, the proposed definition is pertinent for the environment of emerging market economies. In this context, Baumol (1968, pp. 70–1) explains that the entrepreneur in his or her activity must bear some “risk.” Thus - particularly in Emerging Market Economies - the task is to define policies, including policies directed to expand insurance markets that will reduce the costs of bearing risks and encourage entrepreneurship, which is the key to stimulating economic growth. The proposed definition is especially pertinent in Emerging Market Economies, where an underperforming insurance market increases risk aversion and reduces the incentives for potential entrepreneurs, thus limiting innovation and economic growth. However, as mentioned above, it is crucial to understand and distinguish the type of entrepreneurship so that the appropriate policies to favor entrepreneurship can be developed.

Hence, as articulated in more details below, the definition of insurance used in this research is that of a market institution that allows the coverage of several specific risks (e.g., property, life and health); reduces uncertainty and ambiguity; enables the entrepreneur to work effectively and undertake productive and rewarding initiatives; and does not cover uncertainty, the so-called business risk (as Knight points out), i.e., effective insurance markets can play the role of supporting productive activities and economic growth through the intermediation of entrepreneurship. In this respect, insurance is regarded as part of the financial sector and has been considered independently in only a few cases. For example, Haiss and Sumegi (2008) show a

positive impact of life insurance on GDP growth in the 15 European countries before the accession of 10 candidate countries on May 1, 2004.⁶¹ They conclude that the finance-growth nexus should include the insurance sector.

II. Uncertainty and Risk

Uncertainty and risk play a significant role in the economy and in the working of financial markets.

This section articulates: a. the views about uncertainty and risk; b. the contribution of Knight; c. the implications at macroeconomic level; d. the modern views and dynamic interactions that determine uncertainty and risk; and e. the role of risk and uncertainty in this research.

a. There are two fundamental views about uncertainty and risk. A dominant view is that economic models are based on Walras's general equilibrium and the Arrow-Debreu (1954) two-period model, which holds that uncertainty can be eliminated if only enough contingent claims are available, e.g., derivative instruments.⁶² The market is efficient and mathematical models can explain it (Samuelson 1974, 17–19; Lucas 1972); and derivatives enhances welfare (Colander et al., 2009, p. 265). This is the so-called Rational Expectations Hypothesis and the Efficient Market Hypothesis, which are in line with the Bayesian view that all uncertainties are quantifiable. In this respect, Bayesian theory constitutes a tool—based on previous experience—that allows dealing with and predicting uncertainty. The basic concept of the Bayes's rule appears straightforward: by

⁶¹ These countries are Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden and the United Kingdom.

⁶² Under certain assumptions (convex preferences, perfect competition and demand independence), a set of prices exists such that aggregate supplies will equal aggregate demands for every good and service in the economy.

updating initial views with objective new information, an improved view is obtained, which incorporates learning from experience. Various critics do not accept this approach and stress the role of subjectivity (McGrayne, 2011).

A different opinion holds that modern society is mostly the result of humanity's conquest of nature to attempt to reduce uncertainty. According to this view, predicting the future constitutes a futile exercise because the growth of knowledge is unpredictable and influence events (Hayek, 1945, pp. 19–20; Mises, 2007, pp. 105–117; Popper, 2002b, pp. xi–xii, 252) and also points that “no mathematical model can fully mimic what markets do” (Frydman & Goldberg, 2011, p. 250). Along these lines, Ariely (2010) argues that ignored or misunderstood forces (e.g., emotions, greed, nature) influence economic behavior and require reexamining individual motivations and consumer choice, as well as economic policy.

The rationality argument has supported the vast deregulation of markets in the last 30 years. However, the financial crisis of 2007–8 and its continuation in Europe with the crisis of government debt suggests to consider that rational markets do not function properly (Staddon, 2012, pp. 43–53, 55–58, 179–81). The critique of the rational markets is split in different directions. A first direction emerged in the wake of the crisis and holds that the “rationality of the market” is a “myth,” and it leads to the extreme position that markets are casino-like institutions, and inefficient in allocating capital. In this respect, a predetermined rational model, e.g., Fama (1965) incorporates informational asymmetries and asset-price swings as “bubbles” and does not include the fluctuating and

heterogeneous psychology of markets' participants (Fox 2009; Shiller 2006, 2012), i.e., what Keynes called “animal spirits” (Akerlof & Shiller, 2009; Shiller, 2012, pp. 172–73).

A second direction states that rational models lack the understanding of psychology; do not consider irrational behavior; and do not reflect informational distortions and the impact of incentives (Kahneman and Tversky 1979; Kahneman, Slovic and Tversky 1982; Frydman and Goldberg 2007).

A third position, the so-called Imperfect Knowledge Economics (IKE) (Frydman & Goldberg, 2007), puts the role of financial markets and public policy at the center as a factor that influences behaviors;⁶³ focuses on psychological attitudes of individuals operating in the market, e.g., optimism; and on major factors (like policies) that determine these attitudes. IKE draws on the empirical findings of behavioral economics adding qualitative and contingent events. IKE argue that includes prospect theory in the sense that individuals are loss averse (Prospect Theory) and utility from losses is greater than that from gains of the same magnitude (Frydman & Goldberg, 2007, p. 188). IKE also implies a role for the state—differently modulated—in regulation and supervision but also with direct intervention in the markets to offer a view about acceptable levels of risk and reduce excessive swings in assets (Frydman & Goldberg, 2007, pp. 207–11).

Thus, the issue of uncertainty has been long debated. Among other contributions, Menger's analysis of the St. Petersburg paradox argues against the view that decisions are based on the expected value and stresses the importance of uncertainty in economic behavior (Menger, 1977). Menger points out that rational economics create uncertainty of

⁶³ IKE applies to decisions on financial markets as well as on public policy decision (Frydman & Goldberg, 2007, p. 3).

predictions considering that the actions and reactions of other economic agents and thus economics is a game of expectations that can be understood with the aid of game theory.

Other significant contributions on uncertainty are those of Shackle (C. F. Carter & Ford, 1972); (Popper, 2002a; Posner, 2010a, pp. 288–304); (Klaassen & Eeghen, 2009, pp. 5–9) who relate the issue of uncertainty to knowledge, choice and human behavior.

b. The discussion on the rationality and the various critiques takes us back to the difference between risk and uncertainty and to how insurance responds to the need for protection (Knight, 2012). Frank H. Knight (2012, pp. 20, 98) holds that an “imperfect knowledge of the future and makes a distinction between ‘risk’ and ‘uncertainty.’” In Knight’s interpretation, risk refers to situations where the decision maker can assign mathematical probabilities to the randomness with which he or she is faced (Staddon, 2012, pp. 79–80). Knight’s uncertainty refers to situations when this randomness “cannot” be expressed in terms of specific mathematical probabilities (Schlefer, 2012, pp. 142–3, 152–3). In an article following his *General Theory*, Keynes expresses the distinction between uncertainty and risk (Keynes, 1937a, pp. 209–23). By “uncertain” knowledge, Keynes distinguishes what is known for certain from what is only probable: “The game of roulette is not subject, in this sense, to uncertainty. . . . The sense in which I am using the term is that in which the prospect of a European war is uncertain or the price of copper and the rate of interest twenty years hence. . . . About these matters there is no scientific basis on which to form any calculable probability whatever. We simply do not know” (Keynes, 1937a, p. 214).

The distinction between risk and uncertainty, in the Knightian sense, implies that coverage of risk is given through a policy of an insurance firm and that insurance is crucial for managing risks, but in a sense also for reducing uncertainty. In fact, insurers provide coverage by spreading out risks, and managing exposure. At the same time, however, by releasing a policy that covers risk, insurance also reduces uncertainty due to the fact that risk is covered. Hence, markets of insurance are critical for economic activity. The distinction boils down to the fact that risk can be measured while uncertainty cannot (Buckham et al., 2010, pp. 11–2), so events can be measurable or immeasurable. However, risk and uncertainty have a dynamic and not a static dimension. In fact, as knowledge develops, new situations of uncertainty and risk emerge. Also, there are a number of situations, particularly in Emerging Market Economies, when formal insurance policies do not exist and/or are not priced well or do not function appropriately. As a result, faced with uncertainty, as history shows, individuals may operate under uncertainty and resort to less efficient instruments to protect themselves—or they may simply forgo initiatives.

Students of insurance clearly understand this distinction, but finance practitioners (Damodaran, 2009; Neave, 2009; Rachev, Hoechstetter, Fabozzi, & Focardi, 2010) do not fully appreciate it. In fact, in discounted cash models for valuation, ranges of possible future scenarios are used to come up with a value associated with some probability of an occurrence (Thomas & Gup, 2009, p. 327).⁶⁴

⁶⁴ It is interesting to reiterate that practitioners, e.g., Damodaran (2009), do not provide a satisfactory distinction between risk and uncertainty. Neave (2009, p. 424) uses the two terms interchangeably. Damodaran (2009, pp. 574–5) recognizes a generic uncertainty but then argues that everything can be translated into a number for discount model valuations.

Dixit and Pindyck (1994) develop the theory of irreversible investment under uncertainty and illustrate it with some practical applications. They argue that investment decisions are made under uncertainty, which is difficult to identify and quantify in terms of statistical distribution. They add two critical parts of investment decisions: timing and irreversibility; and articulate a theory of real options associated with the investments, i.e., the option to delay the investment that allows uncertainty to unfold, which in this case could be inserted among the known unknowns (see below). The work of Dixit and Pindyck (1994) has prompted a rich literature.

c. From a macroeconomic point of view, Keynes argues that the “animal spirits” of entrepreneurs -“the spontaneous urge to action” (Keynes, 2010, p. 161) - have noneconomic motivations, which at times can be irrational and misguided (Akerlof & Shiller, 2009) and determine investment demand and have a major economic impact. “Uncertainty drives people to store their wealth in safe forms, e.g., cash, and decreases the demand for investments. Also, the increased demand for cash leads to higher interest rates, and hence people tend to postpone risky investments and invest in safe instruments (e.g., fixed income, government bonds). This uncertainty may prompt panic and exuberance, and favors instability of markets” (Ferguson, 2008, pp. 345–47).

The global crisis of 2007-08 and subsequent years shows that an uncertain environment harms financial markets and economies. Ferguson (2008, p. 245) reviews the question of uncertainty versus risk as advanced by Knight and Keynes. Skidelsky and Wigstrom (2010, pp. 13–30) assess the issue of uncertainty and risk in the context of the global financial crisis of 2007–8 and its continuation in 2011–12 and beyond and elaborate on

the position of Knight and Keynes versus the theory of rational expectations of Muth (1961), Fama (1965) and Lucas (1972). There exist not only risks (the range of probabilities of outcomes indicated by past events) but also genuine uncertainty (the impossibility of knowing what the future holds in a probabilistic sense, i.e., the unmeasurable risk, or Knightian uncertainty)⁶⁵. Overconfidence on models has contributed to the proliferation of dubious financial instruments that investment banks and other investment firms produced under the assumption that the data on which their models of risk and return were based would remain stable over time. If an incorrect model is used to measure risk, or the measure of risk is not accurate, the issue becomes: incorrect theory, poor model, and poor risk estimation. However, if the analysis is incorrect, a series of interactions and uncertainties prompt insolvency at global scale, crisis of the financial system and recession (Masera, 2009, pp. 22–3, 44). In other words, when probabilities based on past history are inaccurate, Knightian uncertainty inherent in human behavior emerges (Ferguson, 2008, p. 346).

d. A recent view argues that events are unique and occur in a given historical dimension and financial and economic outcome depend on these distinctive events and are not outside time following probabilistic distributions and therefore cannot be easily predicted. Reality is important for the formation and testing of economic and finance theories (Taleb 2005, 2010), because expectations and actions must rely on something other than the accurate calculation of probabilities about the future, e.g., human behavior, social convention, personal experience and expert opinion. This view underscores that

⁶⁵ Along these lines a theory of reflexivity of financial markets developed, which argues that people base their actions on conceptions of the reality that are not correct and may produce booms and busts (Soros, 2009).

theories about economics and finance should be considered with caution and with an understanding of their relevance in a given time and place. Bernstein (1998) argues that the controversy between those who assert that the best decisions are based on quantification and those who base their decisions on a subjective belief has never been resolved (Posner, 2010a; Taleb, 2010). Hence the global financial crisis of 2007–8 and its continuation in 2011 and 2012 can be viewed through the lens of Schumpeter’s idea of creative destruction: financial markets, through innovation and entrepreneurship—endogenously produced—incessantly destroy old structures and create new ones, and through this process they generate economic growth and progress. Thus, one can argue that financial markets follow a form of Darwinian evolution that permits progress and growth (Ferguson, 2008, p. 352). In this context, a series of errors and miscalculations and a failure of regulation and supervision can prompt global financial debacle, which then further increase uncertainty, so that banks are reluctant to lend and prevent financial intermediation to function properly (Taylor, 2009, pp. 47–8) and entrepreneurs are not able to undertake initiatives. This constitutes a Keynesian situation of preference for liquidity, which can lead to a depression because there is a lack of confidence and even the “animal spirits” are not willing to assume initiatives.

Against this background, the distinction between uncertainty and risk can be viewed as a dynamic process, in the sense that the progress of human life in general and economic life in particular is driven by the dynamics of knowledge and discovery that in turn create new habits, dangers, and uncertainties. However, in this process of discovery, people become aware that there is risk and uncertainty, that some uncertainty can be

converted into risk, but there is also something we do not even imagine could exist or happen, the unknowable. In this dynamic process, advances in the theoretical understanding of probabilities, utility and statistics improve the ability to measure the known and the unknown and also discover the unknowable. However, forms of unknown not measurable and of unknowable not even conceivable will always remain. Thus, the debate between risk and uncertainty moves to the level of knowledge as a theory and as a measure, and can be summarized using the framework of Ralph Gomory (1995). He classifies knowledge into the *Known*, the *unknown* and the *Unknowable*, i.e., the *KuU*. The framework includes three categories: (1) known knowns, i.e., things we know that we know; (2) known unknowns, i.e., things that we know we do not know; and (3) unknown unknowns, i.e., things we do not know we do not know. In the context of financial risk management, Diebold, Doherty and Herring (2010) also refer to the issue of knowledge as a theory and as a measure. Their framework includes risk, which is measurable; uncertainty, which is not measurable; and unknown unknowns, the unknowable, which we do not even know it exists (Diebold et al., 2010, pp. 2–5). This approach constitutes a sophisticated and modern way of expressing the view of Knight about risk and uncertainty adding the dimension of the unknown unknowns, i.e., what we do not even know and we are unable to conceive.

The unknown unknowns are events, which, until they occur, may have been thought impossible. By their nature, these events are rare and extremely dangerous and can have a devastating impact. The authors suggest that risk managers should scan the horizon, think outside the box, consider the unthinkable, and detect emergency plans to

shield disasters. However, this is not enough. In addition, given the features of the unknown unknowns, i.e., rarity of the events, absence of data and lack of a theory, most experts ignore these “tail risks” and concentrate on “normal market conditions,” where there is a theory and there are data that perform in line with expectations. Under these circumstances, as Diebold, Doherty and Herring stress, these events are not recognized and when they occur the crisis is unavoidable. According to Diebold, Doherty and Herring (2010), the crisis of 2007–8 constitutes one of these unknown unknowns, or the so-called financial Black Swan (Taleb, 2010).

Given the definition of unknown unknowns as unidentified phenomena without a theory and a measure, their emergence generates ex-post interest in their understanding, assessment and measurement so that knowledge moves forward.

e. For the purpose of this study, these considerations stress the point that the entrepreneur operates under conditions of uncertainty and risk that are dynamic and changing.

Insurance can operate with respect to the area of the known knowns (K) where risk can be assessed. Insurance cannot operate in the areas of the known unknowns (u) and in the area of the unknown unknowns (U). These are dynamic areas subject to changes as knowledge evolves.

On the other hand, from the point of view of entrepreneurship, the historical review has shown that people undertake entrepreneurial initiatives based on the urge to action, which drives animal spirits (Landes et al., 2010, p. 97). In addition, if the area K is not covered or covered ineffectively, which is what may happen particularly when

insurance markets are not developed, the entrepreneur will see that uncertainty widens and would be discouraged.

From the insurance point of view, in early times, the assessment of risk was based on the intuition of the insurer and not on the probability of an event occurring, i.e., various forms of insurance are introduced without a prior theory, or understanding of the probability of an event occurring.

III. Entrepreneurship, Uncertainty and Risk

The next step in the analysis of the literature is to consider entrepreneurship, uncertainty and risk together. Following Knight (2012), who prompted research on how uncertainty and risk are different from each other (Praag, 1999, p. 322), the issue of entrepreneurship, uncertainty and risk becomes part of the vast literature on entrepreneurship; e.g., Wennekers and other authors (2007) present a model for risk, uncertainty and entrepreneurship.

This section reviews: a. the general aspects of the relationship among entrepreneurship, uncertainty and risk; b. the influence of uncertainty and risk on individual choice and entrepreneurship; c. the role of institutions; and d. the relevance for the research.

a. As shown in the previous section, uncertainty is simply part of our lives, i.e., anything might happen, and uncertainty implies unique events with no statistical basis for calculating a probability. On the other hand, risk can be regarded as a special case of uncertainty, normally stated in probability or percentage and, therefore, to some extent insurable.

Under these circumstances, following Knight, the entrepreneur bears uncertainty as he makes decisions facing incalculable and uninsurable hazards (Praag, 1999, pp. 322–23). Pushing this point further, one can argue that Knight expands the view of the 17th century economist Cantillon (2010) that the entrepreneur arbitrages between supply and demand: “Entrepreneurs buy at a certain price to sell again at an uncertain price, with the difference being their profit or loss” (Hebert & Link, 1988, p. 42). This view is along the lines of classical authors – including Say and Marshall- for whom entrepreneurs are responsible for risk bearing (Praag, 1999, p. 327).

Mises (2007, pp. 253–4) refines the concepts of risk and uncertainty of Knight by adding the concept of human action of the entrepreneur: “The term entrepreneur as used by catallactic theory means: acting man exclusively seen from the aspect of the uncertainty inherent in every action. In using this term, one must never forget that every action is embedded in the flux of time and therefore involves a speculation”. Without entrepreneurship, a complex, dynamic economy cannot allocate resources to their highest-valued use (P. Klein, 2009). Austrian authors, e.g., Kirzner, stress that the discernment of opportunities in the context of uncertainty characterizes the entrepreneur. Coase (1937, p. 22) includes the role of uncertainty in his theory of the firm and imperfect information: “It seems improbable that a firm would emerge without the existence of uncertainty.” Thus, the firm provides efficiency and reduction of costs and business uncertainty. Coase outlines the additional cost of using markets due to uncertainty and risk, and the problems of predicting impediments and issues in long-term contracts.

Thus, uncertainty is central to entrepreneurship (Hebert & Link, 1988). In a sense, in a world without uncertainty, entrepreneurship would not be necessary—as in socialist economies, where entrepreneurship was unnecessary because the central planning was considered able to lead us to the optimal allocation of resources (Wennekers, Stel, Thurik, & Reynolds, 2005). On the contrary, in a world where uncertainty is a fact of economic life, entrepreneurs operate, arbitrage, manage risks, innovate, and overcome uncertainty (Praag 1999; Wennekers and Thurik 1999; Audretsch and Thurik 2001; Audretsch, Carree and Thurik 2001; Wennekers et al. 2007).

b. In this framework, different situations of uncertainty and risk motivate individuals and their initiatives differently, including with respect to undertaking business initiatives and operating as entrepreneur. Kihlstrom and Laffont (1979) state that individuals differ in “risk aversion”; i.e., “more risk-averse individuals become workers while the less risk-averse become entrepreneurs.” In the same direction, Iyigun and Owen (1998) identify a model of occupational choice with “inherently risky entrepreneurial ventures” and relatively “safe” alternatives, such as professional activities. McGrath, MacMillan and Scheinberg (1992) compare attitudes toward risk and failure among entrepreneurs (i.e., founder-managers of businesses at least two years old and with at least one other person) and non-entrepreneurs in eight countries and find that entrepreneurs view a start-up as risk but also excitement, while non-entrepreneurs believe that “failure means losing face and respect.” Bhide (1994) argues that uncertainty affects start-up entrepreneurs, e.g., founders of new businesses, differently from less innovative entrepreneurs (e.g. businessmen who start a franchise). In fact, innovative entrepreneurs

find much more difficult to assess the range of possible outcomes and future profits. (Praag, 1999) argues that risk-averse people have a smaller probability of undertaking business's initiatives.

Arellano, Bai and Kehoe (2011) explore the mechanism whereby increased uncertainty triggers less risk-taking and leads to a decline in output due to a risk/return trade-off. In their model, when uncertainty increases, firms take less risk to reduce the probability of a costly default. With respect to the attitude of the entrepreneur given a high level of uncertainty, the World Bank (2010) indicates that in 2008 and 2009, when the financial crisis rumbled throughout the world, the reduction of credit contracted economic activity and investments, and entrepreneurs wanting to start a new business or register an existing informal business were discouraged (e.g., the number of new business registrations declined).

From a cultural point of view, entrepreneurship operates in a given cultural environment, which affects the attitude toward risk and insurance. According to Hofstede and Minkov (2010), the insurance level in an economy depends on the culture and its impact on the predisposition and willingness to employ insurance contracts to take care of risk. Fukuyama (1996) confirms that the cultural context of a given economy influences heterogeneity. Insurance can offer important economic benefits when the probability of adversity is managed through insurance coverage rather than other risk transfer and avoidance mechanisms. Fukuyama (1996) relates cultural differences to the trust's level that exists in an economy. In this context, some authors (Hofstede & Minkov, 2010, p. 146) introduce the concept of uncertainty avoidance, which represents

the level or extent that societies accept and tolerate uncertainty and ambiguity. It constitutes the level of familiarity with uncertainty. High uncertainty avoidance is the feature of a society when uncertain or unknown situations threaten its members who “look for structure in their organizations, institutions and relationships, which makes events clearly interpretable and predictable” (Hofstede & Minkov, 2010, p. 148). In countries with low uncertainty avoidance, “not only familiar but also unfamiliar risks are accepted, such as changing jobs and starting activities for which there are no rules.” Low uncertainty avoidance thus implies a “willingness to enter into unknown ventures” (Hofstede & Minkov, 2010, p. 164).

Wennekers (2005) introduces a model of choice of occupation to clarify ways in which the avoidance of uncertainty influence the choice of becoming business owner, and the choice between self-employment and wage-employment. Those choices depend on individual’s assessment and valuation of the utility of rewards, the alternatives available, taking into account uncertainty (Wennekers et al. 2005, 2007). Wennekers and other authors (2007) also state that due to economic factors and cultural differences, entrepreneurship (measured as the percentage of business owners) differs greatly among countries (Hofstede & Minkov, 2010). They argue that differences among countries throughout the business cycles are due to cultural factors that are rather stable across countries.⁶⁶ Wennekers and other authors (2007) find evidence of indirect influence of

⁶⁶ Using a pooled data set of a large number of OECD countries in 1976, 1990 and 2004, Wennekers et al. (2007) found a positive direct influence of uncertainty avoidance on business ownership rates; i.e., in those years a climate of high uncertainty avoidance in existing firms and organizations may push enterprising individuals toward self-employment. It is also shown that a personal trait (risk aversion) and its cultural counterpart (uncertainty avoidance) may have a diverging impact on entrepreneurship. These findings are consistent in 1976 and 1990.

uncertainty avoidance on ownership of businesses. In countries with lower level of uncertainty avoidance, the income influence on the business ownership is smaller than in countries that have high level of uncertainty avoidance. In a sample of 8 “high-uncertainty-avoidance” countries, a strong negative link between GDP and business ownership implies that the opportunity costs of businesses are the dominant perceptions. On the other hand, in 13 countries with “low-uncertainty-avoidance”, the weak link between ownership of business and income implies that increasing opportunities constitute the relevant factor.⁶⁷ Wennekers and other authors (2007) recognize the limitations of their study⁶⁸.

The discussion above implies that uncertainty is associated with the outcomes of processes. Various authors (Thurik, 2009, pp. 11–2) (Naudé, 2011, pp. 25–7) (Lazonick, 2011, pp. 25–7) demonstrate that investments in innovation are made on the face of uncertainty and that entrepreneurs who allocate resources to innovative strategies faces three types of uncertainty: technological, market and competitive. These considerations lead to Knight’s fundamental insight that profit is the reward of the entrepreneur.

Actually, Thunen (1850) puts forward exactly this idea in explaining the rewards that accrue to entrepreneurs: as Blaug (1997, p. 98) argues: “The rewards of the entrepreneur,

67 According to the authors in the group of low-uncertainty-avoidance countries, 8 out of 13 countries show either a clear U shape (Finland, Germany, the Netherlands and New Zealand) or a vaguely U-shaped trend (Australia, the United Kingdom, Sweden and the United States), 3 show a continuously upward trend in entrepreneurship (Canada, Ireland and Switzerland), 1 shows a stabilization in the last 20 years (Denmark), and 1 (Norway) shows a decreasing trend. In the group of high-uncertainty-avoidance countries, 2 out of 8 countries (France and Japan) show a strongly decreasing trend, while 6 show an increase or a U shape, sometimes followed by stabilization.

68 First, the modest explanatory power of most regressions Second, the paper only studies the effect of uncertainty avoidance on the level of entrepreneurship, and it could be relevant to repeat the study for the dynamics of entrepreneurship, when time-series data are available. Third, business ownership rates are available for a far smaller number of countries than uncertainty avoidance data.

Thunen went on to say, are therefore the returns for incurring those risks which no insurance company will cover because they are unpredictable.” Since it is impossible to predict the probability of gain or loss, the entrepreneur is regarded as “explorer and inventor” (Hebert & Link, 1988, pp. 45–7). In this context, profit constitutes a “residual” that the entrepreneur receives as a reward for bearing uncertainty (LeRoy & Singell Jr., 1987, p. 397).

c. Along these lines, entrepreneurs would like that uncertainty is reduced by the institutional setting, i.e., organizational and institutional arrangements lower the level of uncertainty avoidance, and risk is covered by market institutions like insurance.

However, the entrepreneur does not want that uncertainty be completely covered, because it constitutes the source of his/her reward. Conversely, a certain social environment must exist in which the entrepreneur understands and trusts that society values his or her work and is confident that there is a societal environment that is willing to address his or her concerns and risks in a fair fashion, i.e., the societal and political environment does not discourage the entrepreneur. In other words, the coverage of given risks can still be somewhat inefficient and not effectively priced, but the entrepreneur will go ahead with his or her activities because the institutional environment protects him or her against problems that can arise. In this respect, financial markets constitute an important determinant of entrepreneurship, particularly in advanced economies, in the sense that at a given time the entrepreneur wants to cash out his or her investment and the venture capitalist wants to exit because he or she has found better opportunities elsewhere and his or her resources can be better invested (Frydman & Goldberg, 2007, p. 160).

In line with this reasoning, following Erbas (2004), insurance plays the institutional role of reducing uncertainty and volatility, in a situation of “Knightian uncertainty,” i.e., payoffs from an investment and the associated probabilities cannot be identified and quantified. The existence of “uncertainty” (that is equivalent to the profit of the enterprise) explains the instability of the competitive environment and the creation of monopoly and oligopoly, to reduce uncertainty. Various authors (Santomero & Babbel, 1997) reiterate that profit is the reward for bearing uninsurable hazards, and it is uncertainty that give rise to profit, which implies that uncertainty is identified with uninsurable hazards. Risks are insurable hazards. In this respect, the reasoning of Knight is that the outcome of entrepreneurship is not insurable without adversely affecting the incentives of the entrepreneur. Therefore, there is a moral hazard problem, and there is also a link with the institutional role of insurance. In other words, if the area of uncertainty is too great and what would be normally insurable—under given circumstances, particularly in Emerging Market Economies—is not insured, the willingness of the entrepreneur is diminished, and this in turn has negative consequences for economic activity and growth.

History shows that humans create institutions, rules and social mechanisms that make outcomes more predictable or increase the accuracy of the prediction. Insurance markets represent an institution that facilitates the conversion of uncertainty into quantifiable risk and allowing entrepreneurs to undertake initiatives. Erbas (2004) explains that when uncertainty is reduced and transaction costs (e.g., insurance costs and interest rates) decline, investment and growth are promoted. Moreover, Erbas stresses

that institutions live longer than individuals and ensure time-consistent treatment of decisions and contractual commitments. In other words, well-functioning institutions reduce uncertainty over time.

Overall, ineffective insurance markets make the task of the entrepreneur more difficult and reduce the incentives to be a productive entrepreneur. Baumol (2002a, 2002b) implicitly implies that ineffective insurance markets produce uncertainty, which constitutes a major discouragement to both savings and economic activity (Baumol, 2002b, p. 17), diverting talent and entrepreneurship to less productive endeavors and reducing opportunities for economic growth. Against this background, if the recommendation of De Soto (2002, 2003) is pursued, i.e., the values of assets in emerging market countries and in Latin America are correctly priced, individuals' wealth would increase and move to the right on the utility curve (with wealth on the x axis and the utility index on the y axis), and the shape of their utility curves also might become less concave with less risk aversion. The increased wealth would increase the demand for insurance (Enz, 2000). Hence, the two policies leading to more effective insurance markets and property rights for "hidden capital" should be pursued in parallel.

d. In sum, entrepreneurship incorporates uncertainty, risk, innovation, change, and expectation of profit. Uncertainty is a wide concept, with different degrees and encompassing risks and opportunities (Wennekers et al., 2005). In line with the view of Knight (2012), Fields (2011) stresses that uncertainty can lead to fear, anxiety, paralysis and destruction. He also underlines that uncertainty can stop creativity and innovation and consequently limit entrepreneurship; i.e., it can stop companies that rely on

innovation. According to Fields (2011), however, uncertainty should not be considered an enemy: it constitutes the territory where entrepreneurs thrive, leads to financial reward and to a meaningful life. In this framework, effective insurance markets reduce uncertainty and influence entrepreneur's attitudes and initiatives.

The contention of this study is that the lack and/or the ineffectiveness of insurance markets create a situation of greater uncertainty, which depresses entrepreneurship. This statement may seem in contradiction with the idea of Knight that we share that the profit of the entrepreneur derives from uncertainty. This could easily lead to a paradox in the sense that if insurance covers uncertainty, it would guarantee profit. In reality, the argument should be read that insurance cover risks as identified and quantified, but does not cover uncertainty because it would be either a subsidy or a gamble. The entrepreneur wishes all the risks be covered and uncertainty left to his/her ability.

It is worth emphasizing the comments made on Chapter 3. Applying the U-shaped relationship between the level of competitiveness and development and the rate of entrepreneurship to Latin American countries, Acs and Amoros (2008, p. 13) suggest to pursue policies leading to an entrepreneurial and networked society, particularly in the most advanced countries of Latin America that are close to the bottom of the U-shaped curve and ready for an entrepreneurial drive: "the implications to develop the entrepreneurial activity in Latin America go beyond achieving an efficiency-driven economy stage. They uphold high-expectation entrepreneurial activity (dynamic new ventures) that may reflect a better performance of the competitiveness and economic development." Amoros, Fernández and Tapia (2011) reiterate the recommendations of

Acs and Amoros (2008) and stress that Latin American countries need to go beyond the traditional forms of entrepreneurship such as self-employment, necessity driven and focus on local markets and move towards a more dynamic and networked entrepreneurship that would allow to compete globally.

Along these lines, policies to develop insurance markets are appropriate to support entrepreneurial initiatives.

IV. Factors Influencing Entrepreneurship

To understand the role of entrepreneurship in emerging market countries and in Latin America, it is necessary to identify the factors of entrepreneurship.

This section a. lists several factors of entrepreneurship and b. reviews the role of institutions.

a. Audretsch et.al. (Audretsch, Carree and Thurik 2001; Audretsch and Thurik 2001; Audretsch and Fritsch 2002) show that many factors shape entrepreneurship, i.e., economic, historical, psychological, social, cultural and political, and introduce a framework for analyzing the determinants of entrepreneurship and defining the appropriate policies to increase entrepreneurial activity. They also distinguish between factors related to the demand for entrepreneurial activities and those influencing the supply of entrepreneurial activities. The demand for entrepreneurship reflects the opportunities to engage in entrepreneurial activity, which varies considerably across regions and countries. The supply of entrepreneurship is shaped by the characteristics of the population, including its demographic composition, educational attainment, income levels and degree of unemployment, and cultural norms. In particular, the resources and

capabilities of individuals along with their attitudes toward entrepreneurship are key factors in influencing the supply of entrepreneurship. Both cultural and institutional factors shape the supply side. Institutional factors include access to finance, administrative burdens and the level of taxation. The interaction of supply and demand factors for entrepreneurship shapes the risk/reward profile of individuals, which implies that at the end individuals make the choice whether or not to engage in entrepreneurial activities. Thus, entrepreneurship policy can change the risk/reward profile of individuals.

b. According to the Austrian School, e.g., Boettke and Coyne (2003) and High (2009b, p. 5), appropriate institutions encourage entrepreneurial activity. The role of institutions—defined as the rules of the game and their enforcement—is crucial for the existence and deployment of productive entrepreneurial activity.

Erbas and Sayers define the role of institutions in emerging countries in relation with the issues of uncertainty and risk; they stress (Erbas, 2004; Erbas & Sayers, 2006) the importance of reliable and predictable rules and institutions and the crucial role of the judicial system and that of the enforcement of laws, regulations and contracts.

In most Emerging Market Economies, entrepreneurial activity is misdirected into socially destructive activities (Baumol, 1990, pp. 893–921). The goal of public policy is to reestablish an institutional framework that favors productive entrepreneurial attitudes.

Within this reasoning, one can include the role of culture, which Olson defines as human capital (Olson, 2007, p. 40), distinguished between propensity and knowledge. The knowledge part of individuals may affect public policies and ease the introduction of

rules and institutions that produce positive results for economic activity and performance and entrepreneurship; i.e., culture influences the shape and institutions. However, the basic tenet of this research is that norms, rules, institutions and systems of incentives direct the behavior of people - and particularly the most talented ones - toward activities that are more or less conducive to economic growth. In other words, the existing institutions determine how people use their attitudes and initiatives and entrepreneurial spirit in working toward economic growth and in turn also shape culture.

Acs and Virgill (2009) explore the literature on entrepreneurship in developing countries based on the existence of network, knowledge and demonstration and externalities. They identify the core policy issues to address externalities. The recommendation of the authors to increase the level of productive entrepreneurship in developing countries is internalizing externalities by rewarding mechanisms.

Naudé (2010) argues that a case exists for supporting entrepreneurs, but governments cannot raise the supply or quantity of entrepreneurship, merely influence the allocation of entrepreneurial ability. In his view, what government should do is “get the institutions right,” i.e., ensure the protection of property rights and a well-functioning legal system, and maintain macroeconomic and political stability and competitive tax rates. The wide range of entrepreneurship rates across countries, even when controlled for variations in institutional quality, suggests that specific policies, interventions and regulations directed to start-up costs or innovative activities may influence the supply of entrepreneurs.

The effective functioning of financial markets – see section Financial Market Development and Economic Growth - to assure financing for valid entrepreneurial initiatives can be regarded as one of the institutional factors necessary to the deployment of entrepreneurship (S. H. Haber, North, & Weingast, 2008). Schumpeter (1982) argues that the services provided by financial intermediaries—mobilizing savings, evaluating projects, managing risk, monitoring managers and facilitating transactions—are essential for technological innovation and economic development (King & Levine, 1993). Government officials and policy makers - concerned about spurring innovation - have been promoting financing for entrepreneurs and venture capitalists to attain economic growth; e.g., numerous efforts to favor financial intermediaries have been launched in countries in Asia, Europe and the Americas. The crisis of 2007–8 financial and its continuation in 2011–12 until 2014 confirm the role of financial markets in that the financial intermediaries were not willing to finance innovative entrepreneurship determining unemployment and decline of economic activity. Various authors (Reavis, 2009) argue that particularly at the outset of the crisis, policymakers came to the rescue of various banks and financial institutions, e.g., with the Troubled Asset Relief Program (TARP), for fear that financial markets would collapse and bring down the entire economic system.

V. Economic Growth and Economic Development

To review whether entrepreneurship is conducive to economic growth and development, the section looks at: a. the theories of endogenous growth; and at b. the concept of economic growth and economic development.

a. With respect to economic growth, the contributions of Solow (1956), Arrow (1962), Lucas (1988), and Romer (1986, 1990, 1994), i.e., the theory of endogenous economic growth, are central. The theory finds its roots in the work of Schumpeter (Schumpeter, 1982) and implies that knowledge, innovation and entrepreneurship are instrumental for development, in the sense that the entrepreneur is able to convert knowledge into marketable opportunities that in turn will lead to different and innovative combinations of the factors of production (e.g., labor and capital) that will increase output (Q_t) more than the level of the existing equilibrium. In other words, economic growth involves a two-way interaction between technology and economic life; i.e., technological progress transforms the very economic system that creates it (Aghion & Howitt, 1997). In a different fashion, one could argue that productive factors are undervalued and the entrepreneur is able to exploit that opportunity.

The contribution of the endogenous theory of economic growth allows clarifying the distinction between economic growth and development. Development constitutes the institutional side—i.e., rules and norms that allow economic activity to take place and entrepreneurship to play its role—and economic growth represents the economic side that implies the increase of GDP and GDP per capita (Van den Berg, 2012).

b. The distinction between economic growth and development was made in early work on the economic growth and with reference to external aid (Clower, Dalton, Harwitz, & Walters, 1966). Easterly (2001) studies the case of Pakistan underscoring the strong involvement of donors and international agencies (\$58 billion in foreign aid), the significant level of GDP per capita in the period 1950–99, and the well-educated and

high-achieving elite. However, given its level of income, Pakistan systematically underperforms on most social and political indicators, i.e., education, health, sanitation, fertility, gender equality, corruption, political instability and violence, and democracy (Easterly, 2001). Examples of “growth without development” are the Middle Eastern oil-exporting countries. Todaro and Smith indicate that where “elites contest control of natural resources, an enclave economy develops with relatively few links to other sectors of the economy, and social spending is crowded out by national defense expenditure” (Todaro and Smith 2011; and also see Karpowicz 2008). Karpowicz (2008, pp. 1–2) stresses the poor performance of many Middle Eastern countries in fulfilling their citizens’ most basic needs and articulates that development cannot be recognized solely based on economic growth reflected in the increase in GNP or GDP. Within this framework, Sen (2000) stresses that wealth and opulence increase around the world, but fundamental freedoms are denied to many people. Thus, the issue becomes that of allowing so-called inclusive development and enlarging people’s choices and opportunities in order for people to “lead long and healthy lives, to be knowledgeable and to have a decent standard of living.”⁶⁹ An appropriate measure of development is the Human Development Index (HDI) of the United Nations Development Program.⁷⁰

A healthy economic and institutional environment should not present indicators of development that systematically underperform given the rate of GDP per capita growth. Economic growth and development feed each other and produce a favorable institutional

69 United Nations, *Human Development Reports*, “Glossary of Terms”
<http://hdr.undp.org/en/humandev/glossary/>.

70 See <http://hdr.undp.org/en/statistics/>.

environment where individuals can exploit opportunities, improve their living conditions and thus increase GDP and GDP per capita (Colombatto & Melnik, 2008). This is along the lines of the Schumpeterian approach to economic growth (Schumpeter, 1947, 1982, 2008), i.e., growth is driven by entrepreneurial innovations that are in turn influenced by the institutional environment. Aghion (2004) argues that the approach of Schumpeter provides the framework to design strategies and appropriate institutions to achieve growth in countries at different initial levels of technological development. In other words, economic growth represents a positive force when the institutional and micro settings are conducive to favor economic agents. Financial markets and insurance systems can play an important role in this respect.

VI. Entrepreneurship and Economic Growth and Development

The last three decades have seen a large number of studies monitoring the impact of entrepreneurship, both from a theoretical (Holmes & Schmitz, 1990) and empirical (Evans & Leighton, 1990) points of view. The literature on the role of entrepreneurship vis-à-vis economic performance and growth has developed two strands that have focused on observation units: **a.** establishment or **b.** country or region. A third strand is **c.** the association between entrepreneurship and economic development.

a. In the first strand, a large literature analyzes the influence of entrepreneurship on performance at the firm level. The studies customarily gauge performance in terms of the growth of the firm (Audretsch, 1995). The findings (Carree & Thurik, 2005, 2010) are that entrepreneurial activity, measured in terms of firm size and age, is positively related

to the growth of the firm. New and small companies expand systematically more than larger establishments. The results are consistent across Western economies and across time.

Various studies have checked the so-called Gibrat's Law, i.e., growth rates are independent of firm size (Lotti, Santarelli, & Vivarelli, 2003).⁷¹ However, almost all the studies rejecting Gibrat's Law have been based on manufacturing or large-scale services such as the banking and insurance industries (Math World 2012; Lotti, Santarelli and Vivarelli 2003). These findings may not be valid for small-scale services such as the hospitality industries. (Audretsch, Klomp, & Thurik, 2002) examine the Gibrat's Law using a large sample of Dutch firms in the hospitality industries, and the evidence shows that growth rates are independent of firm size. (Esteves, 2007) rejects the Gibrat's Law for Brazilian firms for manufacturing and services firms, i.e., the smaller companies grow at larger rates.

Various events, i.e., technology, deregulation, globalization, swings in the supply of workers, diversity in demand and the ensuing uncertainty, have determined a structural change, moving from centralization and concentration en route to decentralization. These circumstances entail a greater role for small firms as well as micro-firms that are less centralized and thus foster a more diffuse industrial structure. These modifications are not identical across countries because culture, history and policies in particular countries have enabled a greater response to the changes. However, the entrepreneur captures greater attention, and the question of whether or not countries that have moved toward

⁷¹ Gibrat's Law - Gibrat R. (1931), *Les Inégalités Économiques*, Paris: Librairie du Recueil Sirey- argues that firm growth is a random walk, which means that the probability of a given proportional change in size during a specified period is the same for all firms in a given industry (Jong & Shepherd, 2007).

more entrepreneurship enjoy more robust growth is of enormous significance to policymakers.

Entrepreneurship is viewed at the core of national advantage (Porter, 1998a, p. 125) and is of great significance to undertake innovations and increase rivalry. This shifts attention to related phenomena of 1980s and 1990s: the small business resurgence, and entrepreneurship revival. There is sufficient evidence that economic activity shifted from larger to smaller firms. Impressive evidence is that the share of employment of the 500 largest American firms, the Fortune 500, decreased from 20% in 1970 to 8.5% in 1996 (Acs, Carlsson, & Karlsson, 1999). Acs and Audretsch (1993) provide evidence regarding manufacturing industries in countries at varying stages of economic development. Carlsson (1995) indicates that various factors explain the move toward smallness: intensification of global competition, increase in the degree of uncertainty, growth in market fragmentation and technological progress. Piore and Sabel (1986) argue that the instability of markets in the 1970s prompted the decline of mass production and promoted flexible specialization. This technological development in many cases produced diseconomies of scale.

Brock and Evans (1986) argue that the shift away from large firms is not restricted to manufacturing industries, and provide four explanations: “increase of the labor supply, leading to lower real wages and coinciding with an increasing level of education; changes in consumer tastes; relaxation of regulations; and a period of creative destruction”.

Loveman and Sengenberger (1991) stress the impact of decentralization and vertical disintegration, and the formation of new business communities. The second reduces

transaction costs (i.e., the examples of the “distretti” of North –East of Italy, Schilirò, 2008). Acs (1999) argues that the increased importance of small firms increases entrepreneurship, innovation, industry dynamics and job generation. Acs and Audretsch (1987) and Audretsch (1995) are crucial references on the role of smallness in the process of innovative activities. Cohen and Klepper (1992) discuss firm’s size and diversity to achieve technological progress.

Wennekers and Thurik (1999) and Audretsch and Thurik (2001) detect that the revival of small firms is linked to the attention to the role of entrepreneurship in firms. If size has an impact on economic growth, it should be the differences in the organization that matter.

However, the main difference between a small and a large company is that in a small company the owner and management is one single person, or few people, which is what is called “entrepreneur” that would then make the difference (Carree & Thurik, 2010).

Audretsch and Thurik (2000) believe that the shift toward the knowledge-based economy represents the driving force behind the move from large to smaller businesses. According to them globalization and advancements in technology are the primary determinants of the challenge for Western countries. SMEs constitute an important form of deployment of entrepreneurship and play a significant role in the field of innovation (Rodríguez-Pose & Refolo, 2000).

Thus, it appears that looking at entrepreneurial performance, e.g., sales and survival rates, and also organization, innovation and flexibility, to measure the contribution of entrepreneurship to the economy, SMEs, star-ups and entrepreneurs are more of the type

of opportunity entrepreneurs, and more related to economic growth and make positive contributions to the economy than larger companies.

On the other hand, the literature holds that entrepreneurship is not good per se (Plumer, 2011), but there are cases of the already-mentioned entrepreneurship by necessity and forms of entrepreneurship in small firms that are protected and shielded from competition and that are not automatically conducive to growth. Micro entrepreneurs - mostly coming out of the poor segment of the population - are more related to entrepreneurship by necessity and thus less able to produce economic growth; but they contribute to economic activity and the production of income.

Recent literature indicates that along with small companies, big firms also innovate and prompt growth (Szirmai, Naude, & Goedhuys, 2011). Various authors (Acs & Audretsch, 1987; P. E. Hart & Oulton, 1996; Sorensen & Chang, 2006) argue that entrepreneurship also constitutes a prerogative of large companies; i.e., firms in capital-intensive industries have a relative advantage in innovation (Acs & Audretsch, 1987); large companies undertake innovative and groundbreaking initiatives, create a big share of jobs as Hart and Oulton (1996) indicate, and are increasingly able to thrive in the globalized environment (Acs & Virgill, 2009). Thus, a measure of entrepreneurship should include performance, such as profit and volume of sales (Sorensen & Chang, 2006). In this respect, an interesting distinction is between product innovation, which belongs to small firms, and process innovation, which fits big companies.

On a related point - the relationship between entrepreneurship and employment - the literature presents ambiguous results. Some studies find a positive link between

unemployment and entrepreneurship (the “refugee” effect); other studies find evidence supporting a negative relationship (the “Schumpeter” effect). Empirical evidence from data on 23 OECD countries over the period 1974–2002 (Audretsch et al., 2001; Thurik, Carree, van Stel, & Audretsch, 2008) suggests that the relationship between unemployment and entrepreneurship is both negative and positive: higher unemployment rates may stimulate start-up activity among self-employed people; and higher rates of self-employment may indicate increased entrepreneurial activity, reducing unemployment in subsequent periods. These two effects imply ambiguities about the relationship between unemployment and entrepreneurial activity. The empirical results confirm the two distinct relationships between unemployment and self-employment, i.e., “refugee” and “entrepreneurial” effects and that the “entrepreneurial” effects are stronger than the “refugee” effects. Shane (2004, pp. 5–6, 210, 223, 238) shows that entrepreneurship brings about gains in employment and sales. According to Aquilina, Klump and Petrobelli (2006) SMEs provide a large share of formal employment. Carree and Klomp (1996) and Davis, Haltiwanger and Schuh (1998) review the role of small firms in the job creation process, which remains controversial.

Within this strand, one should also include the relationship between FDI and entrepreneurship (Training and Mobility of Researchers Network, 2001). The question is whether FDI crowds out domestic entrepreneurs. In analyzing firm entries and exits across Belgian manufacturing industries, De Backer and Sleuwaegen (2003) present evidence that import competition and FDI discourage entry and stimulate exit by domestic entrepreneurs. However, the empirical results also suggest that the crowding-

out effect is moderated or even reversed in the long run due to the positive effects of FDI on domestic entrepreneurship, i.e., knowledge, demonstration, networking and linkage effects between foreign and domestic firms. Longbao (2009) examines the role of entrepreneurship in economic growth and development in China and does not see a contradiction with FDI. Equally, Ayyagari and Kosova (2007) find evidence from the Czech Republic that a larger foreign presence stimulates the entry of domestic firms, i.e., a positive horizontal spillover from FDI.

b. The impact of entrepreneurship on the performance at the level of firms, on employment and on FDIs discussed above constitutes the basis to expand the discussion of the impact of entrepreneurship to the whole economy and to economic growth (Smith, 2010; Andre van Stel, 2006). In this context, the relationship between entrepreneurship and performance extends beyond the firm’s observation to be inclusive of geographic regions, connecting business activity measures to the regional performance of the region or country. In this context, the relationship between entrepreneurship and performance centers on geographic regions or states and links measures of entrepreneurial activity to the economic performance of these areas.

Many policy makers and politicians have begun to recognize the revival of business ownership and the positive impact of entrepreneurship on the growth of GDP and employment, at the local level and at the national level as well, stressing the role of the entrepreneur in implementing innovations.

The impact of entrepreneurship on economic growth and employment has been extensively researched empirically (Audretsch and Thurik 2000; Van Stel, Carree and

Thurik 2005; Thurik et al. 2008). The stylized fact is that entrepreneurship and economic growth are closely related and entrepreneurship produces economic growth (Wennekers & Thurik, 1999). As a result, high levels of innovation are reflected in technology and productivity growth. Parker (2009, pp. 36–7) finds that many studies have discovered that small, newer companies are more positively related to higher growth rates than average, and it appears that entrepreneurship and growth are related at both the firm and industry levels. At the national, macroeconomic level, the relationship is less evident, even though Audretsch and Thurik (2000) and Acs (2006), regress economic growth rates in OECD countries on various measures of entrepreneurship and find a positive relationship. However, the direction of causality has not been definitively proven, and the negative impact of firms that fail is not considered. Overall, the compelling stylized fact that emerges from the literature is that entrepreneurial activity is positively related to economic growth.

Along these lines, a separate body of literature relates theories and definitions of entrepreneurship, as well as measures and appropriate policies to favor economic growth. The focus is on the type of entrepreneurship (and their measures) and its relationship with economic growth, depending on the different environments, e.g., developed or emerging markets, and the designation of appropriate policies to improve the deployment of entrepreneurship that leads to economic growth. This literature underlines the important relationship among theories, definition, measures and public policy actions relevant for supporting entrepreneurship conducive to economic growth. This part is also important

for the selection of appropriate measures of entrepreneurship to perform empirical testing (see Chapter 9 on measures and Appendix 2).

Schiller and Crewson (1997, p. 523,526) distinguish between successful and unsuccessful entrepreneurship, and identify both entry and exit rates related to entrepreneurial activity and also the psychological and sociological characteristics of entrepreneurial entry. They also measure “entrepreneurial success,” as the number of years an individual remains self-employed. These contributions refer to the measurement of entrepreneurship based on the experience in the United States, which normally offers reliable data, at the federal and state levels, and also at the smaller territorial level (e.g., counties). Longitudinal establishment and enterprise micro-level data (Acs & Armington, 1998) provide documentation on the attributes of surviving businesses, births and deaths, and employment. The initiative has become the Longitudinal Business Database (LBD) of the Census Research Data Centers (RDCs) that provides data about business formation and growth (United States Census, 2009). Baumol, Litan and Schramm (2009, pp. 277–86) discuss the measurement of entrepreneurship particularly with reference to the United States. They underline that there is no ideal measure of entrepreneurship, at least to test the various hypotheses related to entrepreneurship. The authors suggest that the best measurement comes from surveys that can be tailored to measure specific aspect of entrepreneurship. They recognize that among the so-called hard data, self-employment and start-ups (or new firm formation) constitute reliable indicators. Entrepreneurship measures from the financial sector—such as venture capital, angel capital, entrepreneurs’ equity financing and initial public offerings—may constitute viable alternatives.

Foreman and Peck (2005, 77–107) identify entrepreneurs with business founders and the consequent measure of entrepreneurship is the number of new firms established.

Reynolds (2005) captures the distinction between push and pull motivations by introducing the concept of opportunity and necessity entrepreneurship. A key point is the difference between “necessity entrepreneurship,” which when someone becomes an entrepreneur because there are no better options, and “opportunity entrepreneurship,” which is when someone makes an active choice to start a new enterprise based on the perception that an unexploited or underexploited business opportunity exists. This distinction has prompted a number of significant and subsequent studies (Block and Wagner 2010).

With respect to the measurement of entrepreneurship in emerging markets and in Latin America, the theories, definitions and measures studied for developed markets apply to a certain extent (see Chapter 9 on measures and Appendix 2). A number of activities are income generating rather than growth generating, i.e., innovative activities typical of entrepreneurs and SMEs (F. Allen and Yago 2010, 52–4). In the same context, Bateman (2010, 216; 2011) speaks of “entrepreneurial poverty” to describe enterprises that are not able to grow, but that can still survive. Longbao (2009) confirms these considerations for China. He underlines the role of entrepreneurship in Chinese economic performance and the transformation of the types of Chinese enterprises from necessity-driven to opportunity-driven entrepreneurship; i.e., entrepreneurship able to deliver innovative products, innovative technology, more exports, and more jobs; and explains how different types of entrepreneurs affect development (Verheul et al. 2001).

A primary problem, however, is finding reliable data, given that gathering data on entrepreneurship in Emerging Market Economies is often challenging. As noted above, in emerging market countries, one can detect the category of entrepreneurs “by necessity,” whose activities to a very large extent do not entail innovations as Audretsch and Fritsch indicate (2002), or breakthroughs (Tiffin 2004; Kantis, Angelelli and Koenig Moori 2005).

Acs and Armington (1998) examine the link between entrepreneurship and national level growth, in the context of GEM research program’s work (Reynolds 2005; Reynolds et al. 2002, 2003) and start developing a theoretical framework joining entrepreneurship and the entrepreneurship measures to economic growth in a context that is cross-national, as well as the reversed causality of development impacting entrepreneurial activities.

Analyzing data gathered by GEM researchers in 11 countries, Acs and Varga (2005) find that the effects on economic growth and development of necessity entrepreneurship compared with opportunity entrepreneurship vary greatly and necessity entrepreneurs have little impact on growth while opportunity entrepreneurs have a positive and significant impact. Thus, the answers to the question “How is entrepreneurship good for economic development?” depend on what one implies by entrepreneurship. If it means self-employment, then in most cases it would not lead to development and growth. In fact, self-employment plummets as economies are more developed. Only when economies can remove individuals from self-employment that an increase in development takes place; e.g., according to Adam Smith, the increase of the division of labor is associated with the increase in economic development. The data indicate that the ratio of

necessity entrepreneurship to opportunity is a pivotal indicator of development. With more of the population being involved in opportunity entrepreneurship with more people leaving necessity entrepreneurship, more levels of fiscal development will rise.

Along the lines of definition, measures and policies, Wong, Ho and Autio (2005) identify different kinds of entrepreneurial activities gauged utilizing the GEM database, i.e., necessity TEA, high-growth-potential TEA, opportunity TEA and overall TEA, and they are seen in relation to innovation and economic growth. Among the four entrepreneurship types, only high-growth-potential type is seen to have any meaning influence on economic growth.

Wennekers et.al. (2005) – cited in many studies- find support for a U-shaped relationship between development level and entrepreneurship. In fact, entrepreneurship—measured with self-employment—plays a distinct role in different countries depending on the stage of economic growth. Acs (2006) contrasts entrepreneurship by necessity and entrepreneurship by opportunity and refers to (and extends) the work of the GEM project. Acs and Virgill (2009) confirm that the empirical evidence is strong in support of a link between entrepreneurship and economic growth. Studies find that regional differences in economic growth are correlated to levels of entrepreneurship. The recognition of the prominence of the entrepreneur and the necessity of markets for the entrepreneur to operate has convinced many countries to improve their markets by eliminating barriers to entrepreneurship and other market failures. However, policymakers must ensure that externalities—knowledge, network, and demonstration and failure externalities—stimulate entrepreneurship and economic development (Acs & Virgill, 2009).

Acs and Szerb (Lamy, O'Shea, & Richard, 2011, p. 5) stress that “entrepreneurial activity varies across stages of economic development as indicated by the U-shaped relationship between the level of development and the rate of entrepreneurship. A positive effect of entrepreneurial activity on economic growth is found for highly developed countries; a negative effect is found for developing nations.” Acs (2010) and Acs and Szerb (2010) construct a Global Entrepreneurship and Development Index (GEDI) to review entrepreneurship across countries and find that the relationship between entrepreneurship and economic development is mildly S-shaped, not U-shaped or L-shaped. The implications of their findings (Acs, 2010, p. 1; Acs & Szerb, 2010, p. 1), as already expressed, is that public policies directed to the development of insurance as a market institution, focusing on emerging countries at an advanced stage and that like Brazil are entering the innovation stage, are instrumental for the full deployment of entrepreneurship.

Chapter 9 deals with the measures of entrepreneurship and expands on the link among theories, definition, measures and policies of entrepreneurship and the different implications for appropriate and effective policies conducive to economic growth.

c. With respect to the third strand, i.e., the relationship between entrepreneurship and economic development, the entrepreneur constitutes a suitable agent for change and for the functioning of the overall economic and institutional setting. A pre-condition for the entrepreneur is that markets function and, indeed, entrepreneurship matters because markets matter. Hayek (1945) recognized that knowledge was “dispersed” throughout society (Hayek, 1945, p. 520), with each person having a unique stock of information.

However, the market, through its frequent adjustments in response to the “separate actions of different people” and “the conditions of supply of various factors of production,” communicates new information through prices, and enables the efficient allocation of resources. The collapse of centrally planned economies has settled that governments cannot allocate resources efficiently and markets are necessary.

Leibenstein implies that entrepreneurship has impact on economic growth and development: “Per capita income growth requires shifts from less productive to more productive techniques per worker, the creation or adoption of new commodities, new materials, new markets, new organizational forms, the creation of new skill, and the accumulation of new knowledge. . . . The entrepreneur as gap-filler and input-completer is probably the prime mover of the capacity creation part of these elements in the growth process” (Leibenstein, 1968, p. 77).

In line with the work of Schumpeter, Leff (1979) concludes that entrepreneurship is essential for development and in Emerging Market Economies entrepreneurs can fill in gaps left by incomplete and underdeveloped markets (Leibenstein, 1968). Leff (1979, p. 48) states that a key function of entrepreneurship in developing economies is to mobilize factors such as capital and specialized labor and allocate them to the activities where productivity is greatest. Even so, according to Leff (1979), when imperfections of the market are severe, businessmen still exist. Obviously, businessmen respond to imperfections by utilizing various gap-filling and, may be, second-best options. In cases that imperfections are extreme, when market and nonmarket failures are pervasive, businessmen are pushed outside the formal sector into the informal one or in

unproductive and rent-seeking activities (Baumol, 1990). In less severe cases, versatile indigenous groups have formed in various developing countries as a response to market failures. The “group is thus an intra-firm mechanism for dealing with deficiencies in the markets for primary factors, risk and intermediate products in the developing countries” (Leff, 1979, pp. 667–73). Many of the groups or teams combine industrial and banking operations and account for big business activity portions in many countries. Big groups were formed in India to rectify the capital market deficiencies. Of particular significance, these groups engage in entrepreneurial behavior while also “providing the capital and the technical and managerial resources.” In this way, the “group” economizes the necessary entrepreneurial efforts. Nevertheless, these teams are not entrepreneurship’s optimal structure in emerging markets, as they engage in “a special form of monopoly capitalism,” that can be disruptive to long-term development.

Conyon and Leech (1994) indicate that a dearth of economic growth means that there is a shortage of entrepreneurs and “entrepreneurial spirit.” Van Stel, Carree and Thurik (2005) articulate the role of entrepreneurship for economic growth and development. They find out that entrepreneurial engagement by nascent businessmen and managers of young businesses impacts economic growth, and this impact is dependent on the per capita income level, suggesting that entrepreneurship has a different role to play in countries according to their stages of economic development.

Acs and Szerb and Virgill (Acs & Szerb, 2009) (Acs & Virgill, 2009) review the literature to address the query “Why is entrepreneurship important for development?” They reach the conclusion that in case entrepreneurship becomes a goal of public policy,

fundamental development benefits accrue during the process of moving to a more entrepreneurial economy. Some of these policies would be targeted at building better entrepreneurial atmosphere and strengthening governance to ensure that entrepreneurs can blossom. A development strategy that is entrepreneurship-based influences economic growth positively through creation of an environment wherein more firms enter markets, operate and fail, facilitate learning spillovers and externalities. By allowing markets to work with lesser burdens and thanks to vigilant entrepreneurs' actions, it is possible that emerging markets will allocate resources more effectively and result in higher economic growth.

From an Austrian perspective, Mises puts at the center of economic development liberal policies that allow human action to act freely and realize progresses (Mises, 2007, pp. 8–10, 143–5.). Harper argues in favor of a “complex nexus of casual relationships among cultural and institutional factors, peoples’ cognitive processes, their alertness, entrepreneurial behavior and economic development” (D. Harper, 2007, p. 23). Leeson and Boettke (2009) stress that entrepreneurship is important for economic development, particularly that part of entrepreneurship concerned with investments in productive technologies that improve productivity and consolidate institutional changes. Harper (2007) reasserts the role of entrepreneurs in the economic process as the drivers of growth and development. In his view, the theory of the entrepreneur is a prerequisite for the theory of the market process. Kirzner (1985) considers that entrepreneurship is a process of discovering opportunities for profit in situations of disequilibrium. He believes that the talent of each entrepreneur is to be alert to opportunities. Entrepreneurs thrive in

a functioning institutional environment and represent instruments to enhance the institutional environment.

About the link between entrepreneurship, economic growth and development, there are views not completely aligned with the nexus of causality between entrepreneurship and economic development and growth, depending on the type, definition and measure of entrepreneurship and the level of development of a given country as well as problems of endogeneity and reverse causality. Naudé (2010) argues that the results do not seem to be very robust with regard to definitions, time periods, quality of data or estimation methods; reverse causality crops up. Some economists even report cases of a negative relationship between entrepreneurial activity and economic growth in case business units seek protection and reduce the level of competition in the market (R. Rajan, 1988). Along these lines, however, Naudé (2011) stresses the point of reverse causality and that the relationship between entrepreneurship and development constitutes a richly dynamic area of research. This research focuses on the continuous and dynamic relationship between institutions and entrepreneurship and emphasizes the importance of institutions for understanding how entrepreneurs can play their innovative, Schumpeterian role to increase the welfare of society.

To sum up this section, the literature shows evidence that entrepreneurs as agent of change constitute a force that improve the existing environment and institutional setting, favor the establishments of conditions that make people benefits from opportunities and in this process create development beyond economic growth. Entrepreneurs interact with the environment and favor its evolution. The role and

importance of entrepreneurship have been growing over the last two decades or so and entrepreneurship has now acquired the status of a discipline taught at Universities and even at high schools (Neck, Greene, & Brush, 2014).

VII. Entrepreneurship in Emerging Markets and in Latin America

In the emerging markets environment, the definition and role of entrepreneurs are different from those in a developed market environment (Lingelbach, Vina, & Asel, 2005). The main aspect and feature of entrepreneurship as identified in the chapters above apply also to emerging and Latin American countries. However, in emerging markets, the institutional setting is much less reliable and has a negative impact on the status of entrepreneurship and the effectiveness of insurance. The entrepreneur in the Schumpeterian sense and business innovation is much less common, and in many respects micro entrepreneurs and small entrepreneurs often undertake activities that replicate already-existing enterprises and thus do not provide innovation, increase productivity and spur economic growth (Levenson & Maloney, 1998; Robinson, 2008).

This section reviews: a. the interest for entrepreneurship in Latin America, the impact of entrepreneurship on economic growth and the commitment of governments to favor entrepreneurship; b. studies and research on entrepreneurship in Latin America; c. the status of entrepreneurship in the region; and d. the shortcoming and issues to address to stimulate entrepreneurship.

a. From historical perspectives, up until the early 1990s, studies and policies in emerging market countries focused on the role of the state for development through forms of protectionism, such as import substitution and export promotion, and they did

not pay attention to the issues of entrepreneurship. In the period after World War II and up to the late 1960s, various authors (Leff 1979; Bauer 1976, 1981, 1986⁷²) recognize the role of entrepreneurship in the economic development of emerging market countries and argue that the lack of entrepreneurship constitutes a constraint to economic growth and development. From the 1970s to the 1980s, the problem of entrepreneurship disappeared from the radar screen of emerging market countries, including those in Latin America, due to the heavy intervention of the state, control of the economy and markets by extremely strong national groups, and the unfavorable political climate for capitalism and the private sector.

In the past three decades, following the emphasis of the late 1980s and 1990s on structural and macroeconomic conditions, entrepreneurship has become a key topic of interest in emerging market countries (Murphy, Liao, & Welsch, 2006). In emerging market countries, entrepreneurship is associated with economic growth and development, e.g., small business sector and entrepreneurship are generally linked to a resilient economy (Beck, Demirguc-Kunt, & Levine, 2005). Entrepreneurship is also linked with jobs and wealth creation, innovation and welfare (Desai, 2009). In general, however, it is safe to say that in emerging markets, entrepreneurship is less related to innovation and more to activities undertaken by necessity for lack of alternatives.

Based on the findings that entrepreneurship supports economic growth, across emerging countries (and developed countries as well), entrepreneurship constitutes a critical part of economic development strategies. In most emerging market countries and

⁷² The work of Peter Bauer is crucial as he has been a pioneer in stressing that private entrepreneurs are the engines of development and they are very capable, in the developing world as much as in the industrial countries, of engendering development.

in Latin America, there is a commitment to make entrepreneurship flourish and support economic growth. The culture and practice of entrepreneurship are widely accepted, however, the level of entrepreneurship in Latin American countries is not the same as in Asian countries (Schramm, 2006) and in advanced economies where the institutional setting supports private initiatives (Lipset, 1997; McCraw, 1998).

b. Entrepreneurship research in Latin America has been growing with experiences, cases studies, best practices and policies oriented toward action. Tiffin (2004) presents a panorama of entrepreneurship in Latin America and a series of case and country studies that have been evolving. Relevant research include various authors (Barreto 2007; Schmitz 1982; Herring 1988; Alcorta and Peres 1995; Robinson 2008; Acs and Amoros 2008; Kantis, Angelelli and Koenig Moori 2005; Davila 2008). Brenes and Haar (2012) in a forward-looking perspective show how lesson from these experiences should pave the route towards a greater commitment to entrepreneurship. Various studies (Tiffin 2004; Bas, Amoros and Kunc 2008) show that Latin America is a center of new business creation, but largely without the educational or institutional infrastructure to support it. Llosa (2007, pp. 189–222) studies the case of Latin America from the perspective of the development of entrepreneurship. He underscores how the Latin American civilization before the Spanish conquest was thriving on exchange, trade and the absence of war and how the Spanish domination developed a quite different model based on privilege and oppression rather than freedom and initiative. This institutional environment continued after the liberation from Spain, despite some attempt, i.e., Juan Bautista Alberdi (Mayer, 1963) in Argentina, to shape Latin American nations

along the lines of the United States. Given these circumstances, what Llosa (2007, p. 194) calls parasitical entrepreneurship has developed in many countries of Latin America, with the exception of Chile. Under state mercantilism, economic nationalism, political corporatism, wealth transfer, political law (different from legislation) and also a judicial power submitted to the politicians, the talent of the Latin American people has been used to obtain rent positions rather than undertake productive activities. In this respect, Llosa (2007) is critical of the reforms of the 1990s that created new forms of economic and political control with private-sector monopolies and oligopolies and large government spending with little positive impact on people. In Brazil, Llosa (2007, p. 195) recognizes that the system took root more gradually, but then become equally a system based on privilege.

c. The commitment of governments to entrepreneurship and innovation is crucial to make progress that would be not visible immediately. In this respect, for Latin American countries the difference between necessity entrepreneurs (i.e., individuals become entrepreneurs for lack of other options) and opportunity entrepreneurs (i.e., individuals become entrepreneurs because they detect an opportunity that provides rewards) is very relevant. Along these lines, according to the Global Entrepreneurship Monitor (2011b) there is growing evidence that certain types of entrepreneurs matter more than other types in terms of impact on long-term economic growth.

“High-impact or high-growth entrepreneurs” are individuals who launch and lead companies with above-average impact in terms of job and wealth creation and the development of entrepreneurial role models. High-growth entrepreneurs are significantly

more educated than members of the general population. High-growth entrepreneurs in the main Latin American countries (see below) are twice as likely as the general population to have university or postgraduate educations (50% vs. 26%). High-growth entrepreneurs and nascent entrepreneurs present similar levels of high status to become successful entrepreneurs. Nascent entrepreneurs—compared with high-growth entrepreneurs—are much more likely to start businesses because they do not have better professional options and at least initially are less likely to target international customers. As Schumpeter indicated, understanding the characteristics and attributes of high-impact entrepreneurs has become a primary focus for researchers, policymakers and other social enterprise organizations concerned with economic development.

Macro-level data on high-impact entrepreneurship is becoming widely available through the GEM and OECD under the Entrepreneurship Indicators Program (OECD, 2012). However, there are still a limited number of research and studies that review and offer insights into entrepreneurs and their impact, particularly for emerging markets.

Acs and Amoros (2008), building on previous studies, conclude that the conditions for entrepreneurship are specific to each country. They confirm that high-growth entrepreneurs are not very present in most Latin American countries. The policy agenda should continue to focus on an efficiency driven economy, which is necessary but not sufficient. As a complement, governments in Latin America should start to focus on innovative entrepreneurship that has an impact on competitiveness.

Other studies confirm the dearth of entrepreneurs that produce significant economic growth. High-growth entrepreneurs (Tursley, 2011) are present in the large

Latin American countries (Argentina, Brazil, Chile, Colombia, Ecuador, Mexico, Peru and Uruguay). These entrepreneurs are among the least likely to rely on exports, with only 13% having at least one-fourth of their customers located internationally, and they are also among the least likely to form partnerships with other entrepreneurs. They are among the most likely to rely on funding from family members, and are also likely to provide funding to family members when acting as angel investors; i.e., over 50% of high-impact entrepreneurs make angel investments within the Latin American countries.

d. Studies, investigations and experiences have identified the reforms needed to adjust the institutional setting to foster innovation and entrepreneurship in the Latin American region (Tursley, 2011). These measures provide a map of the main areas that need improvement and cannot be generalized to all Latin American countries:

- a. weak institutions affect the various components that move around entrepreneurship, e.g., property right; enforcement;
- b. influence of political, cultural and social factors;
- c. lack of entrepreneurial culture and Schumpeterian entrepreneurs;
- d. limited education and training;
- e. regulation and procedures for enterprises;
- f. rigidity of labor markets;
- g. access to financial services and inadequacy of seed capital;
- h. opening of various markets, e.g., factors and products;
- i. and taxation.

In this context, some authors suggest that in Latin America, there are various clusters based on the natural resources of which the region is abundant, where innovation and entrepreneurship thrive. However, a fundamental need exists to spread knowledge and innovation in the whole economy (Bas et al., 2008) and to strengthen institutions including market institutions like insurance.

VIII. Insurance

This section is complementary to that on the basic theory of insurance and covers

a. principles of insurance and b. regulation and supervision.

a. Principles of Insurance

Risk transfer is insurance. Mises (2007, p. 109) indicates that the “basic idea of insurance is pooling and distribution of risks”.

As indicated in the section on the basic theory of insurance, the primary aim of insurance is to meet claims when asked. Thus, insurers have exposure to various risks⁷³: risks of solvency; investment risk when returns are not sufficient to make the company financially sustainable (E. J. Vaughan & Vaughan, 2007); and to the possibility of default by a partner (e.g., a reinsurer), or mismanagement, or systemic risk.

Moreover, the insurer also faces moral hazard and adverse selection (see below) e.g., he/she is not able to gauge the specific risks of the insured party and is not in position to assess or control his/her actions.

Market failure (Kunreuther, Hogarth, & Meszaros, 1993) occurs: “when the market price (premium) does not reflect the insolvency risk. In a world of perfect

⁷³Solvency risks are either technical or investment related.

Technical risks are of two types: underpricing and under provisioning.

Solvency risk occurs is in case of underpricing, i.e., whenever the insurer draws buyers through setting exceedingly low premiums that do not cover the expected claims. In the case of under provisioning that can happen because of underpricing the reserve is not adequate to meet the obligations.

Technical reserves constitute the largest share of the debt of an insurer, and they gauge the “underwriter’s obligations”.

Investment risk relates to the insurer’s role as a financial intermediary. The risk for the insurer is that the return on the invested premium will not materialize and it will jeopardize the ability of the insurer to continue the insurance business.

information, economic theory suggests that competition and rational behavior ascertain that risk is incorporated in consumers' willingness to pay, thereby encouraging insurers to follow efficient risk management. To accurately assess the solvency of the insurer, however, the purchaser of insurance should have correct data on the distribution of loss and claims, the return on the insurer's assets, and the technical reserves that the insurer establishes. Practically, however, such information has significant costs or is unavailable. Hence, it is reasonable to think that the insured is not in position to assess the financial capacity of the insurer, or the quality of the insurance contract.”

Moral hazard – the “hidden-action problem” (Varian 2009) - refers to situations in which one side of the market cannot observe and monitor the actions of the other (Zweifel & Manning, 2000, pp. 413–4). In the case of insurance, ex-ante moral hazard constitutes lack of preventive efforts to reduce the risk in presence of the insurance coverage. In other words, the insured once he/she obtains the coverage has little incentive to reduce the risk, which means that insurance policies may have the effect of reducing the insured's initiatives to diminish losses. Moral hazard appears ex-post when the insured, once the risk occurs, asks the insurance to pay more. For instance, in health and medical insurance the insurance coverage provides the insured with an incentive to get treatment covered by insurance even if not strictly needed, i.e., an increase in the demand for medical care.

Adverse selection occurs in a transaction between two parties with different amounts of information. Asymmetric information leads to a reduction of the quality

and quantity of the good being traded. In insurance, it refers to the situation in which consumers have different expected losses; and the insurer is unable (or finds it too costly) to define the profile of each insured and hence reduces the offer of insurance, or raises its price (i.e., premium), and consequently only individuals facing high risk request the coverage. The insurance policies try to include provisions to reduce moral hazard and adverse selection.

The considerations indicate that asymmetric information constitutes a significant feature of insurance that can create adverse selection and moral hazard and hence result in market failure.

A great deal of research has emphasized the problems of adverse selection and moral hazard in the insurance market. Rothschild and Stiglitz (1976) show that asymmetric information between the insurance company and the policyholder inhibits the design of an efficient contract when the buyers are heterogeneous in their accident probabilities.

The studies show that empirical evidence of asymmetric information in insurance markets is mixed. Several empirical studies have found no evidence of asymmetric information in the property-casualty, life and health insurance markets. These studies include Cawley and Philipson (1999), who examine the U.S. life insurance market; Cardon and Hendel (2001) who study the U.S. health insurance market; and Chiappori, Gollier and Salanie (Chiappori & Gollier, 2006; Chiappori & Salanié, 2000) focusing on the French auto insurance market. Conversely, Cutler and Johnson (2004) review the literature and find evidence in support of asymmetric information

in the health insurance markets; Cohen (2002) gives some evidence of adverse selection in the American automobile insurance. Chiappori and Gollier (2006) argue that “asymmetric information is the fundamental reason that competition in insurance markets may not guarantee that all mutually advantageous risk exchanges take place.” Finkelstein and Poterba (2004) analyze adverse selection by looking at the annuity markets in UK and find no evidence of adverse selection. Recognizing that adverse selection is a problem for insurance markets, they stress that asymmetric information has specific characteristics depending on each single insurance market.

b. Regulation and Supervision

Moral hazard and adverse selection are asymmetric information’s customary forms that can result in insolvency risk and under provisioning of insurance’s products, underpricing and, according to most researchers, validate legal provisioning, regulation and supervision by the government (Faure & Hartlief, 2003) (IAIS, 2012). The regulation of insurance includes two main activities: solvency regulation and market regulation, which are linked and coordinated for the achievement of their specific objectives. Solvency regulation searches out for the protection of policyholders against the risk that insurers will not meet their financial obligations. Market regulation is intended to guarantee fair insurance prices, products and practices⁷⁴ and impacts on the financial performance of insurers. Insurers obtain a license to operate in given jurisdiction (i.e., the domiciliary state in the United States)

⁷⁴ Some insurers write certain specialty and high-risk profiles policies on no-admitted—or surplus—lines basis (assuming that these policies are not sold) that is not subject to price and product regulation.

and are subject to solvency and market regulations in that jurisdiction as well as in other jurisdictions and locations where they sell insurance.

Reinsurers are also subject to solvency regulation in their domiciliary state.

Regulators control entry into the no-admitted market through imposition of trust and solvency regulation. The integration of markets reinforces the significance of regulation and supervision that are appropriate and coordinated at the global level. In fact, each jurisdiction requires an adequate regulatory framework comparable with that of other jurisdictions and in line with the requirements of relevant international organizations, i.e., the IAIS, the International Actuarial Association and the International Accounting Standards Board, to develop a global risk-sensitive solvency regime for insurance companies, insurance groups and conglomerates (Ayadi & Resti, 2004; Monkiewicz & Liedtke, 2011).

The literature contains different views about regulation, capital adequacy and supervision in the insurance business. Based on the assumption that asymmetric information in insurance is not as severe as banking and that an insurance company's crisis or failure is less costly than a bank failure, Flees, Kessner and Klemperer (1999) consider the U.K. (unregulated) and German (tightly regulated) markets. They conclude in favor of a free insurance market without or with very little regulation, supervision, or capital adequacy requirements. In their view, buyers are always ready to pay for an insurer or a reinsurer that guarantees solvency, and there is always enough capital available in case of insolvency. Hence, the insurers' decision is efficient in terms of economic capital, and regulation would impose a deadweight

loss. This point works assuming that consumers are completely informed regarding the risk of insolvency⁷⁵.

Despite arguments for an unregulated market, the practice of supervision and regulation of the industry of insurance is widespread around the globe. Even so the debate for independence from supervision and regulation is more robust with regards to insurance. That's owing to the fact that insurers do not need massive liquidity given that the probability of "runs" is low. Furthermore, reinsure allows insurance companies to change their risk profile. It should be recognized that users' perceptions of regulation and supervision and capital adequacy influence and shape the evolution and development of insurance markets (Ernst & Young, 2011b; IMF, 2009a).

A question that remains open is that of the proper mix of regulation and supervision and government direct intervention in insurance markets. Particularly in emerging markets and in Latin America, public policy is a significant factor in strengthening insurance markets, identifying the limits of government intervention to promote insurance, and assuring welfare gains (M. R. Greene, 1976). Government intervention can create inefficiencies in many respects: in case of direct intervention, the government normally displaces the market; in case of implicit or explicit guarantees, the danger of moral hazard increases; in case of the expectation of bailouts, it removes incentives from policyholders to consider insurers' financial strength when buying insurance products. On the other hand, the danger of adverse selection usually decreases when the government requires mandatory insurance

⁷⁵Klemperer and Meyer (1986) do not have the assumption that consumers understand the risk of insolvency. Under these circumstances, they do not favor the unregulated model and stress that insurance failures (i.e., during the period 1986–99) are more severe than the losses of other financial institutions.

policies (e.g., for automobiles), or when government holds a monopoly on the delivery of insurance policies.

IX. Insurance in Emerging Markets and in Latin America

Chapter 5 tackles the status of insurance in the world and in emerging market countries. This section focuses on the theoretical and empirical contributions related to the Latin American insurance markets.

In general, Giarini and Stahel (1993, p. 6) argue: “insurance is understated and underestimated.”⁷⁶ Cook and Cummins (1994) maintain that the existence of insurance markets facilitates economic activity by reducing uncertainty, taking into consideration that the less risk-averse agents will convert into entrepreneurs in a stable and predictable environment (Kihlstrom & Laffont, 1979). In advanced economies, insurance products are readily available and economic activity benefits from an energetic insurance market.

For emerging market countries, the United Nations Conference on Trade and Development (UNCTAD) stresses (I. Taylor and Smith 2007) that a well-functioning insurance sector plays a critical role in economic development, not just at a macroeconomic level but also for the activities of individuals and businesses (UNCTAD, 2007). Access to financial services, personal savings insurance are critical and constitute an important barrier to new firm formation (Arena 2006; Ardis, Heyman and Milenkos 2011). Potential entrepreneurs and households have exposure to high risk, with significant welfare and efficiency repercussions.

⁷⁶ Giarini relates insurance to the service economy.

In emerging market countries, individuals and entrepreneurs face substantial obstacles and significant greater uncertainty than their counterparts in advanced economies. This situation varies among countries and constitutes a primary factor in the effectiveness of insurance markets. While significant dissimilarities exist, emerging market countries have a low level of trust (Beugelsdijk, Groot, & Schaik, 2002), a lot of interactions are necessary to establish it and conduct transactions (Paxton, 2004) and the institutional setting is not working effectively. Under these circumstances, insurance instruments are underdeveloped and often unknown and/or unavailable to the general public and to the potential entrepreneur and/or they are perceived as mispriced and with the expectation that claims will be satisfied only with long delays.

This is the situation also in Latin America, which implies that many risks are not covered or not properly covered and uncertainty is not reduced. There are unmet needs and untapped insurance opportunities (Ehlich & Becker, 1972; Masci, Tejerina, et al., 2007). Insurance markets in Latin America countries do not provide effective services to potential clients and entrepreneurs.

The expected growth of premiums per capita, the growth of population and the solid economic performance of several emerging market countries – see Chapter 5- reinforce the view that there is a great potential for the insurance sector in emerging markets. Thus, effective insurance markets that delimit risk from uncertainty would be particularly good for economic activity in Latin American countries (Inter-American Development Bank, 1994) (Dercon, Bold, & Calvo, 2006).

In Latin American countries, there are the conditions for a public policy agenda operating on a set of correlated issues: encourage an increase of the supply of insurance; liberalization; opening to foreign competition; and effective regulation and supervision.

X. Financial Market Development and Economic Growth

From the theoretical and empirical point of view, financial intermediation and financial innovation have remained an underexplored area of economics for some time. Schumpeter (1982) recognizes the role of finance in allowing entrepreneurs to realize their initiatives and become the engine for creative destruction. Following several decades where the literature on development was centered on the role of government and that of public banks, in the late 1980s and in the 1990s a series of studies revised the relationship between financial intermediation and economic growth. The role of financial markets and financial intermediation is normally considered as a factor relevant *per se* for entrepreneurship and economic activity. However, as we have seen above, is also regarded as part of a broader ineffectiveness of the institutions.

This section briefly reviews: a. the interpretation of the development of the United States; b. the literature on the relationship between financial intermediation, stock market and economic growth; c. the experiences of the recent crisis of 2007-8 and 2011-12 and the role of financial markets; and d. the part of financial markets in Latin America.

a. From a historical perspective, after the Civil War, the decision of the secretary of the U.S. Treasury, George Hamilton, to bail out the states in default prompted the establishment of a single US financial market where the Federal Treasury could issue bonds. That decision contributed to the economic growth of the United States (Henning

& Kessler, 2012). Rousseau and Sylla (2005) study the early U.S. economic growth (1815-1840). According to Rousseau and Sylva (2005), the development of the financial system provided debt and equity financing to the government and to firms and played a critical role for the economic growth of the United States. In their view, the role of the financial sector was more important than that of the investments in infrastructure to explain the U.S. economic growth. These findings support the notion of finance-led growth in the U.S. and corroborate the interest in emerging markets to undertake policies to improve their financial systems and favor economic growth. On the other hand, even if not strictly related to this study, the experience of the development of the financial markets in the United States and particularly the bail-out by the federal Governments of the single states is an example that the countries of the Eurozone should consider as they intend to exit the existing crisis by strengthening the European Union and making it more perfect (Henning & Kessler, 2012).

b. From the theoretical and empirical point of views, Jung (1986) and Dee (1986) underscore the strong association between financial development and economic growth. King and Levine (1993)⁷⁷ argue “Schumpeter might be right,” which is the title of their article on the role of financial markets for enterprises. Greenwood and Jovanovic (1990) and Pagano (1993) model the effect of financial intermediaries on economic growth, i.e., financial intermediaries have an impact on growth by transforming savings into investment and thus channeling savings to firms by improving the allocation and

⁷⁷ One of the indicators used for the financial sector is that of Goldsmith (1969) and McKinnon (1973), i.e., the size of the formal financial intermediary sector relative to economic activity to measure financial-sector development, or financial depth. The assumption is that the size of financial intermediaries is positively related to the provision of financial services. The ratio of liquid liabilities of the financial system to GDP constitutes a measure of “financial depth.”

productivity of capital and by altering the savings rate. Levine (1997) and Beck and Levine (2001) find a positive causal impact of financial development on productivity and economic growth. Caprio and Demirgüç-Kunt (1997) state that long-term credit is scarce in Emerging Market Economies, especially for small firms that would obtain long-term finance if located in industrial countries. Rajan and Zingales (1998, 2001b) confirm that economic growth finds a limitation in a financial system that is ineffective. Rajan and Zingales (2001a, 2001b) attribute the growth of companies to financial innovation. Levine (2005) identifies the functions of the financial systems to influence long-term growth: (1) lowering the costs of researching potential investments; (2) exercising corporate governance; (3) trading, diversifying and managing risk; (4) mobilizing and pooling savings; and (5) mitigating the negative consequences that random shocks can have on capital investment. Gupta (2011) reiterates the findings on the role of financial market on economic growth. Recently Lin (2012, pp. 30–1,54,136,172) stresses the role of financial market for economic growth and is critical towards financial repression and state-owned enterprise and banks including the practices of “related lending”.

Levine and Zervos (1996) show that stock market development and economic growth are positively associated. Demirgüç-Kunt and Levine (1996) also highlight that the level of stock market development is a good predictor of economic growth. Boyd and Smith (1996) demonstrate that the evolution of debt and equity markets provide financial tools and opportunities that in turn encourage economic growth. Levine and Zervos (1996) show that initial measures of stock market liquidity and banking-sector development are strong predictors of economic growth; Beck and Levine (2001) illustrate

that stock markets and banks have a positive causal relationship with economic growth. Masci and Rowland (2004) review the role of financial markets and stress the importance of developing bond markets particularly in Latin America. Braun and Briones (2006) study the determinants of the development of bond markets.

Part of the literature shows that financial openness, i.e., liberalization and globalization, has a positive influence on growth (Cline 2010; Grilli and Milesi-Ferretti 1995; Alesina, Grilli and Milesi-Ferretti 1993; Quinn 1997).

Several factors influence the structure of a financial system. Various authors (Coffee, 2000; La Porta, Lopez-de-Silanes, Shleifer, & Vishny, 2000; Lopez-de-Silanes, 2002; Stutz & Williamson, 2001) explore the relevance of legal systems and inherited institutions for financial market development. Levine, Louisa and Beck (2000) include three sets of main variables that influence financial intermediation: legal environment, enforcement and accounting standards.

The work of Reid (2010) suggests that countries that intend to develop their financial markets should focus on the experience of advanced economies and consider factors and variables that reflect society, politics and institutions of the domestic economy.

All studies confirm the centrality of the financial system for economic activity and growth. With respect to the casual relationship between financial markets and economic growth, various studies conclude that financial development makes a significant contribution to economic growth (Calderon & Lin, 2002; OECD, 2004).

c. The recent financial crisis provides evidence of the critical role that financial markets play in economic activity and economic growth. In particular, from a historical

point of view, Brood (Bodo, 2008; brood et al., 2001), Bernanke and Lon (1991) and Berger and Duell (1995) study the impact of financial crises around the world and in the United States. In this context, the most relevant implication of the financial crisis of 2007–8 and its continuation in 2011-12 and beyond is the credit crunch for the economic activity, companies, firms and entrepreneurs (Jarda, Schularick, & Taylor, 2010). Puri, Rocholl and Steffen (2010) look at the financial crisis and credit crunch in Germany; Bella and Fulvio (2010) study the case of Italy; Jiménez et. al. and (2009) analyze the case of Spain⁷⁸. The global financial crises also support the view that globalization and openness favor the transmission and spread of the crises, but this is not evidence that openness should be reversed (Cline, 2010, p. 260). Reviewing the experience of the financial crisis of 2007-8 and the following crisis of the European debt, Cecchetti and Khorroubi (2012) find empirical evidence to reassess the role of the financial sector for economic growth. The authors confirm the positive relationship that financial sector development is beneficial to economic growth at low and medium levels of financial development. The authors find that beyond a certain point, a fast-growing financial sector produces negative effects on productivity and on the economy. This could be further interpreted that a too large financial sector goes out of control, and may lead to “bubble” and crisis and is detrimental to economic activity.

Shiller (2012, p. 134) synthesizes the role of financial markets: “It is in the facilitation of the full variety of human activities . . . that finance manifest its most genuine beauty.”

⁷⁸ Another part of the literature examines cross-border transmission of financial shocks: Peek and Rosengren (1997) look at Japanese banks in the United States; Chava and Pumanandam (2010) consider the Russian crisis.

d. The studies on the role of financial markets have focused especially on emerging markets countries. The conclusions and considerations apply to Latin American countries as well. In fact, in all the empirical analysis, Latin American countries are included in the dataset used for the analysis. Some studies that exclusively concentrate on Latin American countries confirm the results. Bittencourt (2010) investigates the role of financial development, and various forms of access to finance to generate economic growth in the main Latin American countries (Argentina, Bolivia, Brazil, and Peru) between 1980 and 2007. The analysis, based on panel data and the analysis, agrees that access to finance promotes growth. It also confirms that macro-economic stability, fiscal responsibility, independence of the central bank and the institutional setting including a less regulated market economy play a positive and significant role in promoting access, financial development and supporting economic growth. With respect to the development of the capital markets, using data for the period 1974-2005, De la Torre (2007) find that capital markets in the countries of Latin America remain below expectations and with the outcome that is not proportional to the efforts of reforms undertaken. Flynn (2012) confirms the findings that Latin American capital markets are not at the level of those in East Asia and developed countries.

XI. Insurance and Economic Activity

The relevance of insurance for the economic growth is multidimensional and includes various aspects, e.g., role of insurance in the economy; insurance demand; savings; role of government, including social security programs; interaction with

financial development; and finally, the relationship between entrepreneurship and insurance.

This section focuses on insurance and the relationship between insurance and the other variables in various subsections (the role of insurance in the economy; insurance demand; insurance and savings; insurance and economic growth; the role of government and the function of social insurance; culture and insurance; financial development and insurance; insurance and entrepreneurship).

a. The Role of Insurance in the Economy

Various authors (Outreville 1990, 1996, 2011; Ward and Zurbruegg 2000; Kugler and Ofoghi 2005; Haiss and Sümegi 2008; Arena 2006) find that insurance markets have the double function of (i) supporting economic activity, including the initiatives of the entrepreneurs, e.g., transferring and permitting to manage efficiently different risks; reducing or mitigating losses; and (ii) favoring the development of financial markets by mobilizing domestic savings, e.g., encouraging investments and the accumulation of new capital (Penalva 2003, 2008).

On the side of economic activity, insurance markets reduce uncertainty not related to business risk and allow the “Knightian” uncertainty to operate properly. In this respect, as the event occurs, insurance meets the claims and protects against large losses individuals and firms in exchange of a small, certain payments and “has been extremely important in reducing the impact of both major and minor tragedies in our lives” (Shiller, 2012, p. 64). The reduction of uncertainty encourages economic activity, the accumulation of new capital, and prompts economic growth.

On the side of financial and capital markets, insurance markets manage risk, allocate savings and ultimately make financial and capital markets more efficient and responsive to the requests of the entrepreneur (Schumpeter, 1982).

The historical review exposes the relationship between insurance and economic activity and how insurance has favored productive initiatives, e.g., North (2010, 17) notes that the development of maritime insurance in the 15th century was a significant factor in increasing trade in early modern Europe.

b. Insurance Demand

The studies on the demand of insurance (or insurance consumption) focus on the insurance demand and its determinant (e.g., GDP per capita, education).

This section focuses on the interaction between insurance demand measured by the insurance per capita, or penetration ratio, and GDP. However, this relationship is indirectly connecting insurance (penetration ratio) and economic growth (GDP). With a sample of 55 developing and developed countries for 1983 and 1984, Outreville (1990) finds that “non–life insurance demand is associated positively with GDP per capita but not with financial development (M2/GDP)” and shows that there is a positive, linear relationship between insurance premium per capita (proxied to indicate the development of insurance markets in a given country) and GDP per capita. The study of Outreville is included (see below) among those that relate insurance to economic growth. With a sample of 45 countries for 1980 and 1987, Browne and Kim (1993) show that life insurance per capita is positively associated with GDP per capita. With a sample of OECD countries over the 1986–93 period, Browne, Chung and Frees (2000) further

report that non-life insurance is associated positively with the level of income. With a sample of 63 countries between 1980 and 1996, Beck and Webb (2003) examine the determinants of life insurance and find that education and development of the banking sector are robust predictors of insurance, and income is a weak predictor. Hussels, Ward and Zurbruegg (2005) provide an extensive review of literature on the determinants of demand of insurance.

c. Insurance and Savings

Savings is a typical function of insurance, which is particularly relevant for economic growth. In fact, any insurance or protection, formal or informal (and less efficient), constitutes foregone consumption. Also in this case, the relationship between insurance and savings is such that relates insurance as a saving vehicle to economic growth.

The article of Cummins and Weiss articulates very well this aspect: the process of economic growth requires investment and increases in real savings and reduced consumption (Cummins & Weiss, 2008). In turn, increased savings leads to increased productivity growth, which also fosters economic expansion (Kong & Singh, 2005; Li, Moshirian, Nguyen, & Wee, 2007). Life insurance, and possibly business insurance, increase savings and support economic growth (S. Sen, 2008) (Jeske & Kitao, 2005). Mohan (2006) illustrates that “there is a long-term relationship between economic growth and savings. The Granger causality tests indicate that economic growth causes the expansion of domestic savings.” Nevertheless, at older age, the saving rate declines;

Beck and Webb (2003) show that the share of life insurance will decrease with a higher savings rate and it will increase with further life insurance penetration. This implies that the relationship between life insurance and the private savings rate is unclear.

Kinugasa and Mason (2007) show that in a dynamic economy that attracts talent, if the population gets older a decline of savings will not occur if life expectancy increases.

d. Insurance and Economic Growth

On the theoretical and empirical sides, the relationship between insurance and economic growth and a potential causal relationship between insurance and economic growth have not been studied extensively as it has been the case of the finance-growth nexus, i.e., Outreville (2011) reviews the literature on the issue of insurance and economic growth and provides a systematic analysis; he points out that a study of the causal link between insurance development and economic growth is lacking.

The scarce attention of the literature on the role of insurance is something that the American insurance industry recognizes. The American Insurance Association (2009) argues that the industry - particularly in the United States - has not done the job of telling the story about the crucial role of handling and managing risk and as long-term investor and borrower in the economy.

Various authors address the impact of the insurance market on economic growth (Arena, 2006; Beenstock, Dickinson, & Khajuria, 1986, 1988; Kugler & Ofoghi, 2005; Outreville, 1990; Shin, 1968; Soo, 1996; I. Webb, Grace, & Skipper, 2002).

In this respect, one can identify two lines of research; the first one (i) that sees insurance as a primary and independent factor that supports economic growth; the second

(ii) that sees insurance as a factor relevant for economic growth together and in connection with the role that the financial intermediation plays.

(i) This subsection looks at the studies where insurance is the independent variable and financial intermediation is not included.

Shin (1968) and Beenstock, Dickinson and Khajuria (1986) recognize that the development of insurance markets play numerous significant roles in promoting economic growth: diffusion of pooling risk mechanisms; reduction of uncertainty; encouragement of accumulation of capital; help to increase economic production; and stimulus of foreign trade (Dollar 1992; Van den Berg and Schmidt 1994).⁷⁹ Using a sample of 12 industrialized countries between 1970 and 1981, Beenstock, Dickinson and Khajuria (1986) figure out that the demand of non-life insurance (measured by the penetration ratio) is correlated with GDP per capita.

Soo (1996) shows that in the United States (1947–93) the growth in life insurance causes an increase in economic growth. Using the test of Granger (1969), Soo (1996) finds that causality is bi-directional between life insurance growth and economic growth, supporting the notion that life insurance growth “Granger causes” economic growth.

Various authors (Arestis & Demetriades, 1997; Demetriades & Hussein, 1996; Krishnakumar & Ronchetti, 2000) highlight the significance of causal relationships from insurance to economic growth depends on cross-country differences.

⁷⁹ Export credit insurance stimulates foreign trade by encouraging foreign investors to enter markets that they would not otherwise have entered (Berg & Schmidt, 1994; Dollar, 1992) and thus favor economic growth.

Ward and Zurbruegg (2000) examine the causal relationship between the insurance market and economic growth for nine OECD countries during 1961–96 using annual real GDP as a measure of economic activity and annual real total written premiums as a measure of insurance activity. For five countries (Australia, Canada, France, Italy and Japan), the long-term relationship between insurance markets and economic growth is positive and significant.

Esho et.al. (2004, p. 265) study the determinant of property casualty insurance in 44 developed and emerging market countries for the period 1994–98 and find a strong positive relationship between the legal environment for insurance, the protection and enforcement of property rights, and the consumption of insurance.

For the United Kingdom, Kugler and Ofoghi (2005) find a long-run relationship between the size of the insurance market and economic growth rather than a cyclical effect.

Kugler and Ofoghi (2005), like Soo (1996), use Granger causality tests to support the contribution of insurance markets to economic growth.

Haiss and Sumegi (2008) stress that if insurance institutions operate effectively and the market is open, competitive and receptive to new necessities, then insurance favors economic growth supporting the view of a supply-side approach for insurance.

Organizations like the U.S. Agency for International Development that is involved in operational activities (USAID, 2006) point out that effective insurance prompts economic growth. Han et.al.(2010) conclude that insurance development is positively correlated with economic growth; and for emerging market economies, insurance development plays a more valuable role than for advanced economies. From an operational point of

view (Buckham et al., 2010), insurance is instrumental for economic activity and economic growth. Diebold et.al. (2010, p. 209) suggest that insurance play an essential role in transforming the unknown into the known.

Various studies have looked at the role of insurance for economic growth including new emerging market economies (e.g., Eastern European transition economies, Turkey and Nigeria) and have found a positive role for insurance, i.e., Ege and Sarac (2011, pp. 2–9)⁸⁰ and Curak, Loncar and Poposki (2009) conclude that the insurance sector affects economic growth positively. Some studies find that insurance does not support economic growth (Omoke 2011), i.e., in the period 1970-2007 the insurance sector does not have a positive and significant impact on economic growth in Nigeria. Akinlo (2013) does not confirm the findings of Omoke.

(ii) This subsection reviews the studies in which insurance is part of a model in which financial intermediation is also included.

The researches in which insurance and financial intermediation interact are of particular interest for this study that includes in the model to test both insurance and financial intermediation variables.

Patrick (Patrick, 1996) says that the direction of causality between insurance and economic growth is not fully unveiled: “Economic expansion can be supply-led through growth in financial development and insurance, or financial development can be demand-led through growth in the economy”.

The work of Outreville (1990, 1996, 2011) identifies the links between insurance market development and economic expansion; affirms the importance of financial development

⁸⁰ The study tests a model in which insurance is present but the financial market is not included.

(of which insurance is a part) for the economic growth particularly of developing countries; and stresses that a supply-side strategy of insurance markets should be pursued.

Webb, Grace and Skipper (2002) examine the causal relationship between banks, life insurance and non-life insurance activity on economic growth⁸¹. The authors use a three-stage, least squares instrumental variable approach (3SLS-IV), where the instruments are legal origin of the country (English, French, German, Scandinavian or Socialist) for the banking; level of corruption and quality of the bureaucracy for the non-life insurance; and religious composition of the country (fraction of the population that is Catholic, Muslim or Protestant) for life insurance. Webb, Grace and Skipper (2002) find that banking and life insurance (exogenous variables) are predictors of economic growth. These variables, however, are not significant in the presence of interaction terms between banking and life insurance, and between banking and non-life insurance suggesting complementarities among financial intermediaries.

Arena (2006) finds robust evidence of a causal link going from insurance to economic growth. Both life and non-life insurance premiums have a positive and significant effect on economic growth. For high-income countries, only life insurance has an impact on economic growth. For both developing and high-income countries, non-life insurance drives the impact on economic growth. However, the results imply that non-life insurance has a bigger impact on countries of high-income than on developing countries.

81 The analysis uses a revised Solow-Swan neoclassical economic growth model, with financial activities (banks), life insurance and non-life insurance as additional inputs in the production function. The empirical specification constitutes a cross-country economic growth regression (Barro and Sala-i-Martin 2003). The measures used are: financial intermediation (the ratio of bank credit to GDP), the penetration ratio of non-life insurance premiums to GDP, and the penetration ratio of life insurance premiums to GDP.

With regards to nonlinear effects of insurance on economic growth, the study finds that life and non-life insurance has variable effects on economic growth for different levels development (measured by GDP per capita). Non-life and life insurances have an impact on economic growth at the low stages of development. Even so, life insurance has a greater impact on economic growth at low levels of development and non-life insurance at middle levels.

For high-income countries, only life insurance has an impact on economic growth. For high-income and developing (middle- and low-income) countries, non-life insurance has an impact on economic growth, which is larger in the case of high-income countries. Regarding nonlinear effects of insurance market activity on economic growth, Arena finds that life and non-life insurance has different effects on economic growth depending on the levels of economic development, i.e., life insurance has a bigger impact on economic growth at low levels of economic development and non-life insurance at middle levels.

Adams and other authors (2006) empirically examine the dynamic relation between banking, insurance and economic growth in Sweden from 1830 to 1998.

Other authors (P. Chen et al., 2011) use a panel data that covers 60 countries from 1976 to 2005. They endorse the positive impact of the development of the life insurance market on economic growth. However, the insurance-growth nexus varies across countries with different conditions. Furthermore, the development of the stock market and the life insurance market are substitutes rather than complements.

The various papers of Outreville, the work of Grace, Skipper and Webb and the research of Arena are of particular interest because they highlight both the impact of insurance and that of the financial sector on economic growth.

In more general terms, the relationship between insurance and economic growth, as shown in Figure 1 (see Chapter 1 above), can be read also in the sense that the lack of effective insurance markets has a negative bearing on economic activity.

e. The Role of Government

Topics of interest for insurance are those related to the role of the government that intervenes in financial and insurance markets to eliminate a so-called market failure and reduce uncertainty. The specific interest of this study is the intervention of government in the social areas, which goes under the name of social insurance.

i. Social Insurance

The impact of social insurance programs (i.e., health, retirement) under the responsibility of governments on economic growth and entrepreneurship is rather complex. There are a number of variables that are coming into play under the headings of social insurance. From the side of the independent variable one can find: social insurance and social security or equivalent general intervention of the government; health insurance, unemployment insurance; and policies and programs of redistribution. On the side of the dependent variable, one can find: entrepreneurship, economic growth measured by the growth of GDP, and wealth.

- Social Insurance and Social Security

Beenstock, Dickinson and Khajuria (1986) and Browne and Kim (1993) find that the state's role in providing insurance services is a determinant of life insurance demand, i.e., social security benefits represent a household asset, and they tend to increase the demand for life insurance activities.

Lewis (1989) finds a negative relationship between life insurance and expenditure on social security, i.e., if the government or the public sector provides retirement savings and benefits to the families of wage earners who die early, then there is less demand for life insurance products.

Sala-i-Martin (1996) argues that social security expenditures have a positive effect on the level and productivity of investment", but if the social security system is such that receipts are independent from contributions, then growth is depressed (Zhang, 1995) as the subsidy element of the receipts not related to contribution depress motivation and initiative. In this respect, one can refer to the pension systems in Latin America and argue that pension systems like the one in Chile based on contributions is more apt to prompt entrepreneurship and effort than a pension system (like many in Latin America) not based on contributions and thus regarded as a subsidy, which does not stimulate further initiative.

Bellettini and Ceroni (2000) use data of cross-country for 61 countries and panel data for 20 industrialized countries and find a statistically significant and positive association between social security expenditures and growth.

Insurance market development also creates important externalities (Ilmakunnas & Kanninen, 2001; Ruser, 1998), e.g., moral hazard and the role of the government as

insurer (e.g., social insurance) that may have an impact on entrepreneurship. According to Ilmakunnas and Kanninen, the crowding-out effect of public production of private goods on entrepreneurship dominates the crowding-in effect of public production of public goods in the OECD data.

Social insurance of the type of health insurance and compensation affects negatively entrepreneurship and life insurance (Valdivia, 1997).

Other studies (Fairlie, Kapur, & Gates, 2010) focus on the impact of health insurance on entrepreneurship, i.e., whether employer-provided health insurance may restrict business creation. The authors articulate the concept of “entrepreneurship lock.” This is a concept that flows out of that of “job lock,” i.e., the incentive to stay in a current job for the health insurance benefits, even if another job (or no job) may be preferable for other reasons. The concept of job lock is extended to that of “entrepreneurship lock,” i.e., when new businesses are not started due to the cost and uncertainty associated with transitioning from a current position, with good benefits, to a start-up with no benefits. The authors use panel data from the Population Surveys in the United States and find evidence of a large negative effect of health insurance demand on business creation for those without spousal coverage than for those with spousal coverage. Fairlie, Kapur and Gates (2010, p. 1) also examine whether employer-based health insurance discourages business creation. They focus on people at age 65 that qualify for Medicare. They compare the probability of business ownership among male workers in the months just before turning age 65 and in the months just after turning age 65. The study provides some evidence that

entrepreneurship lock exists, and the combination of health insurance and employment may create an inefficient level of business creation (Fairlie et al., 2010, p. 1).

- Health Insurance

Chen, Clarke and Roy (2013) point out that the world has experienced impressive improvements in wealth (GDP per capita) and health (infant mortality rate). The question is: are health improvements deriving from the growth in wealth? In other words, does a healthier population facilitate economic growth and wealth? Or vice versa, i.e., does economic growth and wealth prompt better health? The authors analyze the relationship between health and wealth for a panel of 58 developing countries using five-year data covering the period 1960–2005. They consider fixed versus random effects and find bi-directionality, but also non-causality in many countries.

Along similar lines, Erdil and Yetkiner (2009) investigate the relationship between real per capita health care expenditures and real per capita GDP and confirm that Granger causality is bi-directional. The study shows that in low- and middle-income countries, one-way causality mostly goes from income to health, while in high-income countries the reverse occurs.

- Unemployment Insurance

Unemployment insurance financed by the government gets popular as the possibility of find a job becomes more complicated. A study for Norvegia (Røed & Skogstrøm, 2013) shows that unemployment insurance influences significantly a potential entrepreneur, i.e., an individual who receives unemployment insurance starts to

search for a job or start a new business just before the expiration of the unemployment insurance.

- Redistributive Policies

Brenes and Haar (2012) review the status of entrepreneurship in various Latin American countries and make reference to the role of redistributive policies. They argue that the effect of distributive policies on entrepreneurship is most probably positive. The authors recognize that tax based redistributive policies discourage entrepreneurs, but at the same time create a social safety net that makes skilled people less afraid of becoming entrepreneurs. If this effect is stronger than the negative redistributive effect due to taxation, then the net impact on growth is positive (Brenes & Haar, 2012, pp. 16–7).

The studies of the impact of social insurance are very complex. The dependent variable and the independent variable, time span, geographical locations have to be carefully selected. In fact, the studies reviewed here consider different independent variables (e.g., social insurance or social security; health programs run by government) and dependent variables (e.g., life insurance demand, economic growth and entrepreneurship). Time considered varies and normally periods from 1960-to 2011 are considered. From a geographical point of view, the studies examined here look at the global level as well as at the U.S. system and use data accordingly.

Recently (S. Levy & Schady, 2013) present a complete and balanced view about the impact of social insurance programs in Latin American countries. The authors stress that social insurance programs in the region, including policies of redistribution, have supported low-income people and are associated with economic growth. However,

compared with the counties of Asia, Latin American countries present lower growth and more importantly lower level of productivity and in particular Total Factor Productivity. In this respect, the authors expect that policies of redistribution continue, but with great attention to productivity and financial sustainability.

In any event, there are a variety of models and the impact of social insurance is different. This circumstance encourages refining theories, models and definitions of the variables included in the models. Of course, causality between social insurance and economic growth and entrepreneurship is one of the questions to address and of particular interest for this study. Those models will have to be tested in different countries and environments.

The present study includes in the model a variable for social insurance and makes it in relationship with entrepreneurship in Brazil.

f. Culture and Insurance

Culture influences the society and has an impact on several variables included in this study. The literature and historical reviews have expressed this point in various instances. In a previous section, culture was included as part of the institutions.

The section on entrepreneurship, uncertainty, and risk looks at the role of culture in shaping attitudes toward risk. Fukuyama (1996) supports the use of insurance rather than risk avoidance following a given cultural context. Hofstede and Minkov (2010) indicate that culture influences the inclination to buy insurance contracts and introduce the concept of uncertainty avoidance, i.e., the level that societies accept and tolerate uncertainty and ambiguity while low uncertainty avoidance implies a “willingness to

enter into unknown ventures” (Hofstede & Minkov, 2010, p. 164). Wennekers et al. (2005, 2007) introduce a model of choice of occupation to clarify ways in which the avoidance of uncertainty has an influence on the choice of becoming business owner, self-employed. In other words, economic factors and cultural differences have an impact on entrepreneurship (Hofstede & Minkov, 2010).

With respect to the factors of entrepreneurship and the specificities of Latin America, some authors argue that due to cultural factors and traditions Latin American countries have layers of bureaucracy that frustrate the initiatives of entrepreneurs (Arias, 2011, pp. 2–5; Davila, 2008). In turn, the level of entrepreneurship in Latin American countries is not the same as that in Asian countries (Schramm, 2006) and in advanced economies (Lipset, 1997; McCraw, 1998).

In the review of the USA economy, entrepreneurship constitutes a typical feature of the American culture and of American exceptionalism (Lipset, 1997).

The historical review also indicates that culture and religion play a substantial role against the development of insurance (Carr & Landa, 1983; A. E. Clark & Lelkes, 2009; McCleary & Barro, 2006). Traditions and superstitions limit the progress of insurance in many countries (Noland, 2003). The influence of religion on economic activity and insurance is still valid today, e.g., the Islamic tradition holds that certain contracts of insurance are usury and therefore forbidden (Khorshid, 2007).

With respect to Brazil, cultural differences, e.g., language, values, constitute entry barriers for companies.

The circumstance that in several cultures the notion of insurance is unknown makes difficult the expansion of micro insurance (Churchill, 2006, pp. 39–40). In this respect, Olson (2007, p. 40), distinguishes between propensity and knowledge of insurance arguing that knowledge facilitates the introduction of rules and institutions that expand insurance products; i.e., cultural values influence the shape and institutions. The propensity to insurance and the knowledge of insurance are two variables included in the dataset of this study to test the relationship between insurance and entrepreneurship.

In sum, cultural values have an impact on different areas of this study. However, culture is not completely exogenous. The outcome, i.e., the shaping of the institutions, depends on the political process and the strength of the political forces. Once in place, institutions - norms, rules, and systems of incentives –direct the behavior of people and thus influence and define cultural values and attitudes.

g. Financial Development and Insurance

Studies and historical reviews establish that financial market development is an essential determinant of economic growth. As we have indicated, the vast theoretical and empirical researches corroborate the finding of the positive impact of financial sector on growth (King & Levine, 1993) and the positive causal relationship between banking and financial-sector development and economic growth (Levine, Loayza and Beck 2000; Levine 1997, 2005).

The section on Insurance and Economic Growth includes studies that consider insurance as an independent and primary factor for economic growth. Other studies stress

that insurance interacts with financial intermediation as relevant factors for economic growth.

The variables for insurance and financial intermediation are both included in this study and in the empirical tests; and the issue is to see to what extent and under what conditions the two forces of insurance and financial intermediation operate to support entrepreneurship.

Various studies underline the complementarities between financial intermediation and insurance. Conyon (1994) stresses the complementarity between insurance and financial or stock market, development. He states: “the primary impact of insurance comes from the accumulation of productive capital within an economy.” Conyon and Leech (1994) show that institutional investors (i.e., pension funds, insurance companies and mutual funds) enhance productivity.

Insurance and financial markets complement each other (Arena, 2006; Cummins & Weiss, 2008), i.e., insurers not only guarantee risks related to financial-sector activities but also invest most of their reserves in fixed-income and equity markets.

Beck and Webb (2003) suggest that banking-sector development facilitates the development of life insurance and its contractual savings function. While efficient banking systems help develop a life insurance sector by dedicating payment services and raising confidence in financial institutions, life insurance fosters the development of capital markets through the demand of long-term financial investment. As a result, financial markets and other financial products affect life insurance.

(Li et al., 2007) argue that financial development and vigorous competition in the life insurance sector boost life insurance consumption.

It is worth reiterating that the paper of Webb, Grace and Skipper and that of Arena constitute the important contributions that are relevant for this study. Webb, Grace and Skipper (2002) find complementarity between life and non-life insurance and the financial intermediation of banks. Arena (2006) believes that financial systems influence savings and investment decisions and hence long-run growth.

The relevant contribution of Arena to this study is the assessment of the complementarity between insurance and financial intermediation. To assess whether insurance activity (i.e., life and non-life premiums/GDP) is complementary to bank intermediation (private credit/ GDP) and stock market development (stock market turnover), Arena (Arena, 2006) includes an interaction term, i.e., insurance interacts with dummy variables that constitute different stages of financial and stock market development and a multiplicative term between the insurance and financial or stock market development. The sign of the interaction term is negative and significant, implying a substitution effect between insurance and financial or stock market development⁸².

Of course, all the studies are based on the contribution of insurance and financial intermediation for economic growth. The present study focuses on the impact that the variables insurance and financial intermediation can have on entrepreneurship.

⁸² The author warns that collinearity issues drive the results because the correlation between the interaction term and the individual components, particularly insurance, is high, which creates biased results.

h. Insurance and Entrepreneurship

Concerning the role of insurance markets for entrepreneurship, little or no research exists. There is some evidence that access to credit might be facilitated and increased if coupled with proper insurance mechanism (Mel, McKenzie and Woodruff 2007, 2008). Some other evidence - (Aslı Demirgüç-Kunt, Beck, Honohan, & Bank, 2008), and also a World Bank survey of entrepreneurs in Sri Lanka (<http://www.enterprisesurveys.org/>) - suggests that credit constraints are the main reason for the lack of expanding business, and not missing insurance markets. Cole, Gine', and Vickery (2012) with a field experiment in India illustrate that when people have substantial levels of risk coverage through the provision of insurance, they will adjust their investment decisions toward more profitable and riskier, initiatives (i.e., crops). In another related paper (Cole et al. 2012), the authors highlight the role of a dearth of trust, liquidity and financing constraints and limited quality of products as significant non-price frictions that constrain demand and suggest adjustments in the functioning of the insurance market.

The experience of microfinance and micro-insurance is that lending institutions request a premium to the borrower to cover certain risks (e.g., health, life and also household valuables) that could have an impact on the ability to repay.

As we have seen, there are historical research and evidence that point to a role of financial services and insurance to the economic growth of the 19th century particularly in U.K. (see chapter 10). The interpretation of the results could also lead to argue that the mechanism of insurance improves the functioning of the financial system. In other words,

entrepreneurs do not buy insurance products that would give greater protection and enhance the capability of access to credit due to the missing insurance markets, including mispricing, and to the lack of understanding of the benefits of insurance coverage. Thus, the availability of insurance generates a propensity to buy insurance—and these two aspects go hand in hand—and reduce the overall uncertainty and motivate entrepreneurs. Little research exists on the role that insurance would play in case of entrepreneurs who start their own business without financing, but with the need of insurance to cover various risks, e.g., business and personal.

As mentioned above, there is a possibility that insurance interacts with financial intermediation as Arena shows (Arena, 2006). On the other hand, there is support to the notion that insurance market development is a supply-driven phenomenon and thus insurance can be independent from financial markets and operates its own function⁸³. Studies of insurance, financial development and economic growth point out that insurance is not a by-product of economic growth but an agent of it (USAID, 2006, p. 3).

The review of insurance and entrepreneurship provides grounds for arguing that effective insurance markets enhance productive activities, for the development of the financial sector, and for supporting economic growth through the intermediation of entrepreneurship. In this context, a definition of insurance that is used in this research is that of a market institution that allows the coverage of several specific risks (e.g., property, life and health), reduces uncertainty, enables the entrepreneur to work

⁸³ The function of insurance is based on tests of the causal relationship between insurance and financial-sector development and economic growth.

effectively, undertake productive initiatives and assume the so-called business risk that insurance does not cover (as Knight points out).

XII. Stylized Facts and Gaps in the Literature

The literature review leads to several propositions about insurance and entrepreneurship:

- Insurers measure and manage the non-diversifiable risk faced by creditors and borrowers, facilitating the provision of credit.
- Insurance companies mobilize substantial funds through contractual saving products, and by investing them in bonds and stocks, facilitate long-term investments and the growth of debt and equity markets. In this context, insurance companies—as institutional investors—can also pressure financial markets to adopt stronger corporate governance rules and greater transparency.
- Insurance markets support and create the conditions for economic growth, but to perform this function, they must operate effectively and respond to needs and not favor inefficient solutions.
- Insurance throughout history has developed various forms of protection, and the coverage of people has gradually increased; i.e., Shiller calls it the democratization of insurance (Shiller, 2012, pp. 64–8). The task ahead is to continue to expand the coverage, at market conditions particularly to new and catastrophic events (e.g., hurricanes, earthquakes, disability) so that a greater number of people will be covered in emerging market, as well as developed countries.
- Insurance markets in emerging market countries, and particularly in Latin America, show progress and advances and also promising prospects, particularly in some areas, such as agriculture and micro-insurance. However, there is still a lack of adequate depth and penetration, and the region is behind other regions of the world based on standardized measures of insurance.
- Entrepreneurship is crucial for economic growth and economic development. The relationship between entrepreneurship and economic growth and development is complex, with situations of reversed causality. Various countries—particularly most advanced economies like the United States—have shown that public policies can favor entrepreneurship and spur economic growth and economic development.
- Innovation, entrepreneurship and economic growth are solidly connected. There is also evidence that there are forms of entrepreneurship that do not generate growth and are protected from competition and in positions of rent.
- Entrepreneurship and uncertainty are in a never-ending battle.
- Entrepreneurship is part of economic activity; a taxonomy of players in the economic activity—including large companies, SMEs, entrepreneurs and start-ups, micro entrepreneurs, and the poor segment of population—applies to advanced and

Emerging Market Economies as well. However, the ways in which the categories of players—and entrepreneurs—favor economic growth and development is very different.

- Entrepreneurship's measure is challenging but highly necessary to correctly define and implement relevant and effective public policies. Therefore, the link among theories and definitions of entrepreneurship, measures of entrepreneurship and appropriate policies is crucial.
- Entrepreneurs in their various articulations are supported differently in their activity depending on the level of economic and institutional development in advanced and Emerging Market Economies.
- Institutions play a fundamental role in economic growth, i.e., effective institutions prompt and favor economic activity and growth.
- Insurance is a market institution that facilitates economic activity.
- Insurance markets that do not function increase the overall uncertainty of the institutional setting, reducing the drive of entrepreneurs, who become more risk-averse and unwilling to push for innovation and undertake business initiatives.

The literature review reveals several areas that require further research. One such area is the relationship between insurance, economic activity and entrepreneurship.

In Emerging Market Economies, insurance is often unavailable and/or mispriced. In addition to personal difficulties that may occur (e.g., unemployment, medical and health troubles, deaths in the family), natural disasters (e.g., endemic infection, floods, droughts, fiscal downturns, and crop failures) impact people deeply, primarily the poor. Mechanisms of informal insurance and self-insurance give little protection, and people are overwhelmed by calamities. Most people cannot get insurance, and hence dearth of effective instruments and policies adds to the unreliability of institutional setting and result in an exceeding level of uncertainty, which constrains economic growth and poverty reduction.

As highlighted, the scarcity of mechanisms of formal insurance, the dearth of trust in the institutional setting, and the lack of knowledge with regards to the insurance products all

result in inequitable and inefficient solutions. Under these circumstances, as Sen (A. Sen, 2000) states, the key point is that insurance allows everyone, and particularly poor people, to improve their economic potential and become less dependent on welfare state programs. In other words, insurance market development is justified on efficiency and equity concerns.

Two related questions emanate from these considerations: Is insurance availability a supply problem⁸⁴? And should policymakers be aware of the gap that exists and try to promote the insurance instrument availability for the masses?

These queries happen to be at the heart of this research. The aim is the identification of the specific insurance contribution to the economic process, through entrepreneurship intermediation.⁸⁵

84 The implication is that the availability of insurance generates a propensity to buy insurance, which in turn supports the demand for insurance and thus greater opportunities to make insurance products available.

85 A related area of interest is that of the effectiveness of the insurance market in the sense that the working of insurance responds to the needs and demand of the various clients, i.e., customers, regulators, and policymakers.

7. CONSIDERATIONS ABOUT UNCERTAINTY, RISK, ENTREPRENEURSHIP AND INSURANCE

From the previous chapters on the conceptual aspects of risk and uncertainty, the historical review, the status of the insurance markets and the analysis of the literature, several considerations instrumental for this research can be drawn with respect to these issues:

- i. The role of financial markets in economic growth;
- ii. The factors of insurance;
- iii. The relationship between insurance and economic growth;
- iv. The interactions between entrepreneurship and insurance;
- v. The role of insurance as a crucial institution in a capitalist economy;
- vi. The specificities of Latin American countries and Brazil;
- vii. The implications of global financial and economic crisis of 2007-8 and its continuation with the crisis of 2011–12 and the role of effective public policy.

I. The Role of Financial and Insurance Markets in Economic Growth

As discussed in previous sections, insurance is part of the financial sector and is instrumental to economic activity and growth; i.e., insurance markets facilitate economic activity and improve productivity. The key issue is to see how insurance and financial intermediations affect entrepreneurship.

II. The Factors Influencing Insurance

The conceptual analysis, the historical and literature reviews reveal that the need for insurance to protect against unfavorable events is very old and is embedded in the attempt of human beings to deal with dangers. Four fundamental factors are at the root of insurance:

- The spirit of entrepreneurship, which drives the motivation to reduce uncertainty.
- The spirit of association, which leads organizations to protect individuals, groups and communities from various threatening situations, and operates as the other face of the spirit of entrepreneurship.
- The pressure of religious motivations, which influence decisions
- The influence of research on insurance operations.

It is useful to examine each of them briefly.

Firstly, insurance development works in parallel with entrepreneurship. In fact, the spirit of entrepreneurship operates under an accepted level of uncertainty and in an environment that recognizes the role of the entrepreneur (Baumol, 2010, pp. 2–8). Hence, it constitutes the main driver in trying to reduce uncertainty and generating forms of protection. The entrepreneurial process is the so-called creative destruction of Schumpeter that the Austrian School built on (Schumpeter 2008, 80–84; Hayek 1945, 1996; Ferguson 2008, 349–50; Posner 2010b, 99; Kling and Schulz 2009, 4, 182–83, 213). The drive for profit from innovations contradicts the existing order, results in discontinuities and determines new uncertainties that need to be comprehended for the prevention of crashes and abuses. This process (Schumpeter, 1982), however, is not linear, and introducing innovations might determine those situations wherein uncertainty is not removed but increased, as the financial crisis of 2007-8 and its continuation show.

The goal of reducing uncertainty and plan for emergencies is considered in earlier times and shapes the development of insurance as a market institution beneficial to economic activity. Even though people did not then possess all the means available nowadays (e.g., technical knowledge and an understanding of the probabilities of occurrence), they were able to formulate certain methods for the protection of valuables. For example, the bottomry used in Babylon and the practice of convoy ships were substitute for marine insurance; the techniques of mustering building materials or money, or storing goods were substitute for fire insurance: “the most basic financial impulse is to save because the future is unpredictable” (Ferguson, 2008, p. 177,185), and in fact, insurance exemplifies a form of long-term saving. Hence, a thriving sector of insurance is pivotal for every economy nowadays because it promotes the habit of saving; and it makes a safety net for enterprises and individuals. Furthermore, savings pump up the economy since investments through financial intermediation help realize the entrepreneurs’ initiatives. The spirit of entrepreneurship is also at the basis of the creation of organizations like firms that respond to the need of better organize the activities and reduce transaction costs (Coase, 1937).

Secondly, a reason behind insurance’s development is the public spirit of humanity, i.e., the inherent need of association with one another, or simply put “mutuality,” which is based on three principles (MIA, 2010):

- self-help (i.e., solidarity among people in the group to achieve common goals);
- self-governance (i.e., members manage and control the group and the cooperative in a democratic manner); and
- self-responsibility (i.e., members collectively underwrite the risk pool, which implies that profit and losses are distributed only among members).

The family⁸⁶ constitutes the fundamental unit of society, built on the principle of mutuality, which is: “all for one and one for all.” The members of the family possess their property in unison, divide risks and mutually ensure the provision of their needs. Even so, the foundation of mutuality is not the payment of premium as it happens nowadays, but it constitutes the personal contribution of the member to the group. Therefore, while the family does not have the features of insurance, it represents the need of association. The spirit of association heralds the dawn of organizations of social welfare like the medieval guilds. At a certain point the guilds start admitting nonmembers. In case of the guilds, opening the gates to outsiders was in the members’ interest that encouraged participation and wanted contributions from the outsiders. The next step is voluntary associations of people with different professional interest.

Ever since its creation, insurance presents two contrasting tendencies: capitalist and cooperative. These tendencies have not developed independently and are closely mingled. Capitalist tendency is the same as the entrepreneurship spirit that seeks opportunities and struggles to lessen uncertainty. The cooperative tendency relates to the need of association and prompts developments in compulsory insurance and several kinds of direct government intervention the end result of which is the welfare state—all of which also have the goal of reducing uncertainty. Gradually the intervention of government expands over several activities of insurance with the aim of reducing uncertainty.

Supervision and regulation of insurance constitute forms of government intervention that tend to channel the spirit of entrepreneurship. Supervision and regulation have always to

⁸⁶ Other important units are the clan or the tribe.

strike a balance between innovation and control: innovative instruments that lessen uncertainty and possibly make it quantifiable and converting it into risk; or cumbersome, inefficient regulations that raise costs of transaction, shrink innovations and may even menace the system.

The interaction between the spirit of entrepreneurship and that of association leads to the formation of organizations and institutions that respond to the needs of individuals and have also the function of improving the way in which entrepreneurship takes place (Boettke & Coyne, 2003; High, 2009a; North, 1990, 2010).

Thirdly, religious considerations impacted insurance's development and often played part in activities that were akin to insurance (Carr & Landa, 1983; A. E. Clark & Lelkes, 2009; McCleary & Barro, 2006). Throughout the course of history, devotion to traditions and superstitions was substituted for insurance policies and compressed the progress of insurance in many countries (Noland, 2003). Hostility to insurance as a sinful interference with God is a phenomenon from the past, but even nowadays constitutes a stumbling block for insurance. For instance, the canon law of the Church in force in European countries for centuries forbade interest charges as usury and limited the development of insurance⁸⁷. In the Islamic tradition, certain forms of insurance are considered usury and Islamic law prohibits life insurance because the beneficiary might "profit" from someone else's death; e.g., a substitute for life insurance in Islamic countries, the so-called Kataful, which stresses shared responsibility and mutual insurance, is allowed" (Khorshid, 2007)⁸⁸. Simply put, religion's role is to present

87 The slow development of insurance in Japan was mainly due to the customs and traditions that ruled economic life in Japan during the period of isolation of the country from the rest of the world.

88 At the beginning of the 20th century, Muslims of Beirut could not buy life insurance.

uncertainty as a superior order, while insurance intends to eradicate uncertainty and substitute risk coverage instead.

Fourthly, research has accompanied the development of insurance, even though, particularly in early times, insurance contracts were not based on a scientific and quantitative assessment of risks. In the 17th century, Pascal (1623–62) (Franklin, 2001) developed research in the area of probabilities and statistics that could improve the design of insurance operations. Studies and research have intensified in the last 50 years. Dionne (2001) presents a complete picture of the relationship between insurance and research. During the '70s, insurance research had the dominance of optimal coverage of insurance, design of security and equilibrium of imperfect information. In the 1980s, theoretical developments were emphasized, including utility, capacity of retention, volatility of price, insurance contract for multiple risks, and the crisis of liability insurance. The study of financial derivatives and information as well as access to financial services and insurance for micro-entrepreneurs, small businesses and the poor controlled the agenda of research in the 1990s and the early part of the 2000s. Disastrous events, terrorism and the financial crisis of 2007-08 reaffirmed the significance of insurance and also revealed that new, unexpected and unknown events can occur and exposed the flaws of the supervisory and regulatory system while prompting research to understand these new events and regulate the sector effectively.

In other words, research provides support to the introduction, implementation, and review of policies of insurance that are beneficial to the economic activity. Even so, as it

has been shown, there are cases when insurance operations start without any knowledge regarding the events and their occurrence probability.

III. The Relationship between Insurance and Economic Growth

Throughout history, the relationships among business activity, economic growth and financial sector constitute a theme that is recurring, with insurance as its integral part. The literature provides supports to the critical roles of financial and insurance markets.

Various economic historians (E. P. Davis 1996; L. E. Davis 1965; Cameron 1967; Sylla 1969, 2002; Wright and Cowen 2006) report that in the United Kingdom and the United States financing promoted entrepreneurs to realize new ideas of business and financial intermediation propelled economic growth. Hence, the financial sector mobilized the resources required to start massive projects in the period that was preindustrial and had effective incentives in the real sector (Rousseau, 2002). Moreover, a healthy financial sector is crucial for any working economy and its functioning must be based on market principles and not on bad incentives and crony capitalism that recur over time in various countries (Zingales, 2012, p. 10,44).

In this context, one needs to discern the role of insurance.

From the perspective of economic history, there have been various explanations of the relationship between insurance as part of financial services and economic growth. Historians, initially, regarded financial and commercial services, including insurance, as basically being derivatives of the industrial economy and subject to criticism if they were not delivered efficiently (Pearson, 1997b). This traditional view argues that insurance came after the Industrial Revolution rather than before it.

A contrasting view is that financial and insurance services are autonomous and instrumental to the development of economic activity. The notion of innovation is at the core of the debate since it is “central to most concepts of the Industrial Revolution” (Hudson, 2009, p. 3).

Even so opposite to the attention for industrial discoveries, there’s been less investigation of the innovation process with regards to the financial services and its part in encouraging the productive sector.

Along these lines, while interpreting the modern economies’ development, a new emphasis has been on the performance of the service sector. Taking the experience of the United Kingdom, Rubinstein (1994) argues that Britain’s “comparative advantage” lays in commerce and finance. The middle class’s wealth, the dissemination of employment and the achievements of the City of London in comparison with manufacturing provide significant evidence. The period 1770–1860 marked a “partial and equivocal upsurge of industry and manufacturing,” which did not halt the “secular trend” toward a commercial and financial economy” (Rubinstein, 1994, pp. 22–44). Similarly, Cain and Hopkins (1993, pp. 19–22) claim: “financial and commercial services have not received the historical recognition they deserve; they were in fact much more important in terms of output and employment before, during and after the Industrial Revolution, than standard interpretations of British economic history allow.” In particular, they emphasize the “productivity gains” related to innovations in banking, insurance, legal services, transportation and communications. Lee (1987, 1990) defines the financial institutions as

“the essential centerpiece of the British and international economies, particularly starting in the middle of the 19th century.”

In this context, Barras (1986, 1990) examines the influence of technology on financial services including insurance. Attracting a lot of impetus from Barras (1990), the argument is that there is a link between the introduction of new technologies in the capital goods industry (i.e., machine tool manufacturing) and innovation in the service industry. The interaction takes place by two product cycles working in opposite directions; i.e., manufacturing innovation moves from an emphasis on product to an emphasis on process, and services innovation does the reverse. Thus, as product innovation declines in industry, it accelerates in services. According to Barras (1986, 1990) “the innovation process in insurance is something less dramatic than revolutionary change in the service sector during the Industrial Revolution in Britain.” Following Rubinstein (1994), Cain and Hopkins (1993), Barras believes that innovation in insurance was taking place incrementally for a long period before building up a product development crescendo at the end of the 19th century. Barras (1986, 1990) and Pearson (1997b) link the innovation process in services to the industrial economy and provide the explanation of a parallel relationship between innovation in insurance and industrial growth. Casson (2003, 232) stresses that innovation in financial services was in a lagged inverse relationship with respect to the cycles of the industrial economy. Hence, this logic suggests that insurance companies would be prepared to assume significant new risks only when the industrial activity is slowing down as mirrored in the bridging of the gap between marginal economic rate of return in industrial projects and

money market rates of return. When the industry slows down, the insurer has more space to take risks due to financial and technical abilities (i.e., product innovation). The ability to accept new risks at a certain point would make the insurance sector able to respond to the demand of the industrial sector that starts to grow again. In other words, the insurer has room at the starting of the boom cycle when the industrial activity picks up because has introduced new products suitable to the client and because the economy demands coverage.

Scrutinizing the period between 1790 and 1850 might support the thesis. However, given the difficulty of obtaining data, empirical analysis has not conclusively verified the views of Barras and Casson.

However, it is reasonable to think that in the 18th & 19th centuries insurance influenced economic activity. Moreover, it is also conceivable that the relationship between insurance and economic growth passes through the impact that insurance has on another variable such as economic activity and entrepreneurial initiative.

IV. Insurance and Entrepreneurship

The review of the literature and the history of insurance show that in a dynamic and evolving environment of known, unknown and unknowable (i.e., KuU), entrepreneurship and insurance go hand in hand: insurance reduces uncertainty by converting it into risk (Doyle & Ericson, 2004, p. 1,5,182,284); and is instrumental for entrepreneurship, economic activity and growth. The implication is that entrepreneurship constitutes the link between insurance and economic growth.

Landes, Mokyr and Baumol (2010) display the deployment of entrepreneurship, considering the institutional and social impacts. The examples of Landes, Mokyr and Baumol (2010, p. 533) constitute lessons for the promotion and pursuit of entrepreneurship as a means to achieve economic growth and society's welfare. Throughout the course of history, entrepreneurs have had trouble conquering and reducing uncertainty, working to obtain protection and insurance. While the battle against uncertainty rages, insurance and entrepreneurship show complementarities and are instrumental to achieve growth.

Along these lines, Allen (2011) argues that the great variability of events over times has limited the individual. At the time of the Industrial Revolution, at the end of the 18th century, the establishment of recognized institutions has determined a substantial speeding up of economic growth. The main argument is that institutions reduce uncertainty and variability related to natural events and human behavior and increase the ability to predict, plan and act. Institutions and rules favor the introduction and implementation of technological innovations and their full exploitation. However, as already mentioned, the ways in which the institutional frameworks support economic activity and entrepreneurs are different, according to the level of development.

For the purpose of this study, the history and the literature give credence to the viewpoint that entrepreneurs struggle to reduce uncertainty, establishing institutions and that there exists a strong interaction between entrepreneurship and insurance. In this battle of innovation and entrepreneurship against uncertainty, entrepreneurship and insurance have shown complementarities and have been mutually reinforcing and

instrumental for economic growth (Buckham et al., 2010, p. 7). As it has been manifested, at the macro level, the transfer of risk to those who can bear it at a lesser cost improves the economy's efficiency and enhances productivity. At micro level, the transfer of risk decreases the negative financial ramifications of events and serves individuals in organizing businesses. It permits the start of any initiatives, e.g., from developing the oil fields in the North Sea to initiating a small business. Insurance works against family and business contingencies and decreases uncertainty.

Dearth of insurance markets increases the uncertainty of the institutional setting, lessening the entrepreneurs' initiative and drive, as they become more risk-averse and not willing to impulse innovation and start initiatives of businesses.

The insurance history fortifies the viewpoint that insurance comes forward as a market institution owing to entrepreneurship (High, 2009a) and illustrates that entrepreneurship and insurance operate and develop in parallel. Quite possibly, entrepreneurship constitutes the missing link between insurance and economic growth. Hence, one must empirically test the interaction and the link between entrepreneurship and insurance and also figure out whether or not insurance development supports the use of the human prowess, which prompts economic growth.

V. Insurance as a Market Institution

It is worth repeating the key functions that insurance companies play in the economic system (USAID, 2006, pp. ii–iii):

- Insurance companies bear risk by creating pooled risks; assess and cope with non-diversifiable risk; facilitate access to credit.
- Insurance companies are vehicles to mobilize and manage savings investing them in the capital markets, facilitating long-term investments and the growth of debt

and equity markets.

- Insurance companies - as institutional investors - can require companies in the stock market to follow standards of corporate governance and transparency. Thus, institutional investors as shareholders play the role of monitoring and disciplining the markets.
- Insurance companies perform a fundamental role for economic growth and must operate efficiently and effectively (e.g., charging fair price and making provisions) and with transparency.

Insurance allows the deployment of business activity and represents a critical institution for society; e.g., insurance policies that are enforceable constitute the response to natural and human uncertainty and other events.

To clarify the relationship between events and uncertainty and the intervention of insurance, the following categories could be outlined: (i). uncertainty deriving from natural events; (ii). uncertainty deriving from human events and behavior; (iii). uncertainty deriving from institutions; (iv). uncertainty deriving from existing risks not covered or inefficiently covered (Doyle & Ericson, 2004, p. 5).

i. Uncertainty may come from natural events (e.g., natural disasters). Insurance companies, with the support of data and probabilities, can translate some uncertainty related to natural events into risk and produce insurance contracts, which differ across countries and over time, to cover a number of possible outcomes. Hence, the development of scientific knowledge, data, institutions and markets permit to deal effectively with natural uncertainty. In some cases, however, e.g., natural disasters, or the so-called unknown, the analysis of probabilities is much more difficult and insurance coverage is not easily and readily available (Doyle & Ericson, 2004, p. 5).

ii. Uncertainty revolves around events linked to different human activities and behavior including, but not limited to, terrorism, robbery, accidents etc. This uncertainty is also linked to illegal activities like piracy. Terrorist acts that have taken place in the recent past constitute an area that is still not addressed by insurance. Policy uncertainty can be included in this category.

iii. Uncertainty is related to the institutional setting and especially with the enforcement of contracts. Erbas and Sayers (Erbas, 2004; Erbas & Sayers, 2006) argue that dealing with this form of uncertainty requires predictable rules and reliable procedures, institutions for settlement, arbitration and adjudication of disputes. This outcome is comparable across countries and, depending on different factors, enforcement in some countries may be less transparent than in other countries. Social capital, level of trust and effectiveness of the resolution and enforcement systems play a substantial role on the outcome. Of course, policy makers have the responsibility to make the existing system work so it could represent a powerful device for economic growth. Insurance does not cover institutional failure.

iv. Uncertainty occurs when existing risks are not covered or are inefficiently covered. An example is excessive premium; procedures for claims and settlements cumbersome and untrusted. These circumstances create uncertainty that adds to the existing amount of uncertainty.

An additional uncertainty that exists and is not covered in any form is the uncertainty surrounding the business risk that constitutes the reward (profit) of the entrepreneur. History and literature reviews clarify that insurance will not cover the

intuition of the entrepreneur to enter certain market, fail and lose his/ her investment. The entrepreneur's uncertainty will never go away, and he/she will always react to the Knightian "uncertainty" that only his or her alertness can understand and that characterizes his or her added value. Insurance does not cover bad business judgment.

The range and variety of uncertainties in a given environment depend on how society deals with the four categories indicated above, i.e., natural events, human activities, institutions and insurance markets. The way in which countries deal with these areas will determine how entrepreneurship and economic activity are favored and economic growth achieved. In any event, significant uncertainty remains related to events in the 4 categories presented above.

With respect to natural events and human activities and behavior (i. and ii.), uncertainty basically depends on the scientific knowledge, including probability, of these events activities and behavior. Natural and human events fall under the KuU framework and would be defined as *unknown unknowns* that determine an unavoidable uncertainty. Dealing with the *unknown unknowns* is part of the dynamic process of the evolution of society. It is reasonable to assume that the natural and human events that create uncertainty will not be significantly different between developed and emerging market countries.

With respect to the institutional uncertainty (iii above), a transparent and predictable institutional setting (e.g., the legal and regulatory environment, the investment and business climates) characterizes advanced OECD markets (e.g., the United States). In advanced economies, institutions facilitate economic activity; there are high levels of

trust and social capital. Acceptance of the role of the entrepreneur and his/her reward are widespread. Hence, a great deal of institutional uncertainty is eliminated. Entrepreneurial activities in advanced economies rely on a stable and trustworthy institutional environment. In many emerging market countries, however, the institutional setting presents various shortcomings related particularly with enforcement, which make it not reliable and not favorable to the undertakings of entrepreneurs.

With respect to the area of uncertainty deriving from the existing risks (iv above), uncertainty depends on the management and coverage of existing risks. This aspect is of great relevance for this study. In developed market countries, risks are normally covered with insurance instruments; i.e., insurance policies for a number of activities are readily available and can be regarded as “routine” for entrepreneurs and businesses. Thus, insurance covers existing risks and reduces the overall level of uncertainty. New and existing businesses count on a series of insurance policies, and the entrepreneur values these forms of protection. In addition, those entrepreneurs who have access to insurance are likely to remain in business. This reduces the level of uncertainty and transforms it into manageable risk.

However, as it happens in emerging market countries, if risks remain uncovered or inefficiently covered, additional amount of uncertainty is added. If, in a given country, entrepreneurs and investors perceive resolution and enforcement as ineffective and ambiguous; risks not covered or inefficiently covered, then, they may realize that the uncertainty surrounding his/her reward is too large and unbearable. Thus, given these uncertain prospects around the return on investment, entrepreneurs might not be

interested in taking initiatives, or might decide to move to environment with less uncertainty. In other words, entrepreneurs and investors prefer a predictable and rewarding environment with effective institutions. Alternatively, investors will seek higher rates of return as a quid pro quo for investing in countries with uncertain perspectives. In some other cases, as the literature review and history show, government intervenes to reduce or eliminate uncertainty and support entrepreneurs in forms that, however, may also distort the functioning of the market.

Hence, leaving aside the aspects related to the institutional environment and enforcement, the concentration is on the role of insurance as a way to cover the existing risks as identified under iv and make sure that no uncertainty is left related to lack or bad coverage of existing risks. In this respect, the role of effective insurance markets takes central stage.

Literature and history indicate how insurance policies and contracts, as well as property rights (Demsetz 1967, 2011), have progressed over time and space (e.g., in advanced and emerging market economies) to respond to the needs of individuals (and entrepreneurs) and be instrumental for economic activity. In this context, insurance constitutes a market institution that reduces transaction costs (Coase, 1937; Medema, 2010) or reduces what Allen (2011, p. 19) calls the bad behavior of humans and nature. Information and data, and their systemic use, improve the ability of individuals (and entrepreneurs) to evaluate risks and make decisions. However, insurance coverage has to be provided at a fair price otherwise mutual exchanges will not occur and there will be under provision of insurance coverage. Insurance markets respond to the different needs

of agents for buying life, business and property insurance policies and fulfill the institutional function of facilitating economic activities and growth.

The considerations of parallelism and interaction between insurance and entrepreneurship make insurance a market institution to reduce uncertainty consistently. The framework is that of emergent institutions derived from human activity (High, 2009a) that play the function of facilitating the deployment of resources. In other words, insurance emerges in response to human activity such as entrepreneurship and establishes itself as an independent market institution to enable economic growth. Following Boettke and Coyne (2003), one can make the implication that insurance markets lead to productive entrepreneurship and economic growth, i.e., “the adoption of certain institutions . . . channel and encourage entrepreneurial aspect of human activity in a direction that spurs economic growth” (Boettke & Coyne, 2003, p. 3; High, 2009a, p. 5). In this respect, entrepreneurship would be an intermediary variable between insurance and economic growth.

In growing economies like Brazil, the institutional setting is improving but still less reliable than that of advanced economies; there is a lower level of trust, with substantial geographical differences, a considerable amount of uncertainty is not transformed into risk; existing risks are not covered or covered inefficiently. Under these circumstances, business and entrepreneurial activities are more difficult, and at times are undertaken because of a lack of alternative opportunities and jobs. The improvement of the institutional setting in emerging markets - and particularly in Latin America and

Brazil - includes efforts to develop an effective insurance market to reduce uncertainty, which in turn will facilitate entrepreneurship and economic growth.

In this context, insurance plays an institutional role of covering existing risks and reducing the level of uncertainty and hence stimulating initiatives and economic activity and ultimately economic growth.

VI. The Specificities of Latin American Countries and Brazil

The historical and literature reviews illustrate that the Latin American countries present specific features. The economies of Latin America present favorable conditions for economic growth. However, the historically low economic and social development of the Latin American countries is related to several factors.

Primarily, the slow economic growth is due to the unsatisfactory development of rules, norms and institutions that allows the so-called extractive political and economic elites to retain power (Acemoglu & Robinson, 2012, pp. 400–3). The transition to democracy has taken place in almost all the Latin American countries. However, democratic systems are still young and forms of authoritarian regimes or extreme-left government fueled by inequality can emerge (Acs, 2013, p. 44). The low level of trust that still exists in Latin American countries prompts insecurity and limited confidence; favors the influence of political factors; and makes difficult to build effective institutions. The institutional environment has to consolidate and significant asymmetrical information is present. A notable exception is Chile. Brazil is on the road of establishing a reliable and sustainable institutional environment. However, this process is not a

straight line and these days a great displeasure of how the system works in Brazil is on display.

A second element is the lack of determination and persistence in the pursuit of changes and innovations. In fact, Latin American countries have layers of bureaucracy that exasperate entrepreneurs. As developed in other chapters, there is mounting evidence that certain types of entrepreneurs do more to foster long-term economic growth than do other types. These “high-impact entrepreneurs” are those who launch and lead companies with an above-average impact in terms of job creation, wealth creation and the development of entrepreneurial role models (Endeavor, 2012; Ernst & Young, 2011a). These are opportunity entrepreneurs in contrast to the necessity entrepreneurs. Latin American countries have a significant number of necessity entrepreneurs, with a small number of high-impact entrepreneurs who are mainly concentrated in the region’s more advanced countries, and also with no great impact and global orientation.

With respect to insurance, the dependence of insurance from colonial countries has limited and delayed the emergence and development of local capabilities. The intrusive intervention of the government in the business with the argument of reducing foreign influence has hindered the establishment of a competitive system and the development of solid private insurance markets. In Latin America’s emerging market countries, business insurance is often unavailable and/or mispriced. The insurance industry in Latin America, including Brazil, still has to deal with low efficiency, low penetration, limits to competition and measured pace towards deregulation and liberalization.

Under these circumstances, since their independence from Spain and Portugal in the early 19th century, none of the Latin American countries has reached a level of developed country, also taking into account the recent emergence of Brazil. However, as discussed, the economic and social situation has improved at the beginning of this century and also following the crisis of 2007–8 and the crisis of the European debt of 2011–12. Prospects of low inflation and high economic growth provide opportunities to the emerging entrepreneurs. At the same time, the insurance industry is more able to respond to a growing and latent demand. Within this context, Brazil is a leader in entrepreneurship, with one in eight adults being an “entrepreneur.”

It is worth highlighting additional considerations with particular attention to Brazil.

The first consideration is that the history of insurance in Brazil confirms the relationship between economic activity, economic growth and insurance. Since the success of stabilization in 1994 (see Chapter 5 on the status of insurance markets in the world), the country’s economy has been growing steadily, and the performance of the Premiums/GDP ratio over time indicates the strong relationship between insurance and economic growth.

The second consideration is that the interaction between insurance and economic activity takes place in the context of the intervention of the government that limits the role of markets while trying to reduce uncertainty.

A third consideration is that the relationship between insurance and economic activity occurs in the context of a strong and complementary relationship between the

insurance market and the financial market and the interconnection between banking and insurance. In fact, the main insurers in Brazil are owned by and connected with the banking sector.

A fourth consideration is that the review of the development of insurance in Brazil shows that the improvement of the institutional context, including that for insurance, is crucial in making insurance companies responsive to economic needs. Further institutional improvements would be able to put to work the potential entrepreneurship related to the existence of a large informal sector.

A fifth consideration has to do with new opportunities for the development of insurance and economic growth in the coming years. These prospects refer to reinsurance and micro insurance.

A liberated reinsurance market is growing and establishing itself following decades of state monopoly. Coupled with the stabilization of the economy and a favorable risk climate in Brazil, the reinsurance available improves the prospects of growth for the insurance industry. The expectation is that the influx of capacity, competition and sophistication will boost the development of the insurance market in Brazil and prompt economic activity.

In addition, Brazil is a country with one of the highest levels of inequality and where significant portions of the population still live in poverty. The policies of the Brazilian government to open access and opportunities for poor people constitute the basis for offering insurance products directed to the lower segment of the market and provide opportunities for growth.

All these considerations lead to two fundamental and related questions:

- Is the availability of insurance a supply problem, which implies that better insurance markets would favor economic activity and entrepreneurship?
- Should public policy realize that a gap exists and promote the availability of insurance instruments, in various forms, for the general public?

The two questions are at the core of the study and will allow verifying if insurance constitutes a link between entrepreneurship and economic growth.

VII. The Role of Public Policy

The crisis of 2007–8 global and its continuation in Europe show the limitations of rationality and efficient markets, but also the essential roles that financial and insurance markets play for the economy and thus the need of an effective and transparent public policy.

The future cannot be easily forecasted because uncertainty finds new forms to appear in, e.g., social and human behavior, disasters, and complex and complicated algorithms are not able to transform uncertainty into risk.

a. Policy Uncertainty

With respect to public policy decisions, the enactment of policies should gain the agreement of the existing political forces.⁸⁹ In periods of crises, while there are plenty of emergency situations and policy solutions are readily available, in the political world - and not only in the United States - one can detect a great polarization that create an

⁸⁹ Kingdon's book (2010) is a classic on how the public policy process works and how issues become relevant and produce policy changes.

environment of uncertainty that is particularly troublesome for those who operate in the economy. Situations of uncertainty guide the definitions of policy implementation (J. Friedman & Posner, 2010, p. 44) (Stiglitz, 2010, p. 44) and create policy uncertainty damaging for the market. Under these circumstances, a growing interest has developed from a political and research point of view in public policy as a potential source of uncertainty and thus with a negative impact on economic activity (see Appendix 5).

Therefore, Government should set a clear strategy and policies for the insurance markets. A basic criteria should be to allow insurance companies to establish themselves and perform their role as facilitators of business activity; and possibly devise interventions as a guarantor of last resort in case of unknown events, e.g., a comet striking the Earth (Diebold et al., 2010, p. 44)(Granger, 2010, p. 44).

b. Policy for Financial Markets and Insurance

This section deals with financial and insurance markets following the crisis of 2007-8 and its continuation and the need to set up a public policy agenda for insurance to avoid policy uncertainty.

i. As seen in previous sections, many share the ultimate responsibility for the starting of the financial crisis: financial executives who approved assembled risky assets (e.g., subprime mortgages) and other complex products; rating agencies that supported many AAA ratings that moved products off balance sheets; regulators and supervisors who have been unable to assess the systemic risk of the products (Buckham et al., 2010, p. 55) and recognize the existence of perverse incentive; politicians and policymakers

who introduced policies not in line with the rules of market discipline and efficient use of resource (Norberg, 2009). However, one could also argue that the occurrence of the financial crisis constitutes an example of an occurrence - an *unknown unknowns* – that nobody could have expected (Marsh & Pfleiderer, 2012).

The continuation of the crisis in 2011–12 with the debt of various European countries is mainly due to the poor allocation of resources in various European countries following the interest of the extractive elites (Acemoglu & Robinson, 2012) and thus lack of fiscal discipline and inefficient use of resources are at the base of the crisis of many European countries.

The crisis of 2007–8 and that of 2011–12 have vividly established the indispensable part that responsive financial markets play for the economic activity: “Every business needs the right kind of financing at the right time in order to succeed. . . .The recent financial crisis drove home this simple truth” (F. Allen & Yago, 2010, p. 51). These crises have shown precisely the manner in which failure suffered by capital and banking markets can lead to a grand financial crisis and subsequently results in the government having to intervene, which can potentially reduce the innovation, essential to the functioning of markets and otherwise interfere with markets’ efficiency.

These crises have shown how the failure of banking and capital markets leads to an economic crisis and in turn prompts the intervention of government, which may play a positive role of stimulus and reduction of uncertainty, but also may reduce the innovation essential to the functioning of markets and interfere with markets’ efficiency. The need for effective financial markets opens, or reopens the doors to government intervention

and questions its limits (G. Brown, 2010, pp. 10–3). It also raises the doubt that the government can obstruct innovation; and opens a debate on the so-called exit strategy once the crisis is over and the role of the government, including that of state-owned banks, is not needed anymore.⁹⁰

Within this context, the role of the government takes center stage as an outcome of the global crisis, also given that the crisis has hit low-income people harder. The most relevant issue is the rethinking of the liberalization as well as the framework for regulation and supervision⁹¹ to make them more effective on a global scale, fostering innovation, while eliminating wrong incentives and disallowing for scenarios where companies are too large in size to suffer any failure exist and thus *de facto* operate without market discipline (Ferguson, 2008, p. 360). Along these lines, in 2011 and 2013, the Basel Committee on Banking Supervision has developed the so-called Basel 3, a series of measures directed to improve the banking sector's capability to absorb shocks arising from financial and economic crisis and stresses; improve risk management and governance; strengthen banks' transparency and disclosures and thus strengthen the regulation, supervision and risk management of the banking sector at the micro and macro levels. Most notably, Basel 3 has increased the level of capital and liquidity of banks to provide a buffer against future crises (Basel Committee on Banking Supervision, 2011).

90 See the debate that the World Bank initiated about the role of state-owned banks, “The AAF Virtual Debates: Can State-Owned Banks Play an Important Role in Promoting Financial Stability and Access?” <http://blogs.worldbank.org/allaboutfinance/the-question-can-state-owned-banks-play-an-important-role-in-promoting-financial-stability-and-access>.

91 (Cline, 2010, p. 260) asserts that globalization and capital account openness have been the main reforms of the 1980s and 1990s and should not be reversed, i.e., while liberalization and openness might have facilitated contagion of the crisis, there is no evidence that greater openness caused more severe spillovers into domestic economies.

ii. In terms of the insurance sector, over the last 40 years there have been great changes in the structure of the industry and policy makers, regulators and supervisors have to keep up with these changes and maintain adequate and effective roles for the development of insurance. They have also to be in position to oversee the market practices of insurance companies (Doyle & Ericson, 2004, p. 29,265,293).

A significant complication for the insurance industry is an unpredictable human behavior and natural events. Even though human events and natural catastrophes are hard to forecast, or apply relevant models to, the system for insurance has demonstrated that it can offer protective services. Such problems have to an extent reminded the industry of the significance of independence from financial and banking markets, and thus the need that insurance companies avoid becoming embroiled in financial problems which take them away from their primacy insurance business.

With regard to the role of the insurance companies during the financial crisis, as indicated, the view of experts and practitioners (Harrington, 2009) is that the systemic risk for insurance companies is low compared to that banks face. This is especially true for property and casualty insurance. One could say that insurance does not create systemic risk and uncertainty. This is because premiums are paid up-front; the amount of capital is normally large with respect to their liabilities; there is almost no reason for “runs”, as in the case of banks. These circumstances significantly reduce the vulnerability of insurance companies to shocks. The insurance business model (see the section on the basic theory of insurance in Chapter 3) has specific features that provide stability. In addition, a feature of the policies/products of the insurance industry is that they are long-

term and the outflows are systematic and could operate as stabilizers for the financial system.

While the crisis of 2007-08 was taking place, insurers were able to maintain somewhat steady capacity, prices, and business volumes (The Geneva Association, 2012). AIG was among those insurers that suffered losses not because of their primary insurance business but by their banking policies, which linked financial products with insurance. Likewise, the distressed “monoliners”, which include the FSA, AMBAC and BIA, focused primarily on financial guarantees regarding credits. If we go by that point of view then the execution of Solvency II (see page 95) could have played a major role in stopping the crises witnessed in 2007 – 2008 (Lorent, 2008).

As part of the recent history, in emerging markets, in the years of the financial crisis, 2007-2012, the insurance sector has not been involved in crises related to banking, quasi-banking and other speculative and unsafe operations.

In any event, Solvency II constitutes a suitable response to the evolution and needs of the insurance industry.

One important response to the crisis is the July 2010 U.S. renovation of the financial system.⁹² The U.S. legislation includes the possibility that an insurance company be considered a systemically important financial institution (SIFIs). At the same time, the legislation created a new federal regulatory body within the Treasury Department - the Federal Insurance Office (FIO). The role of FIO is to work with the industry to eliminate the possibility that insurance companies become a systemic risk.

The insurance industry regards the possible designation of an insurance company as SIFI

92 OECD (2009a) illustrates the policies that various countries have undertaken.

worrisome and unduly burdensome, but there are suggestions and proposals to find other avenues (e.g., the resolution plans and capital surcharges) to deal with the possible crisis of a large insurer (Baluch, Mutenga, & Parsons, 2011; KPMG, 2011). With respect to the FIO, the prevailing view is that it can strengthen the insurance industry and its independence especially from the banking sector. However, there is some concern that the FIO could become the Federal regulator and take away these functions from the states.

Under these circumstances, both emerging and mature countries should be able to articulate a public policy agenda that stresses the role of insurance as one of the financial services to realize financial access and undertakes actions that make insurance an effective market institution able to promote economic activity, entrepreneurship and economic growth. In this respect, increased access for small and medium sized firms, entrepreneurs and micro-entrepreneurs would reduce uncertainty and spread risks without unjustifiably Government's direct interventions.

The policy recommendations of the OECD (2009a) move along these lines: the main aim in emerging and developed countries is the creation of a supervisory and regulatory framework, which can help improve the value of insurance and reduces the opportunities for insurance companies to become a threat to the system. In this last respect, it is also crucial to emphasize the distinction and independence of insurance activities from banking and capital markets activities.

8. RESEARCH QUESTIONS AND HYPOTHESES

The historical and literature reviews provide material to identify gaps and constitute the basis for the study on the relationship between insurance and entrepreneurship.

I. Research Questions

On the basis of the considerations developed above, the research questions to test empirically are:

- What is the relationship between availability of insurance and entrepreneurship?
- What is the direction of causality, e.g., which comes first, insurance or entrepreneurship?
- What is the role of Social Insurance with respect to entrepreneurship?

Within this framework, there are several specific types of entrepreneurship—the main dependent variable—to consider (Iversen et al., 2007), and there are various insurance products (or policies) that can be related to economic activity and entrepreneurship.

II. Hypotheses on the Relation between Insurance and Entrepreneurship

To test empirically the relationship between insurance and entrepreneurship, Equation [1] relates entrepreneurship and insurance:

$$\begin{aligned} \text{Entrepreneurship} = a_0 + a_1 \text{Availability Insurance} + a_2 \text{Social Insurance} + \\ a_3 \text{Control Variables} + \text{error} \quad [1] \end{aligned}$$

The study will also look at the availability of insurance in Equation 1 as part of a dynamic panel, i.e., Simultaneous Equation Model. In this respect, the availability of insurance -in Equation 1 - is dependent on other variables, i.e., Equation 2:

$$\begin{aligned} \text{Availability Insurance} = a_0 + a_1 \text{Propensity Insurance} + a_2 \text{Knowledge of} \\ \text{Insurance} + a_3 \text{Institutional Setting} + a_4 \text{Financial} \\ \text{Intermediation} + a_5 \text{Control Variables} + \text{error} \end{aligned}$$

[2]

In line with the current literature (Kjosevski, 2012; Park & Lemaire, 2011), Equation 2 shows the variables that influence the availability of insurance, i.e., the propensity to buy insurance and knowledge of insurance, institutional setting and financial intermediation.

Equations [1] and [2] constitute the model to verify the research questions using a panel data for the Brazilian states. The hypotheses of the empirical are:

H₁: Does the availability of insurance interact with entrepreneurship under the specification of start-ups?

H₂: Does a causal relationship between insurance and entrepreneurship exist? And what is the direction of causality?

H₃: What is the impact of social insurance on entrepreneurship?

Chapter 9 on Measures and Appendix 2 review the appropriate measures of entrepreneurship and economic activity, i.e., the dependent variable (Insurance/Penetration); the main independent variable (Entrepreneurship/Start-ups); and other variables included in the model.

The empirical test is performed on a panel data for the period 1995-2011 for the Brazilian states

III. Importance of the Research Questions

Why are the research questions important? The research questions, and especially the answers to these questions, will advance the findings of the literature on insurance and entrepreneurship and prompt more studies and researches in the field, including those that are mentioned in this study.

The answers to the research questions have relevant policy implications because policymakers should consider appropriate policies and interventions directed to facilitate the development of insurance markets as one of the means to support private-sector initiative and entrepreneurship that will lead to more jobs, a more competitive economic environment and more economic growth and development.

9. MEASURES

This chapter addresses the variables used in the empirical analysis. Appendix 2 includes a more detailed review of the measures for the Brazilian database as well as for the global database, which could be used for future research. All the variables described are also log transformed.

I. Entrepreneurship

Entrepreneurship has various measures as indicated in previous chapters. The types of enterprise that could be considered are large companies; SMEs; entrepreneurs and start-ups; micro entrepreneurs; and the poor segment of the population. For this study using the Brazilian database, *Totnumberstartups*, the total number of start-ups, constitutes the measure of entrepreneurship. The source of the data is IBGE (<http://www.ibge.gov.br/home/>).

II. Insurance

Insurance, the main independent variable, is measured using standardized measures.

The first measure is the penetration ratio defined as the ratio of total premiums (life and non-life) to GDP (i.e., premiums over GDP) for states and for various years. For the Brazilian database, *Penetration2__Insavail2* is used. The sources of data are SUSEP⁹³

⁹³ Superintendência de Seguros Privados (SUSEP), Superintendence of Private Insurance <http://www.susep.gov.br/menuestatistica/ses/principal.aspx>.

for the volume of premiums and IBGE for GDP. The penetration ratio measures the availability of insurance.

A second measure is propensity to buy insurance. The propensity to buy insurance can be regarded as risk aversion. Various authors argue that education promotes an understanding of risk and hence an increased demand to buy insurance (Outreville 1990, 2011; Szpiro and Outreville 1988). In other words, the more people are educated, the less risk-averse they become; i.e., better education improves the capability of assessing risk, and increase the demand of insurance and hence the propensity to insurance. In addition, better education facilitates greater risk taking by individuals and less risk aversion and represents a proxy for risk aversion and propensity to buy insurance. Thus, the level of education (Outreville 1990, 1996; Szpiro and Outreville 1988) - defined as the percentage of the population completing secondary school- measures the propensity to buy insurance and risk aversion. The variables used for the Brazilian database are *PropIns22* - the percentage of illiteracy for people 15 years of age or above (*Tasa de anafalbestismo 15 anos o mas*) - and also *PropenInsurance3*—average years of education for adults of 25 years of age or older. IBGE is the source of data.

A third measure is density rate. The density rate is defined as the total volume of premiums (life and non-life) per capita (i.e., premiums over population for different states and countries for various years). *Density* is a measure that relates to the knowledge of insurance and influences the availability of insurance. The number of insurance companies (and also the number of brokers) in a given state (or country) could constitute a measure of knowledge of insurance. SUSEP is the source of the volume of premiums to

calculate insurance density; IBGE is the source of data for population. Olson (2007, p. 40) distinguishes between propensity and knowledge of insurance arguing that knowledge facilitates the introduction of rules and institutions that expand insurance products; i.e., cultural values influence the shape and institutions.

The data on insurance includes the total insurance premiums (life +non-life) in each Brazilian state for the years 1999 to 2011(Masci, Medici, & Weaver, 2007).

For few years, the database includes premiums for specific insurance contracts, i.e., 99 insurance contracts authorized in Brazil and premiums that Small and Medium sized Enterprises (SMEs) paid. The data brings together contracts that have been categorized into specific kinds of risks. These data, however, are not complete and are not used in the analysis.

The source of these data is SUSEP.

Social insurance policies—such as workers’ compensation, health insurance and pensions—are relevant to entrepreneurs who have to shoulder these policies. With respect to social insurance, some authors (Ilmakunnas & Kanniainen, 2001) assert that in the OECD countries social insurance (e.g., workers’ compensation that provides benefits to employees and can be mandatory) is statistically significant and detrimental to entrepreneurship. Other authors (W. Chen et al., 2013) argue that improvements in health facilitate opportunities and substantial economic growth.

The measures of social insurance used in the model consist of federal and state-level social expenditures for social security and health per capita, *GastosSaudePercapita*. The variable contribution of workers to social security (*ContrPrevidenTrabajo*) is an

alternative measure of social insurance. The sources of data for social insurance are IBGE and BACEN.

III. Institutional Setting

Institutional setting represents the quality of institutions. It defines how reliable and effective the institutions are and the importance of enforcement. In other words, institutional setting represents the level of institutional quality in each Brazilian state, which is very relevant for the development of start-ups and also of insurance. It is difficult to find appropriate measures of institutional setting at the level of each Brazilian state. Thus, the task is to find a proxy. The choice has to look at both what is meaningful given the literature and what data are available. The literature review discusses the role of institutions. Scholars have long argued that the institutional context impacts the inclination of firms to invest capital and their ability to grow (Greif, 2006; North, 1990; Porter, 1998b; Weingast, 1995). North, Wallis and Weingast (2012) articulate the relationship between various types of violence and political and economic development, arguing that offering privileges to limit the use of violence by powerful groups and individuals hinders economic and political development. In contrast, open access to economic and political organizations, fostering political and economic competition, favors economic growth and development. Other authors (Borner, Bodmer, & Kobler, 2004) review the efficiency of economic and political institutions indicating, among other aspects, how different types of violence are related to the existence of efficient institutions. Woodruff (2006) addresses the question of measuring institutions. He suggests that mortality and particularly that associated with forms of violence - including

homicide – provides a proxy with respect to the value of human life and the level of institutions in a given country. He underscores that a society where labor regulations are weak - allowing, for instance, labor of underage workers or children - has a low quality of institutions. By the same token, a society that has a large percentage of infant mortality implies a level of development particularly low. Along the same lines, Poe and Tate (1994) indicate that the abuse of internationally recognized human rights, specifically those having to do with integrity of the person such as child labor, correspond to a weak institutional setting. Malesky and Taussig (2009) use various dimensions to measure the quality of institutions and governance in the provinces of Vietnam. They come up with a composite index ranking of Vietnam's 64 provinces.

Based on theoretical and empirical study, various measures of the institutional setting and quality of institutions exist. The United Nations published a Report (United Nations, 2011a) using the United Nations Rule of Law Indicators to measure and monitor changes in the performance and essential characteristics of criminal justice. The Governance and Institutional Quality Resources of Emory University (<http://einstein.library.emory.edu/govinstlinks.html>) provides a series of links to sources for data on the institutional setting. Among them, the Cingranelli-Richards (CIRI) Human Rights Dataset (<http://www.humanrightsdata.org/index.asp>) contains quantitative information on government with respect to 15 globally accepted human rights for 195 countries, for the period of 1981-2010. The main purpose of this particular set of data is to allow scholars to test theories about the reasons of the violations of human rights.

Based on the contributions found in the literature and considering the availability of data, the proxies used for the institutional setting at the level of each Brazilian state are: the people who die for homicide and violence per 1,000 habitants, *MortHomicpermilhab*; the percentage of people who die from infant mortality, *Taxamortinfpermi*; and the share of jobs undertaken by children who are under age, *Taxtrabinf*. The decrease of these measures implies an improvement of the institutional setting. In other words, a decline of homicides (*MortHomicpermilhab*), deaths of infants (*Taxamortinfpermi*) and work by children who are under age (*Taxtrabinf*) indicates an improvement in the institutional setting, i.e., the functioning of the social and legal environment.

The source of the data is IBGE.

IV. Financial Intermediation

Financial intermediation is a relevant variable particularly related to insurance and to the propensity to buy insurance. The empirical test is expected to verify whether insurance operates independently from financial intermediation (Arena, 2006; Wheeler, 2012). Credit available to the economy measures the level of financial intermediation. The financial crisis of 2007-8 and 2011-2012 emphasizes the role of financial intermediation for the economy and its variation with the business cycle. For the Brazilian database, the variable related to financial markets is the volume of financial intermediation (Intermediacao Financiera, Seguros e Previdencia Complementar e Servicios Relacionados, Preco Corente - R\$ - source, IBGE) over GDP for each Brazilian state and for each year. An alternative measure of financial markets for the Brazilian

database is the balance of credit operations. The measure used is fi (absolute value) and $figdp$ and $fipercapita$ (standardized at the GDP and GDP per capita). By including the interaction variable, following Arena (2006), the model verifies the interaction between insurance and financial intermediation, i.e., $interinsfi$, $intirsurfîn$ and $interactioninsurancefi$. IBGE and BACEN are the sources of the financial data.

V. List of Variables

Table 11 provides a synthesis of the variables used in the model. The log transformation of the variables is included. The second section of Appendix 2 lists all the variables available in the databases.

Table 11 Main Variables used in the Regressions

Variable		Name Variable used in the Brazilian Dataset	Comment
Dependent Variable	Entrepreneurship	Totnumberstartups	Total Number of Startups
Main Independent Variable	Availability Insurance	Penetration2__Insavail2	Penetration Ratio
Dependent Variable	Social Insurance	GastosSaudePercapita	Public Expenditure for Health
		ContrPrevidenzaTrabajo	Contribution of Workers to Social Security
Control Variables	Institutional Setting Variables	Taxamortinfpermill	Infant Mortality
		Taxtrabinf	Rate of Infantile workers as percentage of population
		MortHomicpermilhab	Coefficient of death by Homicide - Number of dead people dead because homicides by 1000 people.
	Propensity Insurance	PropIns22	Illiteracy for 15 years old or older
		PropenInsurance3	Years of study for 25 years older or more
	Knowledge of Insurance	Density	Premium over Population
	Financial Intermediation	fi	Level of Financial Intermediation
figdp		Financial Intermediation per capita	
Dummies	Dummy 1	Dummy1 (0-1, Centre 0)	Dummy 1 (0=South and Center; 1=North)
	Dummy 2	Dummy2 (0-1-2)	Dummy 2 (0=South; 1=North; 2=Center)
	Dummy 3	Dummy3 (0-1, Center 1)	Dummy 3 (0=South; 1=North, Center)
Interaction	Insurance and Financial Intermediation	Interinsfi	Interaction between Insurance and Financial Intermediation

Financial intermediation is particularly relevant for the study given the relationship that exists between financial intermediation and insurance. The analysis includes variables for financial intermediation also with log transformation. Table 12 lists the variables of insurance and financial intermediation as well as interaction terms used in the analysis.

Table 12 Variables Financial Intermediation, Insurance and Interaction

Variables of Financial Intermediation and Insurance and Interaction between Insurance and Financial Intermediation				
Category	Type	Definition	Variable Stata	Log Variable
Financial Intermediation	Absolute Value	Financial Intermediation	fi	logfi
		Financial Operations	fscop	logfscop
	Financial Intermediation Ratios	Financial intermediation/GDP	figdp	logfigdp[1]
		Financial Operations/GDP	fscogdp	
		Financial Intermediation/Population	fipercapita	logfipercapita
		Financial Operations/Population	fscopercapita	logfscopercapita
Insurance	Absolute Value	Total State Premium (life + nonLife)	Totstatepremium1	
			Totstatepremium2	
	Insurance Ratios	Penetration Ratio (Availability of Insurance)	Penetration2_Insavail2	logPenetration2_Insavail2
		Density (Knowledge of Insurance)	Density	logDensity
		Propension (Risk aversion-Propensity to Insurance)	PropIns22	logPropIns22[1]
		PropenInsurance3	logPropenInsurance3	
Interaction Financial Intermediation - Insurance	Absolute Values	fi+Premium	fipremium	logfipremium
		Penetration Ratio*Population	interinsfi	loginterinsfi
	Intermediation Ratios	(Penetration Ratio*Population)/GDPpercapita	interinsfipercapita	loginterinsfipercapita
		Penetration Ratio* figdp	intinsurfin	logintinsurfin
		Interaction(TotalStatePremium+fi)/GDP	interactioninsurancefin	loginteractionInsfinFIPremiumGDP

The test of the relationships between insurance and start-ups is performed using the Brazilian database, i.e., a panel data of 27 Brazilian states for the period 1995-2011. Brazil is a federal government with 27 states; the state is the unit of analysis.

With respect to the expected direction and sign of each variable, measures related to insurance - propensity and knowledge - are expected to have positive signs. The propensity to buy insurance, or risk aversion (greater risk aversion means less education),

is expected to have a positive sign (e.g., greater levels of education lead to an increase in start-ups). Knowledge of insurance is also expected to have a positive sign.

Given the measures for the institutional setting (i.e., infant mortality, or people who die for homicide and violence, or work by people under 15 years of age), a decline in the number of people who die from homicide and violence, a decrease in infant mortality, or a lower rate of child labor imply a better institutional setting, and it is expected to have a positive impact on start-ups.

The literature has not settled the impact of social insurance on entrepreneurship.

There could be problems of multicollinearity among the various measures that include insurance and financial intermediation.

Equations 1 and 2 represent the system of simultaneous equations. According to Greene (2008, pp. Chapters 12 and 13, 314–394) simultaneity occurs when there is a feedback relationship between one or more of the independent variables and the dependent variable. Simultaneity causes the ordinary least squares (OLS) estimated coefficients and standard errors to be biased. The view is that insurance stimulates start-ups. However, it is possible that start-ups prompt the availability of insurance. Both variables are endogenous; i.e., a change in the error term will not only change the dependent variable (start-ups) but also the independent variable (insurance). Appropriate statistical analysis makes the endogenous independent variable (Penetration) exogenous, i.e., it is independent of the error term that influences the dependent variable. To make

the endogenous variable exogenous dealing with the problem of endogeneity, simultaneous equations and Instrumental variables (IV) are used.⁹⁴

Global Database

The empirical analysis of this study focuses on the Brazilian database; the analysis of the global database is not undertaken, and should be part of future work. However, this study makes reference to the global database and lays the foundation to complete it and then use it to test the relationship between insurance and entrepreneurship at the global level. The global database is designed with over 100 countries covering a period of 17 years (1995–2011); the country is the unit of analysis. Appendix 3 provides more details, including a list of sources of data, e.g., GEM, World Bank, IMF and other world databases.

At the global level, it is likely that the variables - particularly for entrepreneurship and institutional setting - are available with different specifications and measures and are not comparable to those of the Brazilian database.

⁹⁴ Events that affect a covariate (insurance) can be considered a type of instrumental variable. Since 2000, in Brazil, there have been many changes affecting the insurance industry (see Chapter 5, review of the development of insurance worldwide and in Brazil). Event analysis is part of future research.

10. RESULTS AND FINDINGS

I. Graphical Analysis

Figure 16 shows the two main variables, insurance (LogPenetration2) and start-ups (*log totnumberstartups*), over the period 1995–2001, visualizing a significant relationship between the penetration ratio and the number of start-ups.

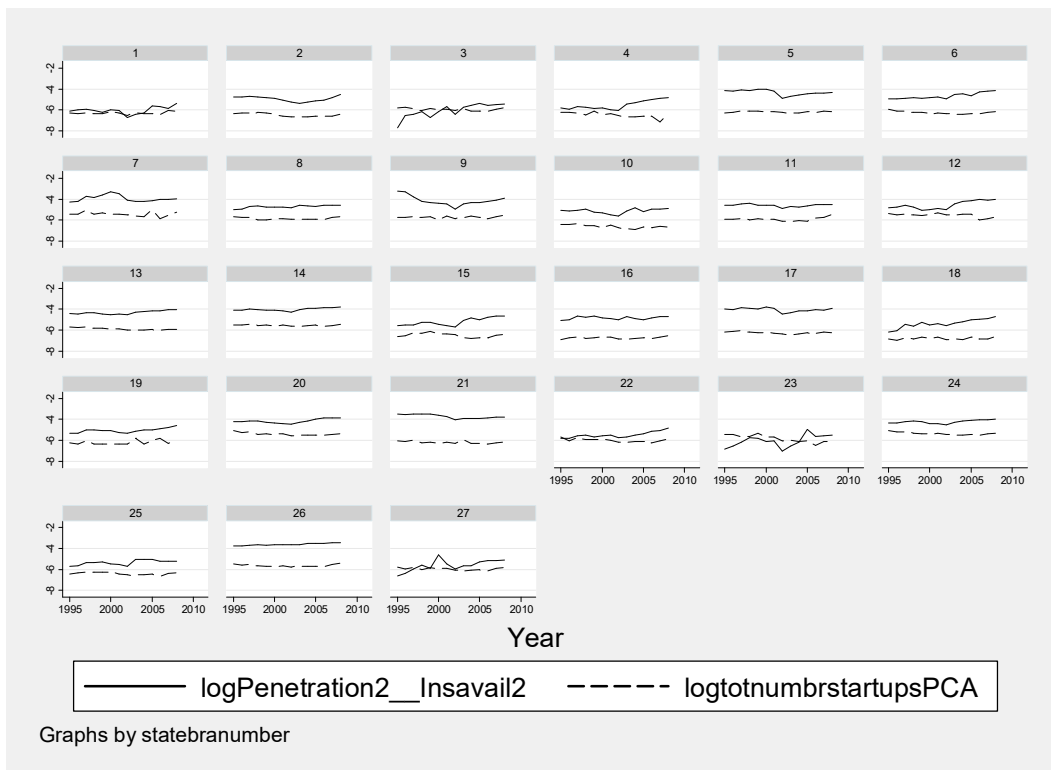


Figure 16 Visualization of Penetration and Start-Ups

II. Pooled OLS

In the analysis of the Brazilian panel database, the starting point is the ordinary regression (pooled OLS). If state effect v_i (cross-sectional or time-specific effect) does not exist ($v_i = 0$), OLS produces efficient and consistent parameter estimates.

OLS consists of five main assumptions (W. H. Greene, 2008, pp. 11–19; Kennedy, 2008, pp. 41–42):

- (i) Linearity says that the dependent variable is a linear function of the independent variables and the error term.
- (ii) Exogeneity says that the expected value of errors is zero, i.e., errors are not correlated with any regressors.
- (iii) Errors have the same variance (homoskedasticity).
- (iv) The observations on the independent variable are not stochastic but fixed in repeated samples without measurement errors.
- (v) The full rank assumption means that there is no linear relationship among independent variables (no multicollinearity).

If the state effect v_i is not zero in the longitudinal data, heterogeneity (regressors do not capture state-specific characteristics like institutional setting) may influence assumptions 2 and 3. In particular, disturbances may not have the same variance but vary across individuals (heteroskedasticity, a violation of 2) and/or be related to each other (autocorrelation, a violation of 3).

The violation of 2 makes random-effect estimators biased. Hence, the OLS estimator is no longer the best unbiased linear estimator. Then panel data models provide a way to deal with the problem.

The OLS is a pooled linear regression without fixed and/or random effects. It assumes a constant intercept and slopes regardless of the state and time period. In the panel data with 27 states and 11 time periods, the basic plan is that penetration, institutional setting,

social insurance and financial intermediation determine start-ups. The pooled OLS suggests no difference in intercept and slopes across states and time periods. The pooled OLS is performed under various combinations of the variables and with the log-log transformation (called log-log as the variables on both sides of the equations are transformed) as Table 13 shows.

Table 13 Pooled OLS—Results

Results OLS Regressions				Results LOG Regressions			
totnumbrstartupsPCA	Coef.	t	P> t	totnumbrstartupsPCA	Coef.	t	P> t
		Adj R-Sq = 0.2895 F = 29.80	0.000			Adj R-Sq = 0.2301 F = 22.12	0.000
Penetration2_Insavail2	0.0844	9.37	0.000	logPenetration2_Insavail2	0.29596	7.77	0.000
GastosSaudePercapita	0.0000	3.03	0.003	logGastosSaudePercapita	0.12801	3.64	0.000
MortHomicipermilhab	0.0000	-2.28	0.024	logMortHomicipermilhab	-0.01748	-0.30	0.761
_cons	0.0016	9.28	0.000	_cons	-5.20661	-19.20	0.000
		Adj R-Sq = 0.3327 F = 36.74	0.000			Adj R-Sq = 0.2957 F = 31.09	0.000
Penetration2_Insavail2	0.0808	7.83	0.000	logPenetration2_Insavail2	0.28681	7.38	0.000
GastosSaudePercapita	0.0000	2.03	0.044	logGastosSaudePercapita	0.08786	2.24	0.026
Taxtrabinf_2	-0.0024	-1.69	0.092	logTaxtrabinf_2	-0.13986	-2.70	0.008
_cons	0.0017	5.22	0.000	_cons	-5.44431	-24.79	0.000
		Adj R-Sq = 0.2904 F = 22.69	0.000			Adj R-Sq = 0.2414 F = 17.87	0.000
Penetration2_Insavail2	0.0703	4.54	0.000	logPenetration2_Insavail2	0.20908	3.66	0.000
GastosSaudePercapita	0.0000	2.63	0.009	logGastosSaudePercapita	0.12	3.56	0.000
MortHomicipermilhab	0.0000	-2.04	0.043	logMortHomicipermilhab	-0.01	-0.24	0.811
figdp	0.0039	1.12	0.265	logfigdp	0.18	2.03	0.044
_cons	0.0015	8.12	0.000	_cons	-5.07	-18.32	0.000
		Adj R-Sq = 0.3365 F = 28.25	0.000			Adj R-Sq = 0.3057 F = 24.67	0.000
Penetration2_Insavail2	0.0624	3.86	0.000	logPenetration2_Insavail2	0.20837	3.80	0.000
GastosSaudePercapita	0.0000	1.72	0.087	logGastosSaudePercapita	0.10	2.57	0.011
Taxtrabinf_2	-0.0025	-1.77	0.078	logTaxtrabinf_2	-0.12	-2.19	0.030
figdp	0.0054	1.48	0.141	logfigdp	0.18	2.01	0.046
_cons	0.0016	4.96	0.000	_cons	-5.28	-22.71	0.000
		Adj R-Sq = 0.3191 F = 20.87	0.000			Adj R-Sq = 0.3387 F = 22.72	0.000
Penetration2_Insavail2	0.0514	3.150	0.002	logPenetration2_Insavail2	0.1644908	3.05	0.003
GastosSaudePercapita	0.0000	2.290	0.023	logGastosSaudePercapita	0.1153892	3.53	0.001
MortHomicipermilhab	0.0000	-1.700	0.090	logMortHomicipermilhab	-0.0125197	-0.24	0.814
figdp	0.0129	2.880	0.004	logfigdp	0.5216038	5.03	0.000
interactioninsurancefin	-0.0087	-3.130	0.002	loginteractionInsfinFIPremiumGDP	-0.42	-5.62	0.000
_cons	0.0017	8.830	0.000	_cons	-5.484	-20.41	0.000
		Adj R-Sq = 0.3636 F = 25.56	0.000			Adj R-Sq = 0.3889 F = 28.37	0.000
Penetration2_Insavail2	0.0417	2.430	0.016	logPenetration2_Insavail2	0.169	3.25	0.001
GastosSaudePercapita	0.0000	1.150	0.251	logGastosSaudePercapita	0.0920329	2.48	0.014
Taxtrabinf_2	-0.0033	-2.340	0.020	logTaxtrabinf_2	-0.1152614	-2.33	0.021
figdp	0.0135	3.070	0.002	logfigdp	0.4774261	4.71	0.000
interactioninsurancefin	-0.0085	-3.160	0.002	loginteractionInsfinFIPremiumGDP	-0.39	-5.45	0.000
_cons	0.0020	5.870	0.000	_cons	-5.698934	-24.65	0.000
		Adj R-Sq = 0.6100 F = 56.26	0.000			Adj R-Sq = 0.6067 F = 55.50	0.000
Penetration2_Insavail2	-0.009	-0.710	0.481	logPenetration2_Insavail2	-0.058	-1.26	0.208
GastosSaudePercapita	0.000	3.710	0.000	logGastosSaudePercapita	0.1108108	4.4	0.000
MortHomicipermilhab	0.000	-3.070	0.002	logMortHomicipermilhab	-0.0725454	-1.75	0.081
figdp	0.008	2.420	0.016	logfigdp	0.2479288	2.98	0.003
interactioninsurancefin	-0.005	-2.360	0.019	loginteractionInsfinFIPremiumGDP	-0.23	-3.79	0.000
Dummy 1	-0.002	-12.470	0.000	Dummy 1	-0.6478476	-11.92	0.000
_cons	0.003	17.030	0.000	_cons	-6.193511	-28.72	0.000
		Adj R-Sq = 0.6212 F = 59.77	0.0000			Adj R-Sq = .6361 F = 63.63	0.000
Penetration2_Insavail2	-0.009	-0.610	0.539	logPenetration2_Insavail2	-0.054	-1.23	0.222
GastosSaudePercapita	0.000	4.280	0.000	logGastosSaudePercapita	0.1586527	5.43	0.000
Taxtrabinf_2	0.001	0.700	0.486	logTaxtrabinf_2	0.0490849	1.21	0.228
figdp	0.009	2.480	0.014	logfigdp	0.2677253	3.34	0.001
interactioninsurancefin	-0.005	-2.400	0.017	loginteractionInsfinFIPremiumGDP	-0.21	-3.76	0.000
Dummy 1	-0.002	-11.990	0.000	Dummy 1	-0.6596388	-11.98	0.000
_cons	0.003	10.370	0.000	_cons	-6.419091	-34.09	0.000

The log-log transformation of the variables is to meet statistical assumptions and permit the same scale that let the matrices of the fixed and random effects to work and to be compared using the Hausman test (Table 27 illustrates the interpretation of the log-log regression).

Looking at Table 13, penetration is almost always significant and with the expected sign, i.e., an increase in the penetration ratio leads to an increase in start-ups. Log penetration shows a similar pattern, i.e., significant and with the expected sign. However, as a dummy variable for the type of Brazilian state (i.e., North and Northeast, less developed; and South, Southeast and Center-West, more developed) is included, the penetration ratio, financial intermediation and the interaction between insurance and financial intermediation decline and, in some cases, become insignificant.

The institutional setting - represented by a proxy for the number of deaths by accident and violence per 100,000 people (*MortHomicpermil*) - is significant and with the expected negative sign (i.e., a decline of deaths by homicides implies an improvement of the institutional setting and generates incentives to start a business); the other proxy for the institutional setting (i.e., the rate of children at work—*Taxtrabinf_*) is also almost always significant and with the expected sign. In the normal regression and in the log regressions with the dummy, the two proxies become insignificant, except in one case.

The expenditure for social insurance (*Gasto público com saúde por habitante*) is significant and with a positive sign.

The variable for financial intermediation (*figdp*) is almost always significant and with the expected sign. The significance and direction of penetration ratio, financial

intermediation and interaction term between insurance and financial intermediation correspond to those of the study of Arena (2006, p. 13) on the role of the insurance market over economic growth, confirming the substitution between financial intermediation and insurance.

The dummy variable for state has a significant impact and in the expected direction, i.e., negative in the less developed states in the North and Northeast of Brazil, where the situation is less conducive to economic activity and start-ups. In case the dummy state is included, the coefficients of the other variables decline and the intercepts are highly significant. This circumstance indicates that the intercepts capture much unexplained variability.

The Ramsey test,⁹⁵ using powers of the fitted values of *Totnumberstartups* and *logTotnumberstartups* given that $p > 0.05$), shows that the models suffer from omitted variables in all the specification of Table 11, except for the log-log models, when a dummy variable is included, i.e., the last two models on the right side of Table 13. The Ramsey test for the basic model without financial intermediation - *totnumbrstartupsPCA Penetration2__Insavail2 GastosSaudePercapita MortHomicpermilhab (or Taxtrabinf_2)* – is that there are omitted variables, under both the normal and the log-log specification, except for the *logtotnumbrstartupsPCA logPenetration2__Insavail2 logGastosSaudePercapita logTaxtrabinf_2* under the log transformation, where the Ho of the Ramsey test that there are no omitted variables cannot be rejected.

⁹⁵ The Ramsey test's ability to test the specification of a possibly "short model" is limited to considering whether its "shortness" may be due to leaving out powers of *Xs*, interactions of *Xs*, etc., and does not really consider "omitted variables" in the broader sense (Wooldridge, 2008).

With respect to heteroskedasticity, the Breusch-Pagan/Cook-Weisberg test for heteroskedasticity indicates that there is homoscedasticity (no heteroskedasticity) in the log-log models,⁹⁶ and heteroskedasticity is present in the OLS models; i.e., for the log-log models, the null hypothesis (Ho) that the variance of the residuals is homogenous is not rejected.

In particular, for the basic model without financial intermediation,

$$\text{totnumbrstartupsPCA} = \text{Penetration2_Insavail2} + \text{GastosSaudePercapita} \\ + \text{MortHomicpermilhab (or Taxtrabinf_2)}$$

—there is no heteroskedasticity.

In any event, the most common response to the presence of heteroscedasticity is to use a heteroscedastically-robust estimator (e.g., robust option in Stata) and hypothesis tests are robust to heteroscedasticity.⁹⁷

Multicollinearity

As rule of thumb, a variable whose VIF (i.e., variance inflation factor) values are greater than 10 merits further investigation for multicollinearity. Tolerance, defined as $1/\text{VIF}$, allows checking the degree of collinearity; i.e., values below 0.1 are comparable to a VIF of 10. In general, the models of Table 13 do not present strong problems of multicollinearity. The results show a VIF below 2 for the model including *Penetration*,

96 For the last log-log model of Table 13: log model Breusch-Pagan/Cook-Weisberg test for heteroskedasticity.

Ho: Constant variance

Variables: fitted values of *logtotnumbrstartupsPCA*

chi2(1) = 0.04

Prob > chi2 = 0.8479 and we do not reject the Ho of constant variance and thus there is no heteroskedasticity.

97 The robust option implies a regression with robust standard errors to failure to meet assumptions concerning normality and homogeneity of variance of the residuals. In the case of the robust option, the value of the coefficients is still significant and with the expected sign.

GastosSaude~*a* and *MortHomicp*~*b* (or *Taxtrabinf_2*) also under the log-log transformation (first specification in Table 13). In the specification of the complete model (last two specifications of Table 13), multicollinearity constitutes a concern.

III. Fixed, Random and Between Effects

Given the theory behind the study and the Ramsey test, the analysis of fixed, random and between effects follows.

Based on the hypothesis of this study, and considering the results as shown in Table 13, the specification examined for fixed and random effects includes the dependent variable *Startups* and the independent variables *Penetration*, *Social insurance*, *Institutional setting*—model [a] below:

$$\log(\text{numbrstartupsPCA}) = \log(\text{Penetration2_Insavail2}) + \log(\text{GastosSaudePercapita}) + \log(\text{Taxtrabinf}) \quad [\text{a}]$$

a. Choosing Between Fixed and Random Effects

The Hausman test allows choosing between fixed and random effects. Statistically, fixed effects (FE) give consistent results, but not efficient. Random effects (RE) give better *p*-values and a more efficient estimator. The Hausman test checks a more efficient model against a less efficient but consistent model to validate that the more efficient model also gives consistent results (Princeton University, 2007).

Table 14 reports and compares the results for fixed and random effects.

Table 14 Fixed and Random Effects—Model [a]

Fixed and Random Effects								
logtotnumbrstartupsPCA	Fixed Effects				Random Effects			
	Coef.	Std.Err.	t	P> t	Coef.	Std.Err.	t	P> t
logPenetration2__Insavail2	0.0513	0.0437	1.1700	0.2430	0.0911	0.0392	2.3300	0.0200
logGastosSaudePercapita	-0.0093	0.0286	-0.3300	0.7450	-0.0208	0.0268	-0.7700	0.4390
logTaxrabinf_2	-0.1336	0.0485	-2.7600	0.0060	-0.1606	0.0457	-3.5100	0.0000
_cons	-6.1109	0.2875	-21.2600	0.0000	-5.9284	0.2663	-22.2600	0.0000

The Hausman test is applied to the two models of Table 14.

The null hypothesis (Ho) is that the coefficients estimated by the efficient random-effects estimator are the same as the ones estimated by the consistent fixed-effects estimator (Princeton University, 2007). If they are (i.e., insignificant p -value, Prob > chi2 larger than .05), then it is safe to use random effects. However, in case of a significant p -value, fixed effects should be preferred. In other words, the null hypothesis here is that the favored model is random effects vs. the alternative the fixed effects model (W. H. Greene, 2008, p. Chapter 9) (Torres-Reyna, 2011, p. 29). It tests whether the unique errors (u_i) are correlated with the regressors, i.e., under the Ho they are not.

The results of the Hausman test for the model [a] are as follows:

b = consistent under Ho and Ha; obtained from *xtreg*
 B = inconsistent under Ha, efficient under Ho; obtained from *xtreg*

Test: Ho: difference in coefficients not systematic:

$$\begin{aligned} \text{chi2 (3)} &= (b - B)'[(V_b - V_B)^{-1}](b - B) &= 1.56 \\ \text{Prob} > \text{chi2} &= 0.6691. \end{aligned}$$

Given that $p > 0.05$, small chi2, the Ho is not rejected, and the random-effects model is retained. Therefore, the Hausman test indicates that it is preferable to use that the random-effects model for the specification [a].

The rationale behind a random-effects model - differently from the fixed-effects model - is that the variation across the Brazilian states is assumed to be random and uncorrelated with the predictors or independent variables (x_{it}) included in the model; i.e., the error term is not correlated with the predictors. “The crucial distinction between fixed and random effects is whether the unobserved individual effect embodies elements that are correlated with the regressors in the model”(W. H. Greene, 2008, p. 183; Torres-Reyna, 2011, p. 25). Thus, with random effects, there are differences across entities that influence the dependent variable Start-ups.

The model tested does not include the variable for financial intermediation, which can be considered the unobserved effect that are different across entities and have an impact over the variable Start-ups.

b. Random over Pooled OLS

For the model

$$\text{Logtotnumbrstartups} = \text{logPenetration2_Insavail2} + \text{logGastosSaudePercapita} + \text{logTaxtrabinf} \quad [a]$$

the suitability of random effects with respect to Pooled OLS is tested.

The Breusch-Pagan Lagrange multiplier (LM) helps decide between a random-effects regression and a simple OLS regression (Torres-Reyna, 2011). The null hypothesis in the LM test is that variances across entities are zero; i.e., there is no significant difference across units (i.e., no panel effect).

Breusch and Pagan Lagrangian multiplier test for random effects
 $\text{logtotnumbrstartups}[\text{statebra},t] = Xb + u[\text{statebra}] + e[\text{statebra},t]$

Estimated results:

Test: Var (u) = 0.00
 chibar2 (01) = 432.76

$$\text{Prob} > \text{chibar2} = 0.0000$$

Thus, the H_0 is rejected and random effects are appropriate; i.e., there is evidence of significant differences across Brazilian states; therefore, random effects are preferred over the OLS regression.

c. Serial Correlation

Wooldridge test for autocorrelation in panel data.

H_0 : no first-order autocorrelation

$$F(1, 26) = 0.580$$

$$\text{Prob} > F = 0.4531.$$

The test shows that the H_0 that there is no first-order correlation cannot be rejected and we conclude that there is no serial autocorrelation.

d. Testing for cross-sectional

dependence/contemporaneous correlation

According to Baltagi (Baltagi, 2008), cross-sectional dependence is a problem in macro panels with a long time series (over 20–30 years). This is not much of a problem in micro panels (i.e., for few years and with a large number of cases). The null hypothesis in the Breusch-Pagan LM test of independence is that residuals across entities are not correlated.

Given that the data set has $N = 27$ and $T = 11$, then the test cannot be run since it requires $T > N$.

If the test is performed, the output is a singular matrix and the test cannot be performed.

Pasaran CD (cross-sectional dependence) is implemented to check if the residuals are correlated across different states (Torres-Reyna, 2011). Cross-sectional dependence can lead to bias in tests results (also called contemporaneous correlation). The null hypothesis is that residuals are not correlated:

Pesaran's test of cross-sectional independence = 20.049, Pr = 0.0000
Average absolute value of the off-diagonal elements = 0.448.

The results show that there is cross-sectional dependence, but given the size of the panels ($N = 27$ and $T = 11$) this should not be a problem.

e. Robustness

The term “robust regression” implies regression with robust standard errors (Yafee, 2012). In regression with robust standard errors, the estimates of the regression coefficients are the same as in the standard regression, but the estimates of the standard errors are robust to failure to meet assumptions concerning normality and homogeneity of variance of the residuals (UCLA: Statistical Consulting Group, 2007).

The results of the robust regression for the random-effects model [a]:

$Logtotnumbrstartups = logPenetration2_Insavail2 + logGastosSaudePercapita + logTaxtrabinf$

are reported in the Table 15.

Table 15 Random-Effects Robust

Random-Effects Robust						
Number of Obs.		216				
Group variable:		statebra		Number of Groups =	27	
R-sq :	within =	0.0457		Obs per group:	min =	8
	between =	0.2886			avg =	8
	overall =	0.2538			max =	8
					Wald chi2(3)=	43.73
corr(u_i Xb)= 0 (assumed)					Prob >chi=	0.000
logtotnumbrstartupsPCA	Coef.	Robust Std. Err.	z	P> z	[95% Conf. Interval]	
logPenetration2__Insavail2	0.091148	0.0351552	2.59	0.010	0.0222451	0.1600509
logGastosSaudePercapita	-0.0207631	0.0226042	-0.92	0.358	-0.0650665	0.0235404
logTaxtrabinf_2	-0.1605633	0.031324	-5.13	0.000	-0.2219571	-0.0991694
_cons	-5.928369	0.2342059	-25.31	0.000	-6.387404	-5.469333
sigma_u	0.31019041					
sigma_e	0.14684456					
rho	0.81692082	(fraction of variance due to u_i)				

In the random-effects model given above, following the theory, Penetration, Social Insurance and Institutional setting are considered the main independent variables that influence the dependent variable Start-ups. Table 15 shows that Penetration and Institutional setting are significant and with the expected sign. Social insurance has a negative but not significant impact on start-ups. The interpretation of the coefficients includes effects from both the within-state and between-state. For this investigation, the coefficient represents the average effect of X (*Penetration*) over Y (*Start-ups*) when X (*Penetration*) changes across time and between states by one unit. In addition, given the log-log transformation, the interpretation of the coefficients follows what is indicated in note 73 above in this chapter (Torres-Reyna, 2011).

The problem is that some variables may not be available; therefore, there is some omitted variable bias in the model.

IV. Further Fixed- and Random- Effects Models

Model [b] - Start-ups, Penetration, Social Insurance, Institutional setting, financial intermediation and the interaction term between insurance and financial intermediation - is examined.

This model is a more complete as it uses all the variables considered relevant.

Model [b] is equivalent to model [a], with the addition of the financial intermediation and the interaction term (insurance and financial intermediation):

$$\log \text{totnumbrstartupsPCA} = \log \text{Penetration2_Insavail2} + \log \text{GastosSaudePercapita} \\ + \log \text{Taxtrabinf_2} + \log \text{figdp} \log \text{interactionInsfinFIPremiumGDP}$$

[b]

Model [b] can be written with the variable $\log \text{MortHomicpermilhab}$ for the institutional setting instead of the variable $\log \text{Taxtrabinf_2}$.

Model [b] can be analyzed without the log transformation:

$$\text{totnumbrstartupsPCA} = \text{Penetration2_Insavail2} + \text{GastosSaudePercapita} + \text{Taxtrabinf_2} \text{figdp} \\ + \text{interactioninsurancefin} \quad [\text{bnolog}]$$

Model [bnolog] can be looked at with the variable $\log \text{MortHomicpermilhab}$ for the institutional setting instead of the variable $\log \text{Taxtrabinf_2}$.

Table 16 reports and compares the results for fixed and random effects.

Table 16 Fixed- and Random-Effects Models [b and b1]

logtotnumbrstartupsPCA	Fixed Effects			Random Effects		
	Coef.	t	P> t	Coef.	t	P> t
logPenetration2__Insavail2	0.066	1.470	0.142	0.092	2.170	0.030
logGastosSaudePercapita	-0.005	-0.190	0.850	-0.014	-0.500	0.616
logTaxtrabinf_2	-0.124	-2.540	0.012	-0.157	-3.430	0.001
logfigdp	-0.107	-0.780	0.438	0.116	0.980	0.326
loginteractionInsfinFIPremiumGDP	-0.031	-0.250	0.804	-0.184	-1.750	0.081
_cons	-6.443	-17.840	0.000	-6.148	-19.330	0.000
logPenetration2__Insavail2	0.005	0.140	0.891	0.032	0.820	0.411
logGastosSaudePercapita	-0.055	-2.280	0.024	-0.056	-2.380	0.017
logMortHomicpermilhab	0.018	0.290	0.770	0.044	0.760	0.445
logfigdp	-0.049	-0.420	0.676	0.132	1.230	0.219
loginteractionInsfinFIPremiumGDP	-0.048	-0.430	0.668	-0.189	-1.890	0.059
_cons	-6.202	-18.300	0.000	-6.026	-18.610	0.000
Penetration2__Insavail2	0.003	0.220	0.828	0.009	0.73	0.463
GastosSaudePercapita	0.000	-2.140	0.033	0.000	-1.79	0.073
MortHomicpermilhab	0.000	-0.440	0.661	0.000	-0.13	0.895
figdp	-0.001	-0.170	0.865	0.004	1.04	0.298
interactioninsurancefin	-0.001	-0.210	0.830	-0.005	-1.31	0.191
_cons	0.003	11.940	0.000	0.002	9.41	0
Penetration2__Insavail2	0.012	0.83	0.410	0.018	1.270	0.202
GastosSaudePercapita	0.000	1.19	0.235	0.000	1.040	0.297
Taxtrabinf_2	-0.002	-1.94	0.054	-0.003	-2.380	0.017
figdp	-0.001	-0.16	0.874	0.006	1.170	0.243
interactioninsurancefin	-0.004	-0.77	0.442	-0.007	-1.740	0.081
_cons	0.003	9.89	0.000	0.003	8.430	0.000

The Hausman test allows choosing between the fixed and the random effects.

In the case of the log-log model, under the two specifications with *logTaxtrabinf_2*, or with the variable *logMortHomicpermilhab*, the results of the Hausman test tell us not to reject the Ho (difference in coefficients not systematic):

$$\begin{aligned} \text{chi2 (3)} &= (\mathbf{b}-\mathbf{B})'[(\mathbf{V}_b-\mathbf{V}_B)^{-1}](\mathbf{b}-\mathbf{B}) &= 10.05 \\ \text{Prob}>\text{chi2} & &= 0.0739 \end{aligned}$$

With the variable *logTaxtrabinf_2*;

and

$$\begin{aligned} \text{chi2 (3)} &= (b - B)'[(V_b - V_B)^{-1}](b - B) = 5.39 \\ \text{Prob} > \text{chi2} &= 0.0739 \end{aligned}$$

with the variable *logMortHomicpermilhab*.

Given that the $p > 0.05$, small chi2, the H_0 is not rejected and based on the results of the Hausman test, the best model - under the specification with the financial intermediation and interaction variables - is the random-effects model (as it is the case for the basic model; see Table 16).

Thus, as in the basic case of Table 16, the rationale behind a random-effects model is that the variation across the Brazilian states is assumed to be random and uncorrelated with the predictors or independent variables (x_{it}) included in the model; i.e., the error term is not correlated with the predictors.

Post estimation tests conducted on the random-effects model:

$$\begin{aligned} \text{logtotnumbrstartupsPCA} &= \text{logPenetration2_Insavail2} + \text{logGastosSaudePercapita} \\ &\quad \text{logTaxtrabinf_2} + \text{logfigdp} + \\ &\quad \text{loginteractionInsfinFIPremiumGDP} \end{aligned}$$

also with the variable *logMortHomicpermilhab* for the institutional setting.

a. Serial Correlation

Performing the test for autocorrelation in both specifications, we cannot reject the H_0 that there is no autocorrelation.

Wooldridge tests for autocorrelation in panel data

$$\begin{aligned} H_0: &\text{ no first-order autocorrelation} \\ F(1, 26) &= 0.924 \\ \text{Prob} > F &= 0.3452 \end{aligned}$$

H0: no first-order autocorrelation
 F (1, 26) = 0.201
 Prob > F = 0.6577

for the variable *logTaxtrabinf_2* and the variable *logMortHomicpermilhab*, respectively. The test shows that the Ho that there is no first-order correlation cannot be rejected, and there is no serial autocorrelation.

b. Robustness

The robust version of the random-effects for model [b]:

$$\text{logtotnumbrstartupsPCA} = \text{logPenetration2_Insavail2} + \text{logGastosSaudePercapita} \\ + \text{logTaxtrabinf_2} + \text{logfigdp} + \text{loginteractionInsfinFIPremiumGDP}$$

is reported in Table 17.

Table 17 Random-Effects Robust Version—Model [b]

Random Effects - Robust						
Number of Obs. =	216					
Group variable =	statebra		Number of groups =	27		
R-sq:	within	=	0.0472	Obs per group	min =	8
	between	=	0.3923		avg =	8
	overall	=	0.3438		max =	8
					Wald Chi2	64.66
	corr(u_i Xb) =	0	Assumed		Prob>F =	0.00
(Std. Err. Adjusted for 27 clusters in statebra)						
logtotnumbrstartupsPCA	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
logPenetration2_Insavail2	0.09201	0.03726	2.47	0.01	0.01897	0.16504
logGastosSaudePercapita	-0.01362	0.02390	-0.57	0.57	-0.06046	0.03321
logTaxtrabinf_2	-0.15682	0.02881	-5.44	0.00	-0.21330	-0.10034
logfigdp	0.11607	0.08942	1.3	0.19	-0.05918	0.29133
loginteractionInsfinFIPremiumGDP	-0.18353	0.08386	-2.19	0.03	-0.34790	-0.01916
_cons	-6.14777	0.23226	-26.47	0.00	-6.60299	-5.69255
sigma_u		0.3077455				
sigma_e		0.1466769				
rho =	0.81488679 (fraction of variance due to u_i)					

The penetration ratio is significant and with the expected sign. The institution setting (*logTaxtrabinf_2*) is significant and with the expected sign. Social insurance is negative but highly insignificant. Financial intermediation is positive, but not significant. The interaction term between insurance and financial intermediation is significant. As noted above, in line with what Arena (Arena, 2006) found in his study on the relationship between insurance and economic growth, the coefficient of the interaction term is negative. Thus as Arena (2006, pp. 12–16) shows in his study, the results suggest that financial intermediation (in the case of Brazil, the variable of financial intermediation does not include the stock market) and insurance measures (life and non–life premiums to GDP) are substitutes rather than complements.

The interpretation of the coefficients of the regressors, in a random-effects model, takes into account effects from both the within-entity and between-entity; i.e., it represents the average effect of *X* (*Penetration*) over *Y* (*Start-ups*) when *X* (*Penetration*) changes across time and between states by one single unit. The interpretation of the coefficients in this case follows the rules of log-log transformation (Table 27).

Adding an interaction between penetration and states does not change the model significantly, only pulling up the coefficient of penetration. This implies that there is no apparent pattern of penetration related to the states.

c. Between Effects Model

To further the analysis, a between-effects (BE) model is reviewed. The BE model is used to control for omitted variables that change over time but are constant between Brazilian states. It allows using the variation between Brazilian states to estimate the effect of the omitted independent variables on the dependent variable.

Table 18 The Between-Effects Model

Between Effects Regression						
Number of Obs. =	239					
Group variable:	statebra		Number of groups =		27	
R-sq:	within	=	0.0043	Obs per group	min =	8
	between	=	0.5493		avg =	8
	overall	=	0.3078		max =	8
					F(5,21)=	5.12
sd(u_i+avg(e_i)):	0.3120842				Prob>F =	0.0032
logtotnumbrstartups	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
logPenetration2__Insavail2	0.4296997	0.2023629	2.12	0.046	0.0088631	0.8505363
logGastosSaudePercapita	0.3778802	0.1686341	2.24	0.036	0.0271865	0.728574
logTaxrabinf_2	0.1260679	0.1810499	0.7	0.494	-0.2504459	0.5025817
logfigdp	0.3402745	0.3111171	1.09	0.286	-0.3067288	0.9872779
loginteractionInsfnFIPremiumGDP	-0.2942279	0.1974093	-1.49	0.151	-0.7047631	0.1163072
_cons	-5.36098	0.6515127	-8.23	0	-6.715875	-4.006085

The BE model answers the question: What is the expected *difference* between two Brazilian states (e.g., São Paulo and Ceara) if their penetration ratio differs by 1?

The FE answers the question: What is the expected *change* between two Brazilian states (e.g., São Paulo and Ceara) if its penetration ratio increases by 1?

In other words, BE looks at the effect of penetration ratio when the penetration ratio changes between states. This can be compared with the results for *xtreg, FE*, which answers the question about the effect of penetration ratio when penetration ratio changes within state.

The between-effects model confirms the impact of penetration—significant—on start-ups. The model confirms the finding of Arena (Arena, 2006) about the interaction among penetration, financial intermediation and the interaction term and the substitution between insurance and financial intermediation. The dummy variable—if included in the model—is significant and with the expected sign (i.e., the less developed Brazilian states of the North and the Northeast present a negative sign, contrasted with the more advanced Brazilian states of the South that have 0). In presence of the dummy, penetration becomes insignificant. Social insurance is always significant and with the positive sign (i.e., social insurance has a favorable impact on start-ups).

V. Instrumental Variables and Dynamic Panel-Data Models

The investigation can advance further introducing instrumental variables (IV) and dynamic panel data with simultaneous equations.

Instrumental variables are normally used to deal with the issue of endogeneity and causal relationship. An instrument is a variable that does not itself belong in the explanatory equation and is correlated with the endogenous explanatory variables, conditional on the other covariates. Instruments are (1) uncorrelated with the error terms and (2) correlated with the independent variable (University of California, 1999).

Instrumental measures for the study are financial intermediation (measured by *figdp*); interaction term of insurance and financial intermediation (measured by *logintinsurfin*, *loginteractioninsurancefin* *loginteractionInsfinFIPremiumGDP*); knowledge of insurance markets (measured by density, i.e., premiums over population); and propensity to buy insurance and risk aversion (measured by *PropIns22* and *PropenInsurance3*) included in Equation 2. Table 19 describes the correlation between the instruments and the main independent variable insurance penetration. An instrument is expected to be correlated with the independent variables and not with the errors.

Table 19 Correlations between Instruments and the Independent Variable (Insurance Penetration)

Correlations between Instruments and Independent variable (insurance penetration)												
Variables	Penetr~2	logPen~2	figdp	logfigdp	intera~n	logint~P	Density	logDen~y	PropI~22	logPr~22	Propen~3	logPro~3
Penetratio~2	1											
logPenetra~2	0.9125	1										
figdp	0.4469	0.4047	1									
logfigdp	0.6909	0.6781	0.8093									
interactio~n	0.2454	0.2544	0.9145	0.666	1							
loginterac~P	0.3416	0.4073	0.6596	0.7321	0.8099	1						
Density	0.721	0.6342	0.4386	0.6473	0.2596	0.3579	1					
logDensity	0.8213	0.8794	0.4261	0.6937	0.272	0.4127	0.7978	1				
PropIns22	-0.3661	-0.2621	-0.2386	-0.2483	-0.1075	-0.0193	-0.5155	-0.5598		1		
logPropIns22	-0.435	-0.3217	-0.3022	-0.3141	-0.1465	-0.047	-0.6365	-0.6135	0.9671	1		
PropenInsu~3	0.4247	0.3339	0.399	0.4143	0.2905	0.2308	0.7223	0.6711	-0.87	-0.9103	1	
logPropenI~3	0.4047	0.3191	0.3572	0.3785	0.2541	0.2008	0.6605	0.6619	-0.8999	-0.9121	0.9901	1

Based on the results for the section on fixed and random effects, the basic model is random effects (see section above, Table 15):

$$\text{Start-ups} = \text{Penetration} + \text{Social Insurance} + \text{Institutional Setting.}$$

This corresponds to:

$$\log\text{totnumbrstartupsPCA} = \log\text{Penetration2} + \log\text{Insavail2} + \log\text{GastosSaudePercapita} + \log\text{Taxtrabinf}_2 \text{ (or } \log\text{MortHomicpermilhab)}$$

The instrument variable and the system of simultaneous equations are instrumental for verifying the endogeneity of the penetration ratio and related it to instruments, i.e., financial intermediation and interaction (fi and $logintinsurf$), propensity ($PropIns22$ and $PropenInsurance3$) and availability of insurance ($density$).

Two static estimators, i.e., $xtivreg$ and $xthtaylor$, and a dynamic estimator $xtabond$ (or $xtabond2$) are used.

a. The $xtivreg$ Estimator

The $xtivreg$ estimator (Stata, 2012b) offers five different estimators, including one with the random-effects option, for fitting panel data models in which some of the right-hand-side covariates are endogenous with instrumental variables (Stata, 2012b). The estimators are two-stage least-squares generalizations of simple panel data estimators for exogenous variables.

Table 20 Correlations Variables and Residuals

Correlations Variables and Residuals RE (res2)												
Variables	res2	logMor~b	logPr~22	logPro~3	logDen~y	logGas~a	logint~a	logint~P	logtot~A	logint~n	logPen~2	logfigdp
res2	1											
logMortHom~b	0.3883	1										
logPropIns22	-0.6985	-0.2208	1									
logPropenI~3	0.7648	0.3161	-0.9294	1								
logDensity	0.7235	0.268	-0.6648	0.7193	1							
logGastosS~a	0.2481	0.2086	-0.3678	0.5193	0.1033	1						
loginterin~a	0.476	0.0525	-0.2574	0.2537	0.7824	-0.3982	1					
loginterac~P	0.2892	0.0526	0.0757	0.0776	0.3513	-0.1522	0.4369	1				
logtotnumb~A	0.4692	0.1165	-0.6505	0.5989	0.6103	0.1203	0.3166	0.0234	1			
logintinsu~n	0.5903	0.1511	-0.3623	0.4021	0.882	-0.2317	0.9338	0.5373	0.473	1		
logPenetra~2	0.574	0.1692	-0.3907	0.4227	0.9042	-0.2341	0.934	0.4235	0.4512	0.9654	1	
logfigdp	0.5264	0.0982	-0.2599	0.3066	0.7101	-0.1921	0.79	0.6419	0.4361	0.9034	0.7603	1

Penetration is endogenous and determined by financial intermediation, risk aversion (or propensity to buy insurance) and knowledge and diffusion of insurance. The random-effects model to test is:

```
xtivreg logtotnumbrstartupsPCA logGastosSaudePer capita logTaxtrabinf_2  
(logPenetration2__Insavail2 = logfigdp logPropIns22 logDensity), re first vce  
[xtivreg]
```

In the regression **[xtivreg]**, *logPenetration2__Insavail2* is the instrumented variable and *logfigdp logPropIns22 logDensity* are the instruments.

Table 21 Results for the Instrumental Variable—xtivreg

First-stage G2SLS Regression						
			Number of obs =	215		
			Wald chi(5) =	1604		
			Prob> chi2 =	0.000		
logPenetration2__Insa-2	Coeff.	Std. Err.	z	P> z	[95% Conf. interval]	
logGastosSaudePercapita	-0.24611	0.02395	-10.28	0.000	-0.29305	-0.19917
logTaxrabinf_2	0.04993	0.03262	1.53	0.126	-0.01400	0.11386
logfigdp	0.10439	0.05498	1.90	0.058	-0.00337	0.21214
logPropIns22	0.32234	0.06444	5.00	0.000	0.19604	0.44865
logDensity	0.68337	0.02182	31.32	0.000	0.64060	0.72613
_cons	-6.89147	0.27517	-25.04	0.000	-7.43080	-6.35214
G2SLS random effects regression						
				Number of obs. =	215	
Group variable :	statebra			Number of groups =	27	
R-sq:	within =	0.0415		Obs per group	min =	7
	between =	0.2915			avg =	8
	overall =	0.2554			max =	8
					Wald Chi2 (3) =	18.16
corr(u_i, X)= 0 (assumed)					Prob> Chi=	0.0004
logtotnumbrsstartupsPCA	Coeff.	Std. Err.	z	P> z	[95% Conf. interval]	
logPenetration2__Insavail2	0.10801	0.04269	2.53	0.011	0.02434	0.19169
logGastosSaudePercapita	-0.02742	0.02734	-1.00	0.316	-0.08101	0.02618
logTaxrabinf_2	-0.16321	0.04585	-3.56	0.000	-0.25308	-0.07334
_cons	-5.82478	0.28385	-20.52	0.000	-6.38112	-5.26844
sigma_u	0.31274					
sigma_e	0.14674					
rho	0.81957	(fraction of variance due to u_i)				
Instrumented:		logPenetration2__Insavail3				
Instruments:		logGastosSaudePercapita, logTaxrabinf_2, logfigdp, logPropIns22, logDensity				

In the IV estimation, *xtoverid* conducts a test on whether the excluded instruments are valid IVs or not (i.e., whether they are uncorrelated with the error term and correctly excluded from the estimated equation) (Indiana University, 2012). According to the

result, the H_0 is not rejected, and therefore the instruments are valid and uncorrelated with the error term.⁹⁸

Running the Sargan test, *xtoverid*
Test of overidentifying restrictions:
Cross-section time-series model: *xtivreg g2sls*
Sargan-Hansen statistic 5.161 Chi-sq (2) p -value = 0.0758

Table 21 shows that the significance and sign of the coefficients are those expected. With respect to the second-stage regression (G2SLS random effects regression with start-ups as the dependent variable, insurance (penetration) has a positive impact on start-ups.

Social insurance has a negative impact on start-ups, but it is not significant, even though social insurance is highly significant and with the negative sign with respect to penetration (see the first-stage regression on Table 21).

Institutional setting has a positive significant effect on start-ups and with the expected sign.

In the first-stage equation (first-stage G2SLS regression), social insurance is highly significant and the increase of social insurance leads to a decline of regular insurance measured by penetration; financial intermediation is significant at the 7.5% level; propensity to buy insurance, or risk aversion, is positive (less risk aversion favors start-ups) and significant; and knowledge of insurance (density) is highly significant.

However, if a dummy is included, penetration becomes insignificant, meaning that many explanations are still at the individual state level.⁹⁹

98 Rejection implies that some of the IVs are not valid.

99 *xtivreg logtotnumbrstartupsPCA logGastosSaudePercapita logTaxtrabinf_2 Dummy1 (logPenetration2 __Insavail2= logfigdp logPropIns22 logDensity), re first*

Test of over-identifying restrictions:

Cross-section time-series model: *xtivreg g2sls* Sargan-Hansen statistic 1.933 Chi-sq (2); p -value = 0.3804.

Including different variables for the interaction between insurance and financial intermediation, e.g., *loginteractionInsfinFIPremiumGDP*, and for the propensity to buy insurance and risk aversion, e.g., *logPropenInsurance3*, gives similar results.¹⁰⁰

The Hausman test also indicates that the random-effects model is preferred to the fixed-effects model.

b. The *xthtaylor* Estimator

The analysis has shown that the states constitute a significant factor. When a fixed-effects (FE) model is assumed in panel data, the FE or FD (first difference) methods provide consistent estimates only for time-varying regressors but not for time-invariant regressors; i.e., the time-invariant regressors are automatically deleted and they cannot be estimated by ordinal methods like FE.

The random-effects models analyzed so far (Tables 15 and 17) have examined the impact of states. However, a dummy for states has not been included in the basic models of Tables 15 and 17. We can use the Hausman-Taylor estimator, *xthtaylor*, a transformed RE model with IVs (Rabe-Hesketh & Skrondal, 2012),¹⁰¹ to distinguish between time-varying and time-invariant regressors.

The model for the *xthtaylor* estimator is:

xthtaylor *logtotnumbrstartupsPCA logPenetration2__Insavail2 logGastosSaudePer capita logintinsurfin logPropenInsurance3 Dummy1, endog (logPenetration2__Insavail2 logintinsurfin logPropenInsurance3)* **[*xthtaylor*]**

100 **xtivreg** *logtotnumbrstartupsPCA logTaxtrabinf_2 logGastosSaudePer capita (logPenetration2__Insavail2 = logGastosSaudePer capita logPropenInsurance3 loginteractionInsfinFIPremiumGDP logDensity), re first xtoverid*

Test of over-identifying restrictions:

Cross-section time-series model: *xtivreg g2sls*

Sargan-Hansen statistic 2.880 Chi-sq (2); *p*-value = 0.2370.

101 Indiana University (2011).

The above example models *logtotnumbrstartupsPCA* using a number of regressors, where *logGastosSaudePercapita*, *logTaxtrabinf_2* and *logPropenInsurance3* are exogenous time-varying regressors; *logPenetration2__Insavail2* and *logintinsurfin* are endogenous time-varying regressors; *Dummy1* is an exogenous time-invariant regressor; and *logPropenInsurance3* can be regarded as an endogenous time-invariant regressor.

Time-invariant variables such as *Dummy1* and *logPropenInsurance3* can be consistently estimated with the *xthtaylor* estimator as well as *logPenetration2__Insavail2* and *logintinsurfin*, which are endogenous time-varying regressors. In particular, when determining the impact of *logPropenInsurance3* on *logtotnumbrstartupsPCA*, the Hausman-Taylor method consistently estimates the coefficient of *PropenInsurance3*, the time-invariant endogenous variable.

This *xthtaylor* estimator needs a stronger assumption that a specified subset of the regressors (IVs) is uncorrelated with the fixed effect or individual effect terms (a_i), and that all regressors are uncorrelated with the idiosyncratic error terms (e_{it})¹⁰²

102 Indiana University (2011).

Table 22 Correlations of Variables and Residuals

Correlations Variables and Residuals FE								
Variables	logtot~A	logPen~2	logGas~a	logTax~2	logint~n	logPro~3	Dummy1	resfe
logtotnumb~A	1							
logPenetra~2	0.4504	1						
logGastosS~a	0.1521	-0.2013	1					
logTaxrab~2	-0.3542	-0.1902	-0.4916	1				
logintinsu~n	0.4714	0.9642	-0.2101	-0.2219	1			
logPropenI~3	0.6116	0.4248	0.5326	-0.745	0.4042	1		
Dummy1	-0.7421	-0.6723	0.1185	0.3509	-0.6815	-0.6205	1	
resfe	0.1754	0.2558	0.3301	-0.8227	0.147	0.553	-0.2277	1

The assumptions can be checked running a correlation among the residuals FE and the variables of interest (Table 22).

The assumptions are tested with the `xtoverid`¹⁰³, i.e., to test whether the excluded instruments are valid IVs or not (i.e., whether they are uncorrelated with the error term and correctly excluded from the estimated equation):

Test of over identifying restrictions:
 Cross-section time-series model: `xthtaylor htaylor`
 Sargan-Hansen statistic 2.275 Chi-sq (3); p-value = 0.1314

According to the result, the H_0 is not rejected, and therefore the instruments are valid and uncorrelated with the error term¹⁰⁴.

¹⁰³ (Indiana University 2012)

¹⁰⁴ The Sargan–Hansen test of over identifying restrictions should be performed routinely in any over identified model estimated with IV techniques. IV techniques are powerful, but if a strong rejection of the null hypothesis of the Sargan–Hansen test is encountered, one should strongly doubt the validity of the estimates.

Table 23: Results for the Instrumental Variable—*xthtaylor*

Hausman-Taylor Estimation			Number of obs. =		228	
Group variable :	statebra			Number of groups =	27	
				Obs per group	min =	7
					avg =	8.4
					max =	9
Random effects $u_i \sim$ i.i.d.				Wald Chi2 (3) =	51.34	
				Prob> Chi=	0.000	
logtotnumb~A	Coeff.	Std. Err.	z	P> z	[95% Conf. interval]	
TVexogenous						
logGastosS~a	-0.03092	0.02847	-1.09	0.278	-0.08672	0.02488
TVendogenous						
logPenetra~2	0.20214	0.09578	2.11	0.035	0.01441	0.38987
logintinsu~n	-0.18496	0.07650	-2.42	0.016	-0.33489	-0.03502
logPropenI~3	0.40358	0.18587	2.17	0.030	0.03928	0.76788
Tlexogenous						
Dummy1	-0.63019	0.12053	-5.23	0.000	-0.86643	-0.39394
_cons	-6.78146	0.41092	-16.5	0.000	-7.58684	-5.97608
sigma_u	0.25301					
sigma_e	0.14476					
rho	0.75337	(fraction of variance due to u_i)				
Note:	TV refers to time varying; TI refers to time invariant.					

The output of the *xthtaylor* (Table 23) shows the exogenous and endogenous variables as defined.

Penetration is significant and with the expected positive sign, which implies a positive impact on start-ups.

The interaction between financial intermediation and insurance is significant and with the negative sign, as we found in Arena (2006). Social insurance has a negative sign but it is not significant.

Social insurance has a negative sign but is not significant.

The variable for the institutional setting (*logTaxtrabinf_2*) is not included in the Table 23 because it represents the institutional setting, which is already included in the model with *logPropenInsurance3* and also with *Dummy1*. In fact, the inclusion of the institutional setting (*logTaxtrabinf_2*) reduces the coefficient of penetration and interaction between financial intermediation and insurance while both remain significant.

It is interesting to note that the propensity to buy insurance (*logPropenInsurance3*), measured by the level of education, can be considered as an exogenous variable in the model and still the assumptions are tested (with the *xtoverid*) whether the excluded instruments are valid IVs or not, i.e., whether they are uncorrelated with the error term and correctly excluded from the estimated equation.¹⁰⁵

Dummy1 variable is significant and with the expected sign, which indicates the role that states play for insurance and entrepreneurship.

c. The *xtabond* Estimator

The *xtabond* is a dynamic estimator as it transforms the model in first differences (Mileva, 2007). If a variable *x* is an explanatory variable of the model (whether exogenous or predetermined) - *xtabond* - takes it in first differences and the variable actually recognized by the test is *D.x*. The Arellano-Bond estimator is also designed for small-*T*, large-*N* panels. In large-*T* panels, a shock to the country's fixed effects, which shows in the error term, will decline with time. The model can be executed with the original syntax *xtabond* or using the *xtabond2* (Roodman, 2006).

¹⁰⁵The specification is: *xhtaylor logtotnumbrstartupsPCA logPenetration2 __Insavail2 logGastosSaudePerCapita logintinsurfin logTaxtrabinf_2 logPropenInsurance3 Dummy1, endog (logPenetration2 __Insavail2 logintinsurfin)* where *logPropenInsurance3* is considered exogenous. The Sargan-Hansen statistic is 5.964 Chi-sq (3); *p*-value = 0.1134, which means that the *H*₀ is not rejected and the IV are valid and uncorrelated with the error term.

The model below examines the impact of insurance on start-ups using the Brazilian data set:

*xtabond2 logtotnumbrstartupsPCA l.logtotnumbrstartupsPCA
logPenetration2__Insavail2 logGastosSaudePercapita logTaxtrabinf_2 logintinsurfin*

[xta1]

written with the Stata syntax and for the use of the *xtabond2* estimator:

*xtabond2 logtotnumbrstartupsPCA l.logtotnumbrstartupsPCA logPenetration2__Insavail2
logGastosSaudePercapita logintinsurfin logTaxtrabinf_2, gmmstyle (logPenetration2__Insavail2
logintinsurfin logtotnumbrstartupsPCA) iv (logTaxtrabinf_2 logPropIns22 logDensity Year)
nolevel twostep robust*

[xta2]

The command *xtabond2* is followed by the dependent variable (*totnumbrstartups*) and the list of all right-hand-side variables, which includes the lag of *logTotnumberstartupsPCA*. After the comma, there are two lists of variables: (i) *gmm (Penetration2__Insavail2, figdp, density)* lists the endogenous variables, which are instrumented with GMM-style instruments, i.e., lagged values of the variables. The second list of explanatory variables, *iv, lists all exogenous variables (Taxtrabinf_2 GastosSaudePercapita)* as well as the additional instrumental variables, which are not part of the equation and, therefore, are not listed before the comma in the Stata command; i.e., for the included exogenous variables the option tells Stata to use the variables themselves as their own instruments (Mileva, 2007).

In the equation above [xta2], *logtotnumbrstartupsPCA* is the log of the number of start-ups in percentage; *l.logtotnumbrstartupsPCA* is its lagged value; *logPenetration2__Insavail2* is the log of the penetration ratio; *logGastosSaudePercapita* is the log of expenditures for social insurance, an independent variable. *Logintinsurfin* is

the log of the interaction between financial intermediation and insurance. *LogTaxtrabinf_2* is a control variable, which measures the institutional setting.

After the comma, two lists of variables are listed: `gmm ()` (or `gmmstyle ()`) lists the endogenous variables (*logPenetration2 __Insavail2 logintinsurfin logtotnumbrstartupsPCA*), which are instrumented with GMM-style instruments, i.e., lagged values of the variables in levels.

The second list of explanatory variables, `iv (variables)` (or `ivstyle (variables)`), lists all strictly exogenous variables (*logTaxtrabinf_2 logPropenInsurance3 logDensity Year*) as well as the additional instrumental variables (*logPropenInsurance3 logDensity*), which are not part of equation [xta1] and, therefore, are not listed before the comma in the Stata command. This option for the included exogenous variables tells Stata to use the variables themselves as their own instruments.

Table 24 Results for the Instrumental Variable—xtabond

Dynamic panel-data estimation Two steps difference GMM						
Group variable :	statebra			Number of obs. =	187	
Time variable :	Year			Number of groups =	27	
Number of instruments =	182			Obs per group		
Wald Chi2 (3) =	14.93			min =	6	
Prob> Chi =	0.011			avg =	6.93	
				max	7	
logtotnumb-A	Coeff.	Corrected Std. Err.	z	P> z	[95% Conf. interval]	
L1.logtotnumbrstartupsPCA	0.08280	0.14163	0.58	0.559	-0.19479	0.36039
logPenetration2__Insavail2	0.21205	0.09544	2.22	0.026	0.02500	0.39910
logCastosSaudePercapita	-0.00670	0.02554	-0.26	0.793	-0.05677	0.04337
logintinsurfin	-0.13799	0.08798	-1.57	0.117	-0.31042	0.03444
logTaxrabinf_2	-0.11346	0.03810	-2.98	0.003	-0.18814	-0.03878
Instruments for first difference equation						
Standard						
D.(logTaxrabinf_2, logPropIns22, logDensity, Year)						
GMM-type (missing=0 separate instrument for each period unless collapsed)						
L(1/16).(logPenetration2__Insavail2, logintinsurfin logtotnumbrstartupsPCA)						
Arellano-Bond test for AR(1) in first difference	z =	-2.15	Pr>z	0.032		
Arellano-Bond test for AR(1) in first difference	z =	0.94	Pr>z	0.347		
Sargan test of overid restrictions (Not robust but not weakened by many instruments):	chi2(177) =	190.36	Prob >chi2 =	0.233		
Hansen test of overid restrictions (Not robust but not weakened by many instruments):	chi2(177) =	25.9	Prob>chi12 =	1.000		
Difference-in-Hansen tests of exogeneity of instrumens subsets iv(logTaxrabinf_2, logPropIns22, logDensity, Year):						
Hansen test excluding group	chi2(173) =	25.96	Prob>chi2 =	1.000		
Difference (null H= exogenous)	chi2(4) =	-0.06	Prob>chi2 =	1.000		

According to the Table 24, penetration is significant and with the expected positive sign, which implies that insurance has a positive impact on start-ups. The interaction between insurance and financial intermediation has a negative sign implying complementarity, but it is not significant. The institutional setting is significant and with the expected sign. Social insurance is negative, but not significant.

The Wald test rejects the Ho that all regressors are equal to 0.

The output reports three additional tests: Sargan test, AR (1) and AR (2) tests.

The Sargan test has a null hypothesis of “the instruments as a group are exogenous” (Baum, 2006, p. 201). Therefore, the higher the p -value of the Sargan statistic the better it is. This is the case in Table 24.

In robust estimation, Stata reports the Hansen J -statistic instead of the Sargan with the same null hypothesis (Mileva, 2007).

The Arellano-Bond test for autocorrelation has a null hypothesis of no autocorrelation and is applied to the differenced residuals. The test for AR (1) process in first differences usually rejects the null hypothesis, but this is expected since the differences include the errors. In the case of the model, the first order of autocorrelation cannot be rejected (Mileva, 2007).

The test for AR (2) in first differences is more important because it will detect autocorrelation in levels and the autocorrelation is rejected.

The serial autocorrelation can be tested with

xtserial logtotnumbrstartupsPCA logPenetration2__Insavail2 logGastosSaudePer capita logintinsurfin logPropenInsurance3 Dummy1 logPenetration2__Insavail2 logintinsurfin

Wooldridge test for autocorrelation in panel data

H0: no first-order autocorrelation

F (1, 26) = 0.028

Prob > F = 0.8689

The results of the test of serial correlation (Wooldridge test for autocorrelation in panel data, *xtserial*) are that the Ho of no first-order autocorrelation is not rejected.

VI. Causality

This section looks at the causal relationship between insurance and start-ups in the context of panel data and the direction of causality and/or the bidirectional causality. The

Granger causality test on time-series permits to investigate whether lagged values of one variable help in forecasting another variable.

The same concept applies to panel data, but with some limitations. The command in Stata is *gcause2* and works on a single unit of a panel including the “if statement” (e.g., if state = 5). In other words, in a panel context, one variable could Granger -cause another in one panel and not in another.

The variables of interest are insurance (*Penetration2__Insavail2*) and start-ups (*Totnumberstartups*).

Before performing the Granger causality test, the two variables need to be checked for unit root (if a series has a unit root means that has more than one trend) against the alternative that the series is stationary.

The variable *Penetration2__Insavail2* does not contain unit root in any specifications (log, lag, first differences) and the series is stationary. The variable *Totnumberstartups* does not have unit root with the Harris-Tzavalis test and also the first differences of the variable *Totnumberstartups* do not have a unit root and the series are stationary. Table 25 reports the results of the test.

Table 25 Granger Causality Test

Granger Causality Penetration Ratio and Number of Startups				
#	State	Direction of Causality From Penetration to Number Startups	Level of significance	Region
1	Acre	yes		Norte
2	Alagoas			Nordeste
3	Amapá	yes		Norte
4	Amazonas			Norte
5	Bahia			Nordeste
6	Ceara	yes		Centro-Oeste
7	Distrito Federal	yes	10	Nordeste
8	Espírito Santo	yes		Sudeste
9	Goiás			Centro-Oeste
10	Maranhão			Nordeste
11	Mato Grosso			Centro-Oeste
12	Mato Grosso do Sul	yes		Centro-Oeste
13	Minas Gerais	yes	15	Sudeste
14	Pará	yes		Norte
15	Paraíba			Nordeste
16	Paraná			Sul
17	Pernambuco	yes		Nordeste
18	Piauí	yes		Nordeste
19	Rio de Janeiro			Sudeste
20	Rio Grande do Norte	yes	12	Nordeste
21	Rio Grande do Sul			Sul
22	Rondônia			Norte
23	Roraima			Norte
24	Santa Catarina	yes		Sul
25	São Paulo			Sudeste
26	Sergipe	yes		Nordeste
27	Tocantins			Norte

According to the analysis and the results, Insurance (penetration ratio) Granger causes entrepreneurship (total number of start-ups) in 13 states (in one case, the *p*-value is at 15%). In all the states, the reverse causality—i.e., start-ups Granger cause insurance—is rejected.

Table 25 shows a pattern that insurance Granger cause start-ups in several less advanced states of the North and Northeast of Brazil and in some states of the more developed states of the South of Brazil. It is difficult to draw definitive conclusions from these results. However, a possible explanation is that in the poorest regions, insurance is more needed and valuable than financing as many activities are undertaken with small amount of financing often provided by Micro Finance Institutions that operate independently and without insurance products. In addition, if there is some level of wealth, financing of initiatives can come out the wealth of individuals and what remains valuable is insurance to protect wealth and entrepreneurial activities.

VII. Spatial Analysis

The data for the various measures of entrepreneurship and insurance have a spatial dimension and can be mapped representing the measures of penetration and entrepreneurship, at the beginning (1995) and at the end (2011) of the period.¹⁰⁶

¹⁰⁶ Geodata for Brazil are available at different sites: <http://www.diva-gis.org/datadown>;
<http://www.diva-gis.org/gdata>;
<http://www.maperuzin.com/free-brazil-country-city-place-gis-shapefiles.htm>
<http://www.ibge.gov.br/home/>.



Figure 17 States of Brazil—Insurance Premiums and Number of Companies in Each State, 2011

These measures can also be presented in the gap analysis, which measures the difference over time. The gaps for insurance and entrepreneurship show the progress over time of these measures by each state of Brazil.

Table 26 Spatial Analysis

Measure of Insurance over time for Brazilian States - Gap Analysis 2001-2011									
#	State	StateName	Region Name	Region	Capital or Most important city	Penetration Ratio Gap	Density Ratio Gap	Entrepreneurship (Start ups) Gap	Entrepreneurship (Start ups) per capita Gap
1	Acre	AC	Norte	N	Rio Branco	0.002524843	42.7524568	553	0.000285872
2	Alagoas	AL	Nordeste	NE	Maceió	0.002317355	54.11882757	565	-6.5948E-05
3	Amapá	AP	Norte	N	Macapá	0.003969028	47.46632697	727	7.76109E-05
4	Amazonas	AM	Norte	N	Manaus	0.004882035	97.33121069	1285	-0.00012256
5	Bahia	BA	Nordeste	NE	Salvador	-0.002527168	75.19120262	7319	0.000244336
6	Ceara	CE	Nordeste	NE	Fortaleza	0.008977216	100.8605095	-647	-0.000554136
7	Distrito Federal	DF	Centro-Oeste	CO	Brasília	0.005038904	770.2044568	5114	0.000776301
8	Espírito Santo	ES	Sudeste	SD	Vitória	0.003626831	175.0058312	2279	8.76768E-05
9	Goiás	GO	Centro-Oeste	CO	Goiania	-0.01924774	151.5340102	8433	0.000717285
10	Maranhão	MA	Nordeste	NE	São Luis	0.001573751	41.47642987	-265	-0.000293323
11	Mato Grosso	MS	Centro-Oeste	CO	Cuiabá	0.001125761	170.2217395	6215	0.001486206
12	Mato Grosso do Sul	MT	Centro-Oeste	CO	Campo Grande	0.009548655	220.7169831	-1260	-0.001311684
13	Minas Gerais	MG	Sudeste	SD	Belo Horizonte	0.005752646	208.905433	-4294	-0.000724342
14	Pará	PA	Norte	N	Belem	0.002676493	58.1528125	4878	0.000428811
15	Paraíba	PB	Nordeste	NE	Joao Pessoa	0.005820973	60.63253126	1484	0.000246536
16	Paraná	PR	Sul	S	Curitiba	0.006116515	316.0142697	8703	0.000218446
17	Pernambuco	PE	Nordeste	NE	Recife	0.001174502	119.1972954	1408	-0.000123642
18	Piauí	PI	Nordeste	NE	Teresina	0.006816895	45.38398022	1446	0.000331288
19	Rio de Janeiro	RJ	Sudeste	SD	Rio de Janeiro	-0.006881261	320.2763794	975	-0.000271722
20	Rio Grande do Norte	RN	Nordeste	NE	Natal	0.005114865	73.44596816	2076	0.000350388
21	Rio Grande do Sul	RS	Sul	S	Porto Alegre	0.005942791	306.5051215	-10939	-0.001677328
22	Rondônia	RO	Norte	N	Porto Velho	0.005145245	89.43460599	100	-0.000440754
23	Roraima	RR	Norte	N	Boa Vista	0.002942883	45.3563709	-256	-0.0002072518
24	Santa Catarina	SC	Sul	S	Florianopolis	0.005266279	307.8941307	-998	-0.00125371
25	São Paulo	SP	Sudeste	SD	São Paulo	0.00933039	619.3657218	38054	0.000247678
26	Sergipe	SE	Nordeste	NE	Aracajú	0.002163011	46.45453587	940	0.000190082
27	Tocantins	TO	Norte	N	Palmas	0.004846891	61.61009997	506	-0.000170445

Further analysis addresses autocorrelation within a spatial context. Spatial autocorrelation tests whether the observed value of a variable at one locality is independent of the values of the variable at neighboring localities (Klinkenberg, 2013). A potential problem with insurance and entrepreneurship in Brazil is that they may have a spatial component. For example, insurance in one state may depend on insurance in neighboring states. This can result in spatial autocorrelation, which causes problems for statistical methods that make assumptions about the independence of residuals (a residual is the difference between an observed and a predicted value).

Getis and Ord Test—General G Index Statistics

The Getis and Ord test—General G Index statistics—looks at the direct association among spatial data values to test the spatial autocorrelation for the dependent variable, which is the main variable of interest. The test for the number of start-ups gives the result that there is no spatial autocorrelation (Figure 18 from Arc View, for the premium). The General Index is 0.12 and the Z score = 1.1 standard deviations.

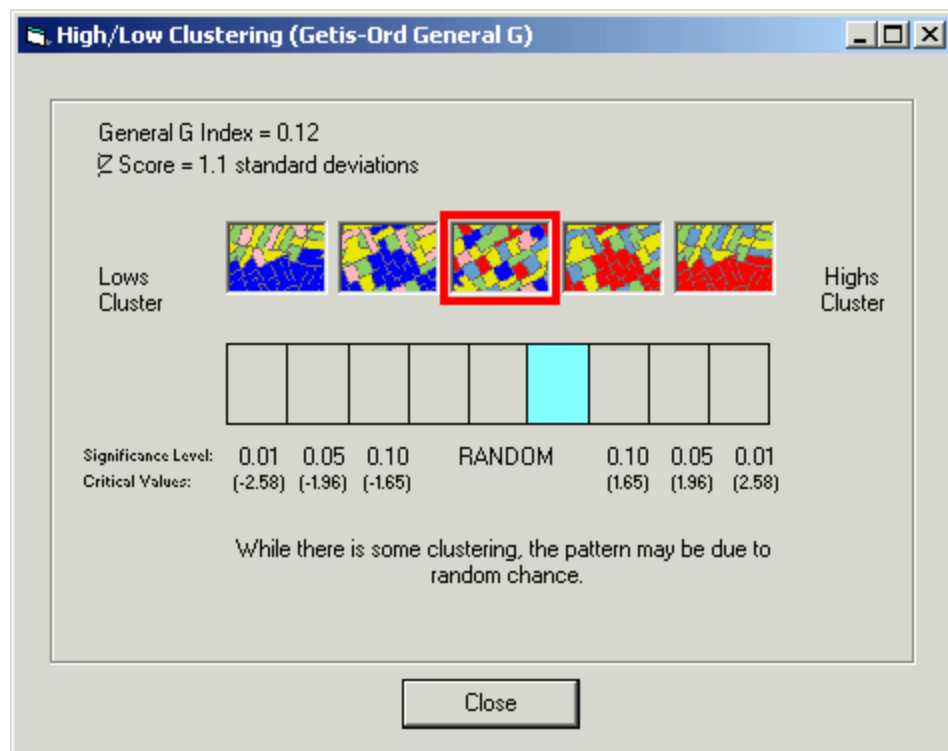


Figure 18 Getis and Ord Test—General G Index

As the windows indicate, the values are random; i.e., while there is some clustering, the pattern may be due to random chance.

Moran Test of Spatial Autocorrelation

The Moran test measures the autocorrelation of the residuals (Jin & Lee, 2010). The values of the residuals to input in the attribute table of the centroids (and /or the cities) are the residuals of the initial regression (i.e., start-ups = premium + dummy).

The Moran test confirms that there is no autocorrelation. Moran's I Index is 0.05 and $Z = -0.2$, and the conclusion is that the pattern of the residuals is random (Figure 19).

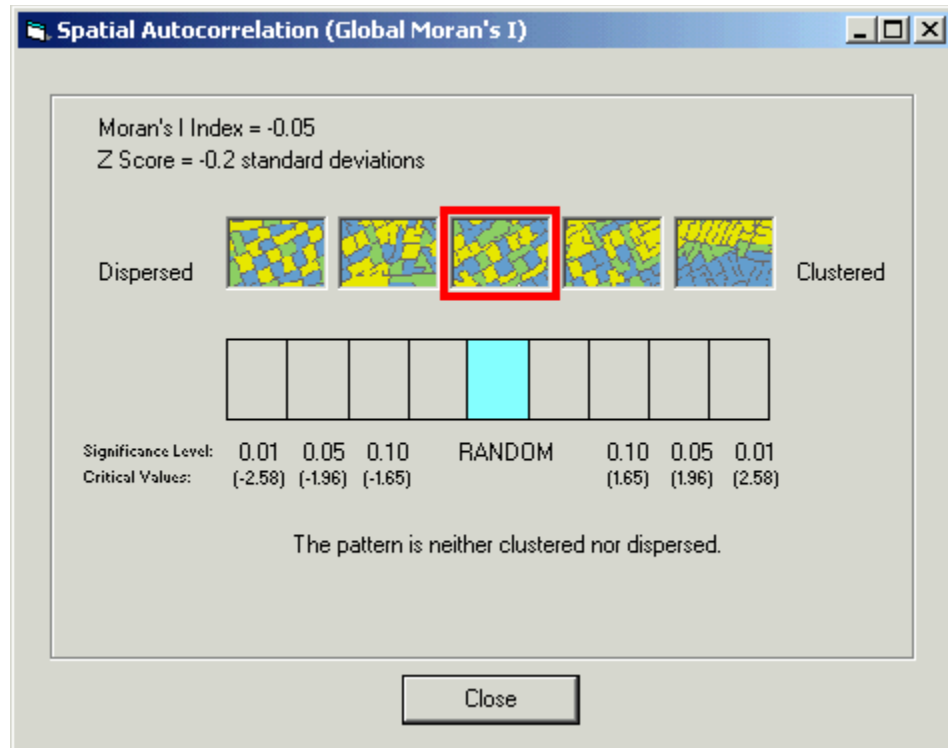


Figure 19 Moran I Index

In terms of spatial auto-correlation, the Moran statistic provides a one-number overall measure of spatial autocorrelation. The statistic is broadly analogous to the

ordinary correlation coefficient, with a numerator that measures the extent to which adjacent points have similar deviations about the mean of the data, and a denominator that standardizes that quantity to reflect the scale or variability of the variable being investigated.

Because no spatial correlation is detected from the previous tests, the Stata SL regression model is not needed.¹⁰⁷

However, spatial analysis and spatial autocorrelation would be more effectively analyzed at the district levels, which require a distinct and costly collection of data and could be left to future research.

VIII. Analysis of the Results

The basic model for studying the relationship between insurance and entrepreneurship is

logtotnumbrstartups logPenetration2__Insavail2 logGastosSaudePercapita logTaxtrabinf_2, re.

The results of the analysis developed above are the following:

- (i) The various tables show that insurance (penetration ratio) is significant and with the right sign with respect to entrepreneurship (start-ups). This implies that increased insurance availability has a positive impact on start-ups.
- (ii) Given the transformation of independent and dependent variables, i.e., both logged—and considering for simplicity only the relationship between penetration ratio and number of start-ups¹⁰⁸—multiplying the original independent variable

¹⁰⁷ The state dummy variable frequently takes care of the spatial autocorrelation.

¹⁰⁸ For the other variables that are also logged, the same type of calculation applies.

(i.e., penetration ratio) by the natural number e , will multiply the original dependent variable (number of start-ups) by e^b .

Table 27 Dependent and Independent Variables

Variables	Base	Increase /Decrease Penetration Ratio (independent variable)	
		+10%	-10%
Penetration Ratio	0.0023	0.0025	0.0020
Number Startups	941.0000	949.2104	932.0065
Increase/Decrease Startups (dependent variable) %		0.87%	-0.96%

Any proportional change in the independent variable is associated with a proportional change in the dependent variable, and the coefficient b represents the elasticity. To get the proportional change in the dependent variable associated with an $x\%$ increase in the independent variable, calculate $a = \log ([100+x]/100)$ and take e^{ab} . The predicted proportional change can be converted to a predicted percentage change by subtracting 1 and multiplying by 100.

In practical terms, looking just for the sake of illustration at the Table 17 of the random effects above, the implication of the coefficient 0.09201 for the penetration ratio (see Table 17) is that the start-ups will be multiplied by e , roughly 2.71828, to the power of the coefficient 0.09201 multiplied by the log of the increase (or decrease) of the penetration ratio. If the penetration ratio increases

by 10%, start-ups increase by about 0.87 %; if penetration ratio decline by 10% start-ups decrease by about 0.96% (Table 27).

- (iii) With respect to the role of financial intermediation, the results show that the interaction between insurance and financial intermediation (*logintinsurfin*) has normally a significant effect. In line with Arena (2006), insurance and financial intermediation are substitute. However, the role of financial intermediation is linked to the insurance and can create problems of endogeneity. The IV models show that financial intermediation can effectively operate as an instrument for insurance.
- (iv) The results show that the institutional setting (*logTaxtrabinf_2*), as expected, has a positive impact on start-ups.
- (v) Social insurance (*logGastosSaudePer capita*) appears to have a negative impact on start-ups, i.e., increased social insurance implies fewer start-ups. However, the values are not significant.
- (vi) About insurance, looking at the results given in Table 27, the development of insurance markets by itself would need a big jump in the supply of insurance policies to generate a substantial increase in start-ups. It confirms that a series of policies in various areas are needed, one of which is developing insurance markets, but insurance alone cannot do.
- (vii) The results with the inclusion in the models of the instrumental variables and with the Arellano-Bond dynamic panel data analysis confirm that insurance (penetration ratio) has a significant influence over start-ups. The simultaneous

equations' model confirms that financial intermediation, propensity to buy insurance and knowledge of insurance are valid instruments for the model.

- (viii) The results about the role of insurance and those related to causality indicate that states and their different conditions in each of the 27 Brazilian states represent a significant explanatory factor. In other words, the role of insurance over start-ups has a different impact depending on Brazilian state, with the entrepreneurship of less advanced states in the North of the country benefitting more from the availability of insurance. The between effects better explains the role of Brazilian states over time.
- (ix) The causality tests show evidence that in various Brazilian states and particularly those less advanced of North and Northeast, insurance “Granger causes” start-ups. On the other hand, there are no states in which start-ups “Granger cause” insurance. Under these circumstances, there is ground to state that insurance has a substantial casual impact on the willingness of the entrepreneur to start a business.

The results of the regressions respond to the first part of the research questions in the sense that there is evidence of a strong relationship between availability of insurance and start-ups. Insurance favors start-ups according to the dynamic model and Granger. There is also evidence that in various Brazilian states insurance Granger causes start-ups, while the reverse direction (from start-ups to insurance) is not supported.

With respect to the second part of the research questions, there is conflicting evidence about the role of social insurance on entrepreneurship in Brazil under the

specification of start-ups.

11. CONCLUSIONS, POLICY IMPLICATIONS AND FUTURE RESEARCH

The results respond to the first of the research questions and gives significant evidence that insurance plays a substantial role in favoring start-ups and ultimately for economic growth. There is also evidence that in many Brazilian states' insurance Granger causes start-ups, while the reverse direction (from start-ups to insurance) is not supported. It confirms that entrepreneurship constitutes a link that connects insurance to economic growth. The findings are in line and expand the work of (Cole, Gine', & Vickery, 2012) that when people have considerable levels of risk coverage through the provision of insurance, they will adjust their investment decisions toward more profitable and riskier initiatives (i.e., crops).

In this context, this study implies that insurance as a market institution reduces overall uncertainty and provides incentives for the development of entrepreneurship.

However, the impact of the development of insurance markets by itself would need a big push in the supply of insurance policies to generate a substantial increase in start-ups. It confirms that a series of policies in various areas are needed, one of which is developing insurance markets, but insurance alone cannot fix all the problems.

With respect to the second part of the research questions, there is conflicting evidence about the role of social insurance on entrepreneurship in Brazil under the specification of

start-ups. In some cases, social insurance (*logGastosSaudePercapita*) appears to have a negative impact on start-ups, i.e., increased social security implies greater start-ups.

However, the values are not significant.

With respect to the role of financial intermediation, the results show that the interaction between insurance and financial intermediation (*logintinsurfin*) has normally a significant effect. In line with Arena (2006), insurance and financial intermediations are substitute. Financial intermediation is linked to the insurance and can determine problems of endogeneity. However, the IV models show that financial intermediation can effectively operate as an instrument for insurance.

Institutional setting (*logTaxtrabinf_2*) has a positive impact on start-ups.

The results about the role of insurance and those related to causality indicate that different conditions in each of the 27 Brazilian states represent a significant explanatory factor. In other words, the role of insurance over start-ups has a different impact depending on Brazilian state, with the entrepreneurship of less advanced states in the North of the country benefitting more from the availability of insurance. The between effects better explains the role of Brazilian states over time. These findings reinforce the need of undertaking policies tailored to each specific situation.

These conclusions prompt policy implications; research implications and specific areas to investigate.

I. Policy Implications

From the point of view of policy implications, the study stresses the role that insurance plays in supporting start-ups and entrepreneurship in Brazil and possibly in

emerging market countries and for less-developed areas and for the low segment of the population.

In Brazil- and in Latin America- insurance markets are still underdeveloped, with significant differences among countries and remarkable potential. Demand in the region for insurance is emerging in the private sector, among insurance companies, regulators and supervisors, and in the agriculture sector. Consequently, policymakers should stimulate policies to improve the supply of insurance and its delivery as part of the goal of creating a favorable environment for entrepreneurs and spurring economic growth.

Given the role that wealth plays to spur entrepreneurship (i.e., wealthier people are more likely to undertake entrepreneurial activities) and insurance (wealthier people are less risk averse and thus more prone to demand insurance), one of the objectives of public policy would be to realize the argument of De Soto (2003) to recognize the value of property (and property rights in general) in Latin America that will rise wealth and have positive effects on entrepreneurship and insurance and economic growth.

The significant role that the institutional setting and individual Brazilian states play reinforces the need of policies tailored to specific situations. The findings of the study complement the perspective of Acs and Szerb (2010) among others of differentiated situations in each country, which implies that countries should apply policies to address specific situations. Along these lines, the Kauffman Report (Atkinson and Correa 2007) suggests that in advanced economies like the United States, policy should be aimed at accelerating the transition to an entrepreneurial economy. In emerging market countries, such as Brazil, policies need to focus on enabling the institutional

setting - including insurance markets - to function more effectively, i.e., emerging market countries, especially in Latin America, should improve efficiency and effectiveness.

In this respect, the *Doing Business Publication* of the World Bank starts to give attention to insurance as an important factor for economic actors undertaking and continuing business activities. In that vein, the international financial institutions (e.g., the World Bank, Inter-American Development Bank, International Monetary Fund) are implementing programs to make insurance markets more effective.

II. Research Implications

From a research point of view, the study prompts a series of theoretical and empirical investigations concerning the role of insurance in various directions.

First, this study should lead to the expansion of research on the themes of insurance and entrepreneurship and their relationship, which in turn prompts policy implications consistent with the framework of Boettke and Coyne (2003) that insurance market can help promote entrepreneurship and achieve economic growth; i.e., “the adoption of certain institutions . . . channels and encourages the entrepreneurial aspect of human activity in a direction that spurs economic growth” (High, 2009a, p. 5). In this respect, consistent with the findings that insurance supports entrepreneurship and with Boettke and Coyne (2003, 2009), the added value from the research is that the study expands knowledge in the field of entrepreneurship as part of the research agenda on entrepreneurship, as spelled out by Shane and Venkataraman (2000), which is related to the conditions under which entrepreneurs operate. In this respect, this study covers the “why, when and how different modes of action are used to exploit entrepreneurial

opportunities” (Shane & Venkataraman, 2000, p. 218). Once an opportunity is discovered, the entrepreneur must have the possibility to exploit it. The individual preference, the nature of the opportunity, and the institutional context—including the availability of insurance—all influence the extent to which the opportunities can be implemented.

III. Future Research

With respect to specific future research, the need for further analysis emerges in various directions.

- a. As mentioned above, it would be extremely valuable to expand the research with an empirical analysis of the relationship between insurance and entrepreneurship at the global level. This study has given some indication of how to construct an appropriate database taking advantage of the resources of the World Bank, IMF, OECD, ASSAL and Swiss.Re, among others.
- b. The analysis requires some additional work to find an appropriate measure of institutional setting at the state level. In this respect, the two proxies used, *logTaxtrabinf_2* and *logMortHomicpermilhab*, are alternatives for more direct measures of institutional quality.
- c. The analysis of the relationship between insurance and entrepreneurship could be extended to other countries with high heterogeneity, e.g., the Middle Eastern countries.

- d. The analysis could also focus on particular areas, such as rural areas, looking at entrepreneurship, insurance and credit.
- e. It is also essential to expand the existing study moving to a lower level than the states and establishing a database for the municipalities of Brazil as well as for other countries. Making cities and municipalities the unit of analysis would allow a more meaningful spatial analysis. To that end, some attention should be devoted to the appropriate and valid measures of the institutional setting that are not easy to measure at the local level but constitute very important factors for the development of entrepreneurship.
- f. This study has found a significant role of insurance for the deployment of entrepreneurship. This happens in complementarity with the role of the financial sector. It is worth to further explore, for instance for entrepreneurs and micro entrepreneurs, to what extent the only availability of insurance can support businesses independently from the role that financing play. This could be the case with entrepreneurs that have a satisfactory level of wealth and would undertake a business initiative out of self-financing, but still in need of insurance. Along these lines, a continuous effort should be undertaken to discover the role of the availability of insurance especially for micro entrepreneurs in various regions and areas of the world.
- g. As the link between insurance and entrepreneurship becomes more evident, new methodologies based on surveys and micro-level data and focusing on attitudes and behavior can be applied, e.g., factor analysis, path analysis and structural equations.

This type of analysis relies on attitudes and behavior and on latent and not-defined variables, such as regulation and competition, and thus needs measures of the judgment the actors in the market provide rather than hard, macro-level data.

- h. The analysis should be extended to various specifications of entrepreneurship beyond that of start-ups used in this study. In fact, future research at the local level within a country (e.g., Brazil), or at the global level, could test to what extent the availability of insurance affects—possibly in different ways—the various specifications of entrepreneurship and economic activity, e.g., large firms, SMEs, entrepreneurs, micro entrepreneurs, start-ups, limited liability companies (LLCs) and Total Factor Productivity (TFP).
- i. Conversely, future research could also look into the various types of insurance policies. With respect to the types of insurance policies of interest, life insurance is relevant for the entrepreneur who wants to protect the continuation and continuity of his or her business (e.g., partnership) after his or her death. Life insurance is also relevant for lenders to entrepreneurs. Non-life insurance is critical to protect specific assets or activities. In the non-life categories, business insurance is the first type of insurance policy that an entrepreneur seeks. For example, entrepreneurs are concerned about punitive damages related to product liabilities, and insurance policies are crucial to eliminate the risk that a business could be wiped out because of a liability lawsuit. In this category, one can include casualty insurance to cover the cost of defense and judgment against a company resulting from bodily injuries or property damage that can also be extended to product liability; e.g., automobile

insurance. It also includes professional liabilities (e.g., medical), and environmental liability. A relevant form of business insurance for the entrepreneur has to do with fidelity, protection and financial guarantees, such as fidelity bonds to assure against acts of employees. Bonding, for example, protects the company if an employee or subcontractor fails to complete a job within an agreed-on period of time; financial guarantees reduce the liability due to the failure of repayment. Household and property insurance (e.g., fire insurance, robbery and burglar insurance, and business interruption insurance) constitutes a type of protection that is relevant for entrepreneurs. Each of these types of insurance can be measured by the penetration ratio, i.e., the ratio of the volume of the premium for a particular risk covered to GDP; and by the density ratio, i.e., the ratio of the volume of the premium for a particular risk covered to the population.

- j. The role of social insurance warrants more research. There is conflicting evidence about social insurance: some evidence indicates that social insurance favors entrepreneurship and start-ups; but there is also evidence that social insurance has a negative or no impact on start-ups.

APPENDIX

Appendix 1: Risk Aversion, Wealth, Utility and Entrepreneurship (*)

Assumption of Risk Aversion

In contrast to risk-neutral individuals, *risk-averse* individuals care not only about the expected value of losses but also about the possible magnitude of losses.¹⁰⁹

Thus, for instance, risk-averse individual will find that a 5% chance of losing US\$20,000 is worse than a 10% chance of losing US\$10,000, and in turn, they will find this situation (10% chance of losing US\$10,000) worse than a sure loss of US\$1,000—even though each of the situations involves the same expected loss of US\$1,000 (see the example in Box 1). Risk-averse individuals dislike uncertainty about the size of losses per se. Risk-neutral individuals would not find any one of the situations worse than any other.

Risk aversion does not always decrease with the income or wealth of the individual. It depends on the shape of the utility curve. Under the logarithmic curve ($U(W) = \ln(W)$, $W > 0$) utility function, risk aversion decreases as wealth increases. Under the exponential utility function, $U(W) = -e^{-AW} = -\exp(-AW)$, there is absolute constant risk aversion—equal to A —over all ranges of wealth. In case of a quadratic utility function ($U(W) = a + BW + cW^2$), risk aversion increases as wealth increases.

¹⁰⁹ This chapter relies heavily on various authors (Nicholson, 2004; Pratt, 1964; Shavell, 2007).

It seems implausible that the willingness to pay to avoid risk is independent of the level of wealth of the individual and therefore the concavity of the utility function such as the logarithmic and square root utility functions are in many circumstances justified.

Box 1: Risk, Utility and Wealth

BOX 1: Risk, Utility and Wealth

Consider an individual for whom the utility of wealth is shown in the Figure 1 and assume that the individual has wealth of \$30,000 and faces the 5 percent risk of losing \$20,000. Then his level of wealth will be 30,000 with probability 95 percent and \$10,000 with probability 5 percent. His expected utility will therefore be 95% x (utility of \$30,000) + 5% x (utility of \$10,000)—or Figure 1—95% x 10.3090 + 5% x 9.2103 = **10.254**. On the other hand, if the individual faces 10 percent risk of losing 10,000, similarly his expected utility will be 90% x 10.3090 + 10% x 9.5035 = **10.268**, which is higher. The individual's expected utility will be higher still if he/she loses 1,000 for certain (i.e., 20000*5%, which is the insurance premium), for then his expected utility will just be the utility of having 29,000, or **10.275**. The example illustrates that an individual for whom utility of wealth is concave is indeed risk-averse.

Probability 5% of losing 20,000 for an individual of wealth 30,000	Probability 10% of losing 10,000 for an individual of wealth 30,000
10.2540	10.2684

The importance of risk aversion will ordinarily depend on the size of risk in relation to an individual's wealth and assets and to his/her needs. However, risk-averse people will always tend to insure his/her assets as demonstrated above. On the other hand, insurers can be characterized as risk neutral and earn their profits because premiums they receive are greater than the expected losses and also because of diversification.

The assumption that an individual is risk-averse turns out to be equivalent to a simple assumption concerning the utility the individual attaches to his or her wealth. In

particular, the individual's utility increases with the level of his or her wealth, it does so at a decreasing rate. The interpretation being that the value to him/her of having more wealth falls as he/she fulfills his or her more imperative needs.

Box 2- Utility Functions

Box 2- Utility Functions

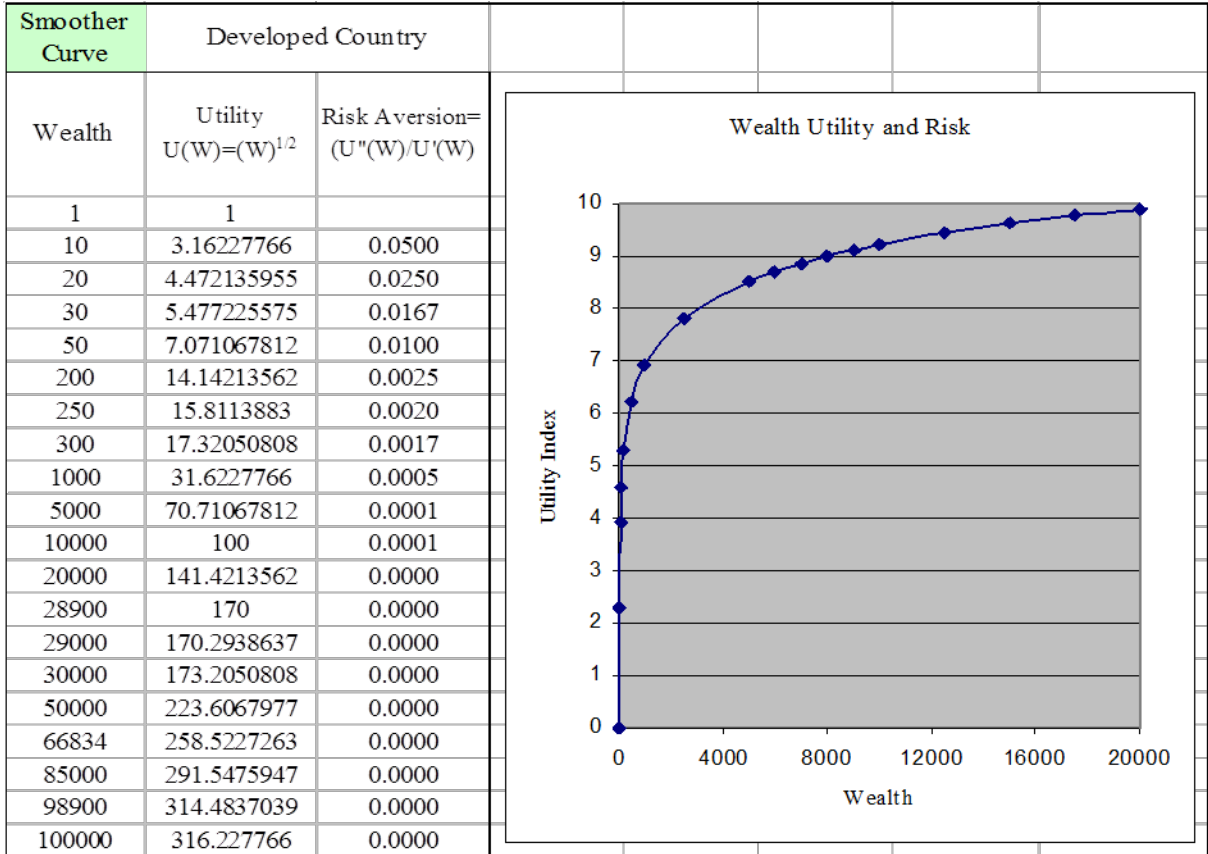
Risk-averse: concave utility function

Risk neutral: linear utility function

Risk loving: convex utility function

In 1947, Von Neumann–Morgenstern (2007) introduced the Utility Index that reflects what the individual feels at any level of wealth ($U = f(W)$) so that the party's utility to his or her wealth has the concave shape (Figures 1 and 2). The concavity reflects the assumption of diminishing marginal utility, i.e., it assumes that gaining dollars add less enjoyment as total wealth increases. It seems plausible that a party for whom the utility of wealth has this shape will especially dislike bearing the risk of large losses, for such losses will evidently matter to him/her disproportionately in terms of utility, i.e., a party is assumed to evaluate a risky prospect by measuring its effect on his expected utility. Expected utility is obtained by multiplying the utility of each possible consequence—here the utility of each possible level of wealth—by its probability. Calculations show that for a party whose utility is a concave function as depicted in Figure 1, expected utility will be lower if he or she faces the 5% chance of a US\$20,000 loss than if he or she faces the 10% chance of a US\$10,000 loss, because a loss of US\$20,000 will result in more than twice the diminution in utility than will follow from a loss of US\$10,000.

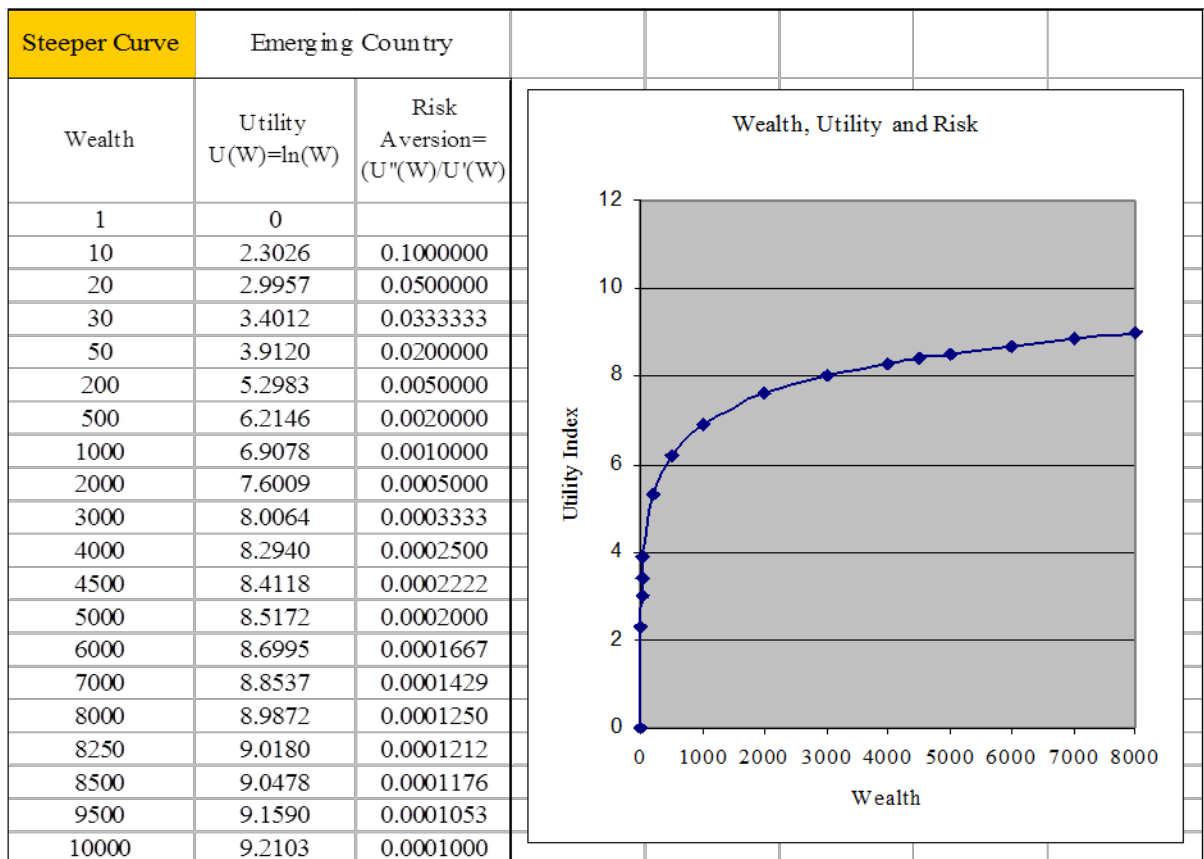
Figure 1. Utility Function for Developed Countries



There are different degrees of risk aversion corresponding to various degrees to which suffering large losses would matter to parties. It is conceivable that in emerging market countries, given the weak institutional setting, people are inclined to be more risk-averse, i.e., will take less risk, than people in developed countries and therefore the risk aversion curve tends to be steeper. Risk aversion depends on the concavity of the function of the utility of wealth: the greater the concavity, the greater the degree of risk aversion (because the greater the rate at which utility losses grow with losses of wealth). Figures 1

and 2 illustrate the behavior of wealth, utility and risk under different situations. Figure 1 could represent a risk-averse individual in a developed country, and Figure 2 could depict a risk-averse individual in an emerging market economy. The smoother curve (developed country) has a square root function and the steeper function (emerging market country) has a logarithmic function, i.e., the function is the Utility Index as $U = f(W)$. On the other hand, risk aversion depends on the level of wealth and the lower part of each concave utility function—corresponding to low levels of wealth—also shows that risk aversion is greater at low levels of wealth.

Figure 2. Utility Function for Emerging Market Economies



Therefore, in an emerging market economy there are two factors that make individuals more risk-averse: (1) the shape—concavity—of the utility function; and (2) being in the lower part of any utility function. Thus, the shape of the utility function, more concavity in emerging market economies, depends on the uncertainty of the institutional environment and the inefficiencies of the market institutions including insurance, i.e., more concave curves of utility imply more risk aversion, i.e., individuals in emerging market economies face steeper curves and therefore resort to be more risk-averse. The second factor is linked with the fact that emerging market economies are less wealthy and individuals are more risk-averse.

Certainty Equivalent

The *certainty equivalent* of any gamble, g , represents the amount of money, called CE, offered for certain, which gives the consumer exactly the same utility as the gamble¹¹⁰. Conversely, the *risk premium* (EconPort, 2006) of any gamble is the difference between the expected value of the gamble and its certainty equivalent, i.e.: Risk Premium = $E(g) - CE$. It follows that a risk-averse person's certainty equivalent will be less than the expected value of the gamble, and he or she will have a positive risk-premium. *Certainty equivalent* implies that a risk-averse person prefers a sure thing to a fair gamble. The question is then if there is a smaller amount of certain wealth, W_c that would be viewed as equivalent to a gamble with the same expected payout.

The *certainty equivalent* is defined as:

$$U(W_c) = E[U(W_b)] = p_1U(W_1) + p_2U(W_2)$$

¹¹⁰ (EconPort, 2006).

Risk aversion implies

$$W_c < p_1W_1 + p_2W_2 = E[W_b]$$

and the risk premium is

$$E[W_b] - W_c = p_1W_1 + p_2W_2 - W_c > 0$$

To illustrate the certainty equivalent, suppose Jill owes Peter US\$100. She says to him “I would be happy to pay you US\$100 right now. Alternatively, you can flip a coin. If it comes up heads, I will pay you \$200. If it comes up tails, I will pay you nothing. Which do you want?” If Peter answers, “I don’t care,” he is risk-neutral. If he prefers the first option, he is risk-averse, i.e., risk-averse people do not accept fair bets (e.g., 50/50 bet of losing or winning a given amount of dollars). Actually, a risk-averse individual would be prepared to pay (buy risk insurance and pay a premium) to avoid the bet. If he/she prefers the second, he/she is a risk loving and likes to gamble.

Assuming that the utility function is

$$U(W) = W^{1/2}$$

$W_a = 100$ with probability 1 (initial Utility) and a gamble of winning 50 or losing 50 with the same 50% probabilities,

$$E[U(W_a)] = U(W_a) = 100^{1/2} = 10,$$

which is the expected utility for the sure thing.

The wealth from the gamble is:

$$W_b = 50 \text{ with } p_1 = 0.5 \text{ and } = 150 \text{ with } p_2 = 0.5.$$

Thus,

$$E[W_b] = 50(0.5) + 150(0.5) = 100 = W_a.$$

and in terms of utility:

$$E[U(W_b)] = 50^{1/2}(0.5) + 150^{1/2}(0.5) = 7.07(0.5) + 12.25(0.5) = 9.66,$$

which represents the expected utility for the gamble.

The certainty equivalent wealth associated with $E [W_b] = 100$:

$$U(W_c) = W_c^{1/2} = E [U(W_b)] = p_1 U(W_1) + p_2 U(W_2) = 9.66$$

$$\Rightarrow W_c = (9.66)^2 = 93.32$$

And finally, the risk premium:

$$W_b] - W_c = 100 - 93.32 = 6.68.$$

Given the shape of the utility curve (concave for a risk-averse), expected utility for the sure thing $E [U(W_a)]$ exceeds the expected utility from the gamble $E [U(W_b)]$, with the same expected payment. Thus, certainty equivalent depends on the shape of the utility function and the level of wealth; i.e., simply put, risk-averse people need an additional incentive to make them want to take on the risk of the gamble.

A risk-neutral consumer will have a zero-risk premium, and a certainty equivalent equal to the expected value of the gamble. Similarly, a risk-loving consumer will have a negative risk-premium since she would need an extra incentive to accept the expected value, not the risky gamble, and her certainty equivalent would be greater than the expected value of the gamble.

Measuring Risk Aversion

Pratt (1960) found a measure of risk aversion as the ratio of the second derivative of the utility function (Eeckhoudt, Gollier, & Schneider, 1995) to the first derivative of the utility function:

$$r(W) = -U''(W)/U'(W)$$

Considering the diminishing marginal utility of wealth, the second derivative of a decreasing function is always < 0 , and therefore Pratt's measure of risk aversion will be always positive. In the case of the two functions for risk aversion $U = W^{1/2}$ and $U = \ln(W)$ - Figures 1 and 2—the level of the measure of the risk aversion is obtained calculating the first and second derivative of the two utility functions, $U = W^{1/2}$ and $U = \ln(W)$, which are

$$(1/2) * (W)^{1/2} \text{ and } 1/W, \text{ respectively.}$$

The second derivatives are:

$$-(1/4) * 1/(W)^{3/2} \text{ and } -1/(W)^2, \text{ respectively.}$$

The measure of risk aversion would be then the ratio of the respective second and first derivatives. In the case of the function $U = W^{1/2}$ the measure of risk aversion is $1/2 * W$; and in the case of the function $U = \ln(W)$, the measure of risk aversion is $1/W$. Thus, $1/(2 * W)$ in the case of the smoother square root function of developed countries ($U = W^{1/2}$) and $1/W$ for the steeper curve of Emerging Market Economies represent the measures of risk aversion. Risk aversion is greater in Emerging Market Economies than in developed countries.

The definition of the measure of the risk aversion and its formula imply that the smaller the level of wealth and the steeper the utility function, the greater the measure of risk aversion. Thus, risk aversion is greater in Emerging Market Economies than in developed countries. This consideration can be substantiated by looking at the level of wealth and risk aversion in each curve (i.e., risk aversion is greater at lower levels of wealth). It can

be also validated looking at two different utility functions, i.e., the risk aversion of the steeper function is greater.

Risk Aversion in Developed and Emerging Market Economies

Demand for insurance can be different depending on the type of insurance (e.g., life, and non-life). Risk attitudes, initial wealth, amount insured, premium levels, probability of occurrence, rate of interest,¹¹¹ and also demographic structure, e.g., growth and composition of the population,¹¹² are common to any type of insurance.

Following the reasoning above, an individual with assets of \$10,000 could be regarded as quite averse to a risk of a \$5,000 loss, especially if he or she will soon want to use (say, for medical or educational purposes) the greater part of his \$10,000. But where a person with assets of \$100,000 faces a \$5,000 risk, risk aversion will likely be an unimportant factor, and it will usually do no harm to consider the person as risk neutral (although risk aversion would probably become relevant if the magnitude of the risk he faced were \$50,000).

This example can be applied to emerging market versus advanced economies. Individuals in emerging market economies with a level of wealth of 10,000 are more risk-averse than individuals in developed economies with wealth of \$100,000, i.e., contrast Figure 1 and Figure 2, or simply note that the at lower levels of wealth the measure of risk aversion of Pratt is greater. In addition, given the situations in Emerging Market Economies the risk

¹¹¹ The demand varies inversely with the price of insurance and interest rate.

¹¹² Specific factors are identified for life insurance and non-life insurance. For non-life insurance, they include regulation (e.g., compulsory coverage), claim awards, exposure to natural disasters, and the public sector's role in health. For life insurance, they include economic stability (e.g., inflation and the exchange rate), demographics, the tax system, the savings rate, and the pension system (Blanchet, 2007).

of occurrence of damaging events (e.g., a fire in a house) would be much higher than that of the same event occurring in developed economies. One can compare the situation of a risk of fire of a house in a developed economy where one could have a probability of occurrence of 5% and a probability of losing about 80% of the value of the asset (the house). On the other hand, in the context of an emerging market economy the risk of the event occurring would be much greater, e.g., 15% probability with the possibility of losing 100% of all capital and remain poor for the rest of his or her life.

Insurance in Emerging Market Economies

The example of a fire in a house under the conditions of a developed and emerging market economy can be shown in the Figure 1 and Table 1. In the case of developed economy—Figure 1—assuming a fair premium is charged for insurance¹¹³ (Table 1)—utility would be higher, if he or she buys the insurance.

Table 1. Premium and Loss in Developed and Emerging Market Economies

¹¹³ Assuming that there are no administrative costs.

Emerging Country - Steeper Curve	Probability 85% of remaining with the value of the asset (house) of 10000			Probability 15% of losing 100% of the value of the asset (house) of 10000				Total Expected Utility
	%	U(10000)	Damage	%	U(10000)	Damage	Utility	
	0.85	9.2103		0.15	8.9872	0		
			7.8287893				0	7.8287893
	Fair Premium						CE	2511.8864
		0.15	10000	1500	15.00%		RP	7488.1136
Residual		8500	9.1590	9.0478214		Utility Diff.	1.3303	
Developed Country - Smoother Curve	Probability 95% of remaining with the value of the asset (house) of 100000			Probability 5% of losing 80% of the value of the asset (house) of 100000				Total Expected Utility
	0.95	U(100000)		0.05	U(10000)	Damage		
	0.95	316.2278		0.05	141.4214			
			300.41638				7.0710678	307.48745
	Fair Premium						CE	94548.529
		0.05	100000	5000	5.00%		RP	5451.4708
Residual		95000	308.2207	308.2207		Utility Diff.	0.7333	

Note: CE = certainty equivalent; RP = risk premium.

In case of the event of the house fire occurring in an emerging market economy—Figure 2—assuming a fair premium, the risk premium in emerging market economies is higher than in developed economies. In fact, the example shows that risk premium represents almost 75% of the wealth in emerging market economies versus 5% in developed economies. Difference between the utilities of individuals living in Emerging Market Economies are greater, i.e., the utility of buying insurance or accepting the game. Normally, buying insurance will leave the risk-averse individual better off in terms of expected utility. However, in Emerging Market Economies, despite buying insurance is theoretically attractive, in reality, given the level of wealth and the cost of insurance

(premium) as percentage of the wealth and for a number of institutional inefficiencies including the lack of an effective insurance markets, individuals do not like and do not trust buying insurance products. Thus, there is underproduction or under provision of insurance.

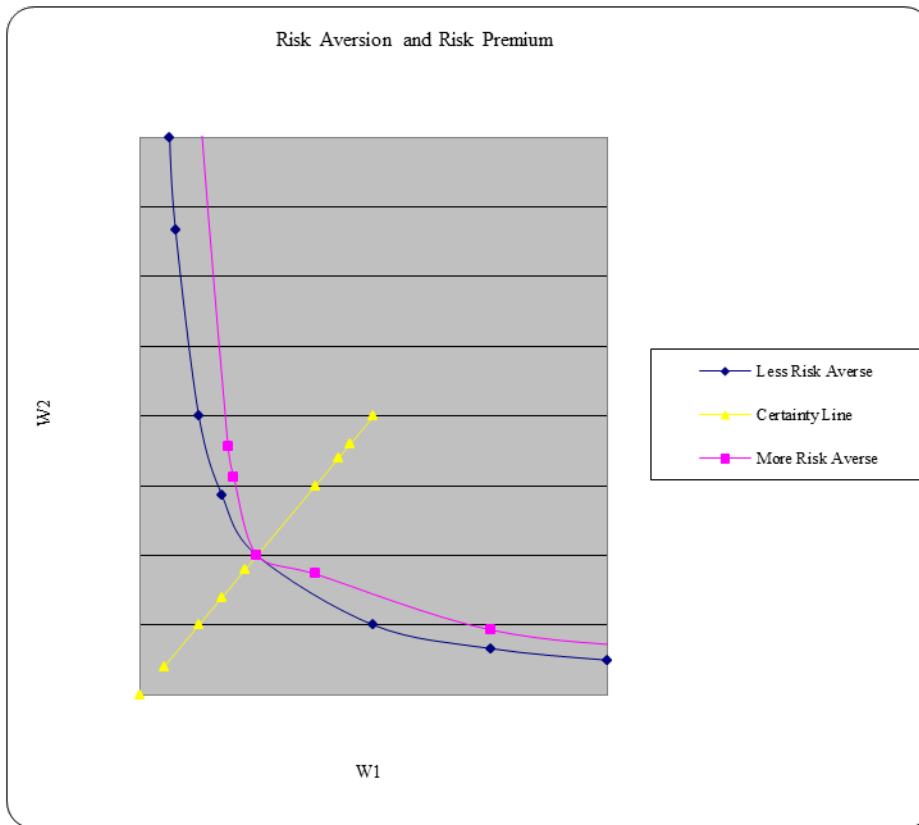
Insurance, Risk Premium and Indifference Curve

The considerations about risk aversion, level of wealth and shape of the utility function are confirmed if the problem is framed in terms of utility curves. Under the arrangement known as *insurance*, parties referred to as *insureds* pay *premiums* to an *insurer* in exchange for protection against possible future losses. The insurer has the obligation to pay insureds an amount specified by an insurance policy if the insureds make claims for losses they suffer. Insurance is an example of sharing of risk beneficial to among many parties and can be regarded as a market institution. In this latter respect, institutions are important for a number of reasons. First, they reduce uncertainty and structure behavior in human interactions, both from the social and the economic point of view. Second, institutions have the capacity of cutting transaction costs that appear due to information asymmetry and thus, indirectly contribute to economic performance. Third, in the special case of market institutions—market institution specifies the rules and conditions under which demand and supply make contact giving birth to binding allocations—they help for knowledge coordination together with prices. Their existence allows rational agents to form expectations and strategies with respect to their expectations.

Insurance is related to the measure of risk aversion and the risk premium to pay, and the conditions under which insurance operates. In the analysis of insurance, it is anticipated that insured parties face identical, independent risks of loss and are risk-averse; and it is assumed that administrative expenses associated with the operations of the insurance company are zero. As indicated under the section about the basic theory of insurance, the insurance company will be covering its cost by collecting from the insured party the expected value of the amount it will have to pay him, e.g., if the probability of losing US\$10,000 is 10%, and the insured party will pay a premium of US\$1000, the insurance company will likely cover its costs.

There are different situations of risk aversion and they have a correspondence with the indifference curves. In this respect, the flatter the indifference curve, the more the individual is willing to assume risk (i.e., less risk-averse) (Figure 3). When faced with the risk of losing X dollars, the person who is more risk-averse will require a greater compensation than the person who is less risk-averse.

Figure 3. Risk Aversion, Risk Premium and Certainty Equivalent



In Figure 3, the yellow line represents the *certainty equivalent*.

Imagine moving from equilibrium (point A at the center, interception of the budget line with the indifference curves) to a situation facing a possible loss of d . In this respect, imagine d as the distance from 1 to 0.5 on the vertical line representing the prospect of loss, which will have different values for the indifference curves of the more risk-averse and that of the less risk-averse. The risk of losing d for the less risk-averse individual (blue line) would be acceptable if in good times his/her wealth were to increase from 1 to 2. The more risk-averse individual (red line) would require a greater compensation than the less risk-averse individual. In fact, the more risk-averse individual (red line) would

require that his or her wealth were to increase in good times to 3. The difference between 3 and 2 indicates the effect of risk aversion on the willingness to assume risk.¹¹⁴

In terms of entrepreneurship, following authors (Van Stel, Carree and Thurik 2005; Wennekers and Thurik 1999; Wennekers et al. 2007; Acs and Szerb 2010),¹¹⁵ who suggest a U-shaped relationship between level of entrepreneurship and GDP per capita, individuals in Emerging Market Economies would have a very high opportunity cost to start appropriate entrepreneurial activities and therefore they decide to maintain their existing job.

In emerging market economies, given the institutional failure and the lower level of wealth as well as for cultural, social reasons, following the formulation of Pratt (1964) people tend to be more risk-averse—less flat indifference curve. These individuals would have indifference curves of the type of the red line in Figure 3. Therefore, they are less inclined to undertake risk and require paying a greater risk premium. In the previous sections, Table 1 shows that the risk premium that individuals in Emerging Market Economies would pay is much higher in proportion to the respective wealth (75% vs. 5%). In other words, in Emerging Market Economies the degree of risk aversion is greater and given the low level of wealth and income, individuals in Emerging Market Economies tend to insure less and to bear more risk in an inefficient form.

The situation is quite the contrary in developed economies. The United States represents the typical example where profit is recognized and rewarded; and the use of insurance as

¹¹⁴ It can be shown that in case of unfair premium, the individual would have to accept a lower level of certainty equivalent.

¹¹⁵ The original intuition of the U-shaped curve, i.e., self-employment rate will decrease as economies become more developed, goes back to Lucas (1988), Blau (1987) and Acs, Audretsch, and Evans, (1994).

an effective market institution to cover various specific aspects of the business activity is widespread. The result of the entrepreneurial activity is the only thing that cannot be insured.

However, the unreliable institutional setting of Emerging Market Economies and the low level of “wealth” create an *excessive uncertainty* that discourages entrepreneurs to commencing businesses. In emerging market economies, an “additional earning premium” is necessary to compensate risk-averse businesses owners and entrepreneurs for the greater uncertainty associated with their incomes (Hamilton, 2000, p. 605).

The high level of risk premium represents an indicator that in Emerging Market Economies there is a latent demand and a scarce supply of insurance products. Hence, a significant potential for buying (and selling) insurance exists, which is not exploited and insurance markets remain underserved and underdeveloped.

Individuals in emerging market economies—and in the Latin American region—are more risk-averse than individuals in developed countries. Evidence in Latin America shows (Masci, Tejerina, et al., 2007) that people tend not to buy insurance due to a number of shortcomings: level of wealth; and excessive level of uncertainty, which in turn (Erbas, 2004) includes many components: status of the insurance markets; high level of premiums; delays in the satisfaction of claims and lack of transparency and reliability on companies to pay claims; deficiencies of judicial remedies; and also cultural and social factors that do not fully recognize and reward profit.

All these factors reduce the appeal of insurance in emerging markets. Therefore, individuals in emerging market economies opt to find inefficient forms of protection

avoiding buying insurance. Under these circumstances, individuals in emerging economies, individuals tend to also escape from undertaking initiatives such as those that an “entrepreneur” would embark on.

Moreover, as indicated in Chapter 3, the realization of the intuition and program of De Soto (2002, 2003) implies that if assets in Emerging Market Economies and Latin America are correctly priced the utility curves of individuals would be uplifted and would become less concave with less risk aversion.

Box 3: From Risk-Averse To Risk Neutral

Assume that the risk-averse party of the preceding example initially bears, say, the 10 percent risk of losing 10,000, and consider the situation if he pays 5,000 to a risk-neutral party for him to bear the risk. The risk-averse party will be better off, for it was shown in Box 1 that his expected utility will be 11.4998. It will be 11.5029—higher- if he pays 5,000 (i.e., he buys the insurance and does not bear the risk). On the other hand, the risk-neutral party will be just as well off, since he will be indifferent between not bearing any risk and being paid 1,000 to bear the 10 percent risk of losing 10,000. It is therefore clear that if the risk-averse party pays a little more than 1,000 (say, 1,100), he will still be better off having shifted the risk (his wealth will be 98,900, so his utility will be 11.50, which is still greater than 11.4998). Also, the risk-neutral party will also be better off (by 100) rather than just as well off.

Risk Aversion and Social Welfare

The distinction among attitudes toward risks implies that the allocation of risk between risk-averse and risk neutral or less risk-averse individuals influences social welfare. In case social welfare can be assessed as the summation of individuals’ utilities, if government intervention shifts risks from the risk-averse to the risk neutral or from the more to the less risk-averse social welfare goes up. In fact, the bearing of risk by the more risk averse instead of the less risk averse will increase total utility, i.e., social welfare. This is because the bearing of risk by the more risk-averse would result in a greater reduction in their expected utility than will the bearing of risk by the less risk-

averse or by the risk neutral. Indeed, for this reason, it is always possible for the more risk-averse to pay the less risk-averse or the risk neutral to assume risk, so as to leave both better off in terms of expected utility. The logic of the transfer of risk for social welfare can be explained with the example in Boxes 3 and 4.

Box 4: From Risk-Averse to Risk-Averse

Box 4: From Risk-Averse to Risk-Averse

Assuming that the risk-averse party with wealth of 30000 (Box 1) initially bears the 5 percent risk of losing 20,000 and that another, otherwise identical, risk-averse party bears no risk. Then since the expected utility of the first party will be (as was shown) 10.254 and that of the second 10.3090 (no losses), the sum of their expected utilities will be 20.56. If, however, losses are divided equally between the parties, so that each bears a 5 percent risk of losing only 10,000 (and remaining with 20000), then the expected utility of each will be $95\% \times 10.309 + 5\% \times 9.9035 = 10.288$. The sum of their expected utilities will thus be 20.577, which is greater than 20.56, and social welfare will be higher.

Transfer from Risk Averse individual to Risk Averse individual	
20.5630	20.5774

“Social welfare is raised not only by the complete shifting of risks from the more to the less risk-averse or to the risk neutral, but also by the sharing of risks among risk-averse parties. Thus, for example, an individual may decide to undertake a promising business venture only because he has partners with whom he can share the risk. Sharing risks reduces the magnitude of the potential loss that any one of them might suffer” (Shavell, 2007, pp. 189–192).

However, the shifting of the risk for social welfare may not help to create the incentives for a supply of risk neutral individuals. Quite the contrary, redistribution policies may reduce the incentive of being risk neutral and entrepreneurs may have little incentives to undertake risky businesses. Ilmakunnas and Kanninen (2001) indicate that

risk influences the distribution of people between entrepreneurs and employees. With a panel data for various OECD countries, they study the relationship between private sector firms and the resources that the public sector devotes to social insurance. The results confirm that entrepreneurs as risk takers; and “business risk” is not insurable (i.e., the failure of a firm is not covered). In addition, they find that the availability of social insurance, which implies an increase of public sector spending, and social regulation determine disincentives on risk-takers entrepreneurs. Emerging Market Economies have put in place several forms of social welfare and social protection. The analysis of Ilmakunnas and Kanninen (2001) could provide similar results for the Emerging Market Economies. Thus, the transfer of risks in a social welfare context may have detrimental short- and long-term effects on Emerging Market Economies as the incentives for undertaking productive and risky business activity will be reduced and consequently the supply of risk neutral individuals may dry up, as they may feel used for transfer collective risk rather than undertaking private risk. This type of policies may substantially penalize the entrepreneurs who are potentially those more willing to undertake business activities and risks and thus promote economic growth.

Relevant Factors for Insurance Development: Demand and Supply

The analysis of demand and supply of insurance is relevant for the research as it provides the background to define and measure the insurance variables to include in the equations; and discusses the supply of insurance considering that the approach of this study is that of strengthening and improving the supply of insurance to satisfy a latent demand

Demand of Insurance or Insurance Consumption

A substantial part of the analysis of insurance markets focus on the demand of insurance under the assumption that the stimulation of demand is equivalent to promote insurance growth (Merton 1969; Mossin 1968; Samuelson 1974; Beenstock, Dickinson and Khajuria 1986, 1988; Gollier 2004; Esho et al. 2004; Hussels, Ward and Zurbruegg 2005).

Individual attitudes toward risk (e.g., risk aversion reviewed before) are among the factors related to the demand of insurance. The profile of the insured is normally that of a risk-averse individual. However, with respect to the demand of insurance of entrepreneurs, one could expect a less conservative a more aggressive risk profile.

At the individual level, wealth, level of saving, and GDP per capita have a positive impact on insurance and prompt the development of insurance markets (Swiss.Re reports, various years). The relationship between demand of insurance and GDP per capita indicates that the marginal propensity to insure - the increase of spending on insurance as income increase by \$1 - is positive and greater than 1, which implies that insurance is a superior good¹¹⁶.

The level of premiums and their perceived fairness constitute significant factors of the demand of insurance.

Hussels, Ward, and Zurbruegg (2005) indicate that a functioning legal system, a stable political environment constitute the most important factors for the demand of

¹¹⁶ A superior good might be a luxury, which is not purchased at all below a certain level of income, or have a wide quality distribution (where the number produced may stay constant with rising wealth, but the level of spending goes up, to secure a better experience.)

insurance. Therefore, the institutional setting, e.g., legal system, regulation, supervision, enforcement, trust, rules of the games and incentive's structure, represents a relevant factor of demand.

Relevant macro-economic factors are also: macro-economic conditions and stability, inflation, wealth, and financial development. For casualty insurance relevant factors that stimulate demand are level of GDP, financial development and legal environment and particularly enforcement of property rights.

There are non-economic factors that influence the demand of insurance, i.e., culture and religion. This indicates that the demand of insurance is not based exclusively on personal, economic, legal and political factors, but other factors (e.g., cultural) influence the attitudes toward risk (Park & Lemaire, 2011). For instance, referring to the European market, Hofstede and Minkov (2010) underline that insurance is a product of the national culture and values, e.g., solidarity, independence and predictability, which limit generalizations and the ability to import insurance models from other countries.

Knowledge of insurance is a factor to be considered as relevant for the demand of insurance. In this respect, the diffusion of insurance practices and products facilitates the knowledge of insurance and the interest towards the products offered.

*Measures*¹¹⁷

The factors identified above can be measured and hard data are available. Three measures of the factors of insurance demand are relevant for the study: risk aversion, penetration ratio and density ratio.

¹¹⁷ See also Appendix 2 on Measures.

Risk aversion is measured by the level of education attained under the assumption that better educated individuals have a superior ability to understand the issues related to risk and make informed decisions (Schooley & Worden, 1996, pp. 92–3).

The Penetration ratio is measured by the Total value of Premiums over GDP. It constitutes a measure of the availability of insurance

The Density ratio is measured by the Total value of Premiums over Population. It constitutes a measure of the knowledge of insurance.

The number of insurance companies (and also the number of brokers at territorial level) could be a measure of knowledge of insurance.

Penetration and density- respectively availability of insurance and knowledge of insurance in the model of this study- have been used as dependent variables in various insurance studies as they represent two measures of demand of insurance (Kjosevski, 2012). Park and Lemaire (2011) explain that penetration and density measure different effects: penetration measures insurance consumption relative to the size of the economy; density compares insurance purchases across entities without adjusting for income.

Penetration measures how wealth is allocated to insurance in relative terms: two states/countries with similar GDP may exhibit different insurance consumption patterns, an effect that penetration can gauge and not density.

All these factors, and particularly the various components of the institutional setting,¹¹⁸ play a significant role in the demand for insurance.

¹¹⁸ The institutional setting and the level of trust are not easily quantifiable, given the long-term nature of the insurance contract.

Table 2. Factors Influencing Insurance Demand

Factors Influencing Insurance Demand	
General Factors	Specific Factors
economic growth	knowledge of insurance /products offered
wealth distribution of income	distribution channels
religion, culture	risk awareness
education	insurance regulation
property rights, legal certainty	trust in insurance
Non-life insurance	Life Insurance
compulsory insurance	economic stability (e.g., inflation)
natural catastrophe exposure	savings rate
public role in health and workers' compensation insurance	demography
claims awards	Tax and tax benefits
	Pension system
<i>Source: Swiss.Re Economic Research and Consulting- author</i>	

Insurance Supply

Insurer is normally risk-neutral. Insurance supply is a typical upward curve: the insurance company is normally willing to sell more insurance as the price rises.

Insurance markets characteristics heavily influence the supply of insurance. For instance, excessive risk aversion does not help insurance consumption and does not encourage the supply of insurance. The solvency of the insurer, i.e., following particularly negative circumstances that call for disbursements for claims, the insurance company normally

faces a solvency constraint that may lead to increases of premiums, additional capital contributed, distress, and bankruptcy. The levels of premiums, interest rates, and value at risk, and probability of occurrence and the effectiveness of institutions impact the supply of insurance. The risks that insurers face and the existence of asymmetric information influence the supply of insurance (e.g., under provisioning).

Beenstock, Dickinson and Khajauria (1988) study the relationship between property-liability insurance premium and income with a country panel data (1971–82) for 12 industrialized countries with premiums as the dependent variable.

They find that higher interest rates tend to raise premiums. The institutional setting and the rules of the game create the condition under which insurance operates and offers policies and products for the clientele. Insurance supply is somewhat exogenous as an activity that requires a certain amount of entrepreneurship, but also has an endogenous component in the sense that as a market institution is dependent on the existing rules of the games and institutional setting.

As shown in the preceding sections, in emerging market and Latin American economies given the level of wealth, a series of social economic and institutional inefficiencies – lumped together under the headings of insufficient institutional framework - make risk aversion particularly large, and prompts the under provisioning of insurance, or at least of formal insurance considering that people undertake less efficient forms of protection.

The analysis of the supply of insurance is relevant to address the question of causality between insurance and other areas such as economic growth or

entrepreneurship. The supply side would argue that a solid supply of insurance is the condition to develop the demand for insurance. In other words, the economic activities of the entrepreneur will develop better and faster in an environment where the instrument for coverage exist and are readily available.

Appendix 2: Measures and Variables

Part A: Measures

This section discusses in more details the so-called operationalization and provides appropriate measures of the variables—entrepreneurship, insurance and other variables—included in the model for the empirical verification of the relationship between entrepreneurship and insurance. The discussion intends to clarify the construction of the Brazilian database used for the analysis and lays the foundations for the global database to be used for future research

Entrepreneurship

Different theories, definitions and measures of entrepreneurship have emerged over time¹¹⁹.

As research and policies on entrepreneurship expand, it also clear that theories, definitions and measures of entrepreneurship are intrinsically related, in the sense that to different theories and definitions of entrepreneurship correspond various measures (assuming that data are available), which present diverse implications for effective public policies that ultimately intend to promote economic growth. Various authors (Acs & Szerb, 2010; Acs & Virgill, 2009; Audretsch & Thurik, 2001; Congregado, 2010; Desai, 2009; Iversen et al., 2007; Reynolds, 2005; Schiller & Crewson, 1997) have formulated theories, definition and measures of entrepreneurship applicable to developed and Emerging Market Economies.

From an operational point of view, the research and operational work of relevant entities such as the World Bank and the IFC, Babson College and other universities have complemented

119 Entrepreneurs introduce innovations reflected in technology and productivity advance and lead to economic growth (Carree and Thurik 2010); at the firm and industry levels, small, newer companies are positively related to high growth rates, and entrepreneurship and growth are associated (Parker 2009); at the national, macroeconomic level, there is a positive relationship between various measures of entrepreneurship and economic growth rates in OECD countries (Audretsch and Thurik 2001); entrepreneurship brings about gains in jobs and sales (Shane 2004, 5–6, 210, 223, 238).

theoretical studies. These entities have applied the theoretical work to emerging market countries; verified theories and definitions; implemented appropriate policies; and tested their effectiveness.

The Global Entrepreneurship Monitoring (GEM, <http://www.gemconsortium.org/>) - a joint initiative of Babson College (United States), Universidad del Desarrollo (Chile) and Universiti Tun Abdul Razak (Malaysia) - constitutes an essential step toward the goal of providing reliable and comparable data on entrepreneurship. The GEM database shows the entrepreneurship's diversity across the world by identifying the factors associated with variations in national entrepreneurial activity. The data are disaggregated into poor and rich countries, include activities, aspirations, and attitudes to entrepreneurship, and distinguish between necessity and opportunity entrepreneurs. Full GEM data sets for 1999–2012 are currently in the public domain (Bosma, Coduras, Litovsky, & Seaman, 2012). The GEM is considered a leader on measures of entrepreneurship: http://www.gemconsortium.org/about.aspx?page=gem_datasets.

As indicated in the literature review, in the section on entrepreneurship, the definition of entrepreneurship in relation with different types of companies imply that not all forms of entrepreneurship produces growth (Sorensen & Chang, 2006), i.e., the literature suggests that innovative entrepreneurship makes a relevant contribution to economic growth. Therefore, particularly for policies oriented toward economic growth is crucial to identify the types of entrepreneurs that prompt economic growth. From an operational point of view, measures of entrepreneurial performance, e.g., sales, sales growth, revenues and revenues growth, tenure of firm (Sorensen & Chang, 2006) are not easily available, thus measures of entrepreneurship by necessity and entrepreneurship by opportunity (Wong et al., 2005) seem most suitable. Along these lines, the measures of Total Entrepreneurship Activity (TEA), and the related measures of opportunity TEA and necessity TEA—developed by the GEM—should be considered to test the relationship between insurance and entrepreneurship. However, measures of the entrepreneurship

by necessity and opportunity are available at the global level (i.e., global database), but not national and sub-national levels, i.e., the Brazilian database constructed with the states of Brazil as the unit of reference.

Since 2007, the World Bank has undertaken the Entrepreneurship Survey (Klapper, Amit, Guillen, & Quesada, 2007), which measures entrepreneurial activity in 84 developing and industrial countries around the world over the period 2003–2005. The database includes cross-country, time-series data for both all and newly registered businesses. The World Bank's 2007 Entrepreneurship Survey (Klapper et al. 2007) (Desai 2009), gathers data directly from registrars of companies and other official sources on the year-end stock of total registered firms and new firms registered each calendar year. As (Klapper et al., 2007) indicate, the definition of entrepreneurship includes businesses that operate in the formal sector and - to maximize comparability across countries with different legal and economic systems - the database includes LLCs. A key indicator of entrepreneurship is the entry rate, measured as new firms (those that were registered in the current year) as a percentage of lagged total registered firms. Business density is measured as total firms as a percentage of the working-age population.

In 2010, the World Bank has updated the database of entrepreneurship with the 2010 World Bank Group Entrepreneurship Snapshots (WBGES —<http://econ.worldbank.org/WBSITE/EXTERNAL/EXTDEC/EXTRESEARCH/0,,contentMDK:22731215~pagePK:64214825~piPK:64214943~theSitePK:469382,00.html>), continuing to illustrate the importance of entrepreneurship for the dynamism of the modern economy. In comparison to the 2007 survey, the survey in 2010 incorporates improvements in methodology, greater participation from the countries included. These improvements allow greater cross-border compatibility of data. This joint effort by the World Bank Development Research Group, the International Finance Corporation (IFC), and the Kauffman Foundation

constitutes the most comprehensive data set on cross-country firm entry data available today. Other international organizations have entrepreneurship as priority in their work. The United Nations Conference on Trade and Development (UNCTAD) has issued a policy framework of policies for entrepreneurship developing a methodology and measures to evaluate these policies (UNCTAD, 2012a).

Acs, Desai, and Hessels (2008) study the differences between the GEM data set for early-stage entrepreneurial activity and the World Bank Entrepreneurship Survey data set for formal business registration(see also Acs, Desai, & Klapper, 2008). They find a number of important differences in the two sets of data. First, the GEM data tend to report significantly higher levels of early-stage entrepreneurship in developing economies than do the World Bank data, while the World Bank data tend to be higher than the GEM data for developed countries. They also find that the magnitude of the difference in rates reported across countries in the two databases is related to the local institutional and environmental conditions for entrepreneurs, after controlling for levels of economic development. An explanation for this discrepancy is that the World Bank measures rates of entry into the formal economy, whereas the GEM data reflect entrepreneurial “intent” and capture informal entrepreneurship, particularly in developing countries. Therefore, this discrepancy might be interpreted as the spread between individuals who could potentially operate businesses in the formal sector and those who choose to do so.

Acs and Szerb (2010) - see Chapter 6 - study the relationship between entrepreneurship and economic development and find that a function mildly S-shaped captures entrepreneurship across countries. The work of Acs and Szerb has then led to the creation of the Global Entrepreneurship and Development Index (GEDI) (Acs & Szerb, 2012) to measure the ambition of entrepreneurs as well as the prevalence of start-ups. Szerb, Aidis, and Acs (2013) have recently reviewed the methodology of GEM and GEDI.

The OECD has developed extensive research and data on entrepreneurship and OECD-Eurostat (OECD, 2009a) provides various entrepreneurship indicators.

<http://www.oecd.org/fr/industrie/stats-entreprises/theentrepreneurshipindicatorsprogrammeeipbackgroundinformation.htm>.

Under the present status of the literature, the task is to select combinations of theories-definition-measures that are relevant for economic growth and can prompt effective policies in favor of entrepreneurship that have an impact on economic growth.

The relevant measures used in this study derive from the existing literature and particularly Iversen (2007) and Congregado (2010), following the logic of the distinction between entrepreneurship by opportunity and entrepreneurship by necessity (Acs, 2006; Reynolds, 2005; Wong et al., 2005) and from the empirical work that GEM and the World Bank have made with respect to definitions and measures of entrepreneurship.

For the purpose of this study, Table 3 summarizes definitions and theories, measures. The left column of Table 3 offers the definitions of entrepreneurship and economic activity that are relevant for this study: large companies, SMEs, entrepreneurs and micro entrepreneurs, as well as the entrepreneurship by opportunity and by necessity.

Table 3. Taxonomy of Entrepreneurship for the Study

Entrepreneurship: Definitions and Measures				
Definition	Measures of Entrepreneurship	References	Brazilian Database	Global Database
Large Firm	Number of Firms Business Density	Sorensen and Chang (2006); Iversen and others (2007); Congregado (2010)	Number of Firms	Business Density
Small and Medium-Sized Enterprises	Limited Liabilities Companies (LLC)	Iversen and others (2007); Congregado (2010); Desai (2009)	Limited Liabilities Companies (LLC)	Business Ownership
	Business Ownership			
Entrepreneurs	New Entries	Audretsch and Thurik (2001)	Start Ups	New Entries
	Start Ups			
	Total Factor Productivity (TFP)	High (2009); Erken, Donselaar and Thurik (2009)	Total Factor Productivity (TFP)	Total Factor Productivity (TFP)
Micro entrepreneurs	Self Employment	Acs and Szerb (2010)	Self Employment	Self Employment
Entrepreneurship	Total Entrepreneurship Activity (TEA)	Reynolds (2005); Wong, Ho and Aution (2005); Acs (2006)	NA	Total Entrepreneurship Activity (TEA) - GEM
Entrepreneurship by Opportunity	Opportunity TEA		NA	Opportunity TEA - GEM
Entrepreneurship by Necessity	Necessity TEA		NA	Necessity TEA - GEM

Access to financial services, including insurance, is crucial to support economic activity and entrepreneurship, reduces uncertainty that exists in the system and possibly transforming it into controllable risk. In this context, policies to improve the institutional setting, supporting the supply of insurance could create a favorable business environment that supports entrepreneurship.

The Brazilian database - see Chapter 9, Table 11 - includes measures of the different specifications of entrepreneurship indicated in Table 3 above. The measures included in the Brazilian database are: the number of large companies, SMEs, start-ups, and self-employment. The source of these data is IBGE. The database includes a primitive measure of TFP by state. As indicated previously, total start-ups constitute the measure of entrepreneurship used in this study.

In view of future work, the second column of Table 3 refers to different specifications of the measures of entrepreneurship and economic activity and offers an implicit ranking of entrepreneurship as follows:

- Number of firms; Business density
- LLCs; business ownership; number of entries and new entries
- Start-ups,
- TFP
- Self-employment
- TEA

- Opportunity TEA
- Necessity TEA.

The total number of firms as well as the large firms is a measure of business activity and to lesser extent of entrepreneurship. More accurate measures of entrepreneurship would refer to different type of companies: limited liability companies, business ownership rate (number of business owners per workforce), new entries, start-ups, TPF, self-employment. Then, the measures of TEA, Opportunity TEA and Necessity TEA as indicated by GEM constitute relevant measures of entrepreneurship. All the measures indicated above are normalized for the level of economic development (GDP and GDP per capita).

The list of measures includes TPF, which tests the role of entrepreneurship and productivity growth (High, 2009b). The concept and measure of TFP deserve some clarification. According to High (2009b), TPF represents the gains in productivity not directly related to labor and capital, heavily influenced by entrepreneurship and innovation. TPF is crucial to achieve economic growth. Thus, TFP can be regarded as the share of output not explained by the inputs used in production. In other words, TFP is the productivity growth due to innovation and entrepreneurship and that is endogenous to economic processes and policy incentives (High, 2009b). The level of TFP depends on how efficiently the inputs are used in production (Comin, 2006). The implication is that TPF and economic growth depend on the amount of labor and capital invested and the productivity with which these inputs are employed to produce innovative goods and services (Blyde, Daude, & Fernandez-Arias, 2009). Thus, improving production methods increases TFP. Successful practices include the use of the two basic inputs of labor and capital through greater and more elastic labor involvement (e.g., new working techniques); investment in tangible (improving the use of existing capital), and intangible assets like human capital (greater labor abilities and proficiencies); R&D (creation of new operational knowledge), and technology (innovation). TPF, therefore, can be regarded as a choice variable “endogenous”

to the economic processes. Various studies underscore the contribution of entrepreneurship to TFP. High (2009b, p. 72) stresses the link of TFP to the entrepreneur as the “active force behind the productivity increases.” (CBO, 2007) studies the impact of R&D (Czarnitzki & Hottenrott, 2010) on productivity and argues that innovation rather than R&D creates productivity gains and that entrepreneurship allows the commercial realization of the innovation. (Erken, Donselaar, & Thurik, 2009) include TFP in a model to explain entrepreneurship and show that in OECD countries entrepreneurship has a positive impact on TFP. They measure entrepreneurship as the business ownership rate (number of business owners per workforce) corrected for the level of economic development (GDP per capita). On the basis of the research, TFP (over time and by each country and state) is regarded as a possible measure of entrepreneurship.

Thus, the measures of entrepreneurship range from a broad definition of economic activity to more specific measures of entrepreneurship; provide different specifications of entrepreneurship; and allow testing the relationship between insurance and entrepreneurship.

The design of the global database includes the measures corresponding to the specifications of entrepreneurship indicated in this section. These measures result from the World Bank–IFC and the GEM database and are not equivalent to the measures of entrepreneurship used for the Brazilian database. A measure of TFP by country should be calculated and included in the global database.

At the end of this section there is a list of sources of data on entrepreneurship.

Insurance

The measures of insurance - the independent variable - used in the research follow the studies mentioned in the literature review, and particularly the work of Outreville (1990, 1996, 2011).

Haiss and Sümegi (2008) present an almost complete survey of the studies of the link between insurance and economic growth and the variables used and refer to a series of variables such as population, savings, risk aversion, education, and corruption (Haiss & Sümegi, 2008). Kugler and Ofoghi (2005) similarly use various values of insurance premiums, e.g., life, health, and accidents as independent variables. Arena (2006) uses life and non-life insurance premiums as independent variables. Ward and Zurbruegg (2000) include total insurance premiums as independent variable. Webb, Grace and Skipper (2002) use premiums on property and liability insurance as percentage of GDP as independent, explanatory variable.

Availability of Insurance. The availability of insurance - the main independent variable - can be measured by the ratio of total insurance premiums (life and non-life) to GDP, which constitutes the so-called penetration ratio and a standardized measure of availability of insurance (Outreville 1990, 1996, 2011). This insurance penetration ratio can also be measured for different types of insurance (e.g., life, non-life, business insurance).

Availability of insurance for different types of insurance can also be measured by the level of premiums related to business activity, i.e., the volume of premiums collected in each country or state over a certain period of time divided by the number of people, i.e., the density ratio.

A measure of the availability of insurance would also be the number of brokers by country or state over time. Taking the share of the total brokers in a given region could standardize this measure.

Propensity to Buy Insurance. The propensity to buy insurance can be measured by the attitude to risk, i.e., *risk aversion*. However, risk aversion is not easily measurable, i.e., it is difficult to measure the attitude of risk particularly in the past. According to Outreville (1996), education promotes an understanding of risk and hence increased demand for insurance. Szpiro

and Outreville (1988) argue that the more people are educated, the less risk-averse they become, i.e., better education improves the capability of assessing risk of risk. Also, a better education is associated with an increase in transferable human capital, facilitating greater risk taking by individuals with lower risk aversion. Therefore education—defined as the percentage of the population completing secondary education—represents a good proxy for risk aversion.

Knowledge of insurance is inserted in the model and is measured by the insurance density (total volume of premiums over population), which is a per capita index referring to the average insurance premium. It is included in the model as it is related to the propensity to buy insurance and influences the availability of insurance. The number of insurance companies (and also the number of brokers at territorial level, not easily available) could be a measure of knowledge of insurance.

Penetration and density - availability of insurance and knowledge of insurance in the model of this study, respectively - have been largely used as dependent variables in various insurance studies as they represent two measures of demand of insurance (Kjosevski, 2012). Park and Lemaire (2011) explain that penetration and density measure different effects. In their words, penetration measures insurance consumption relative to the size of the economy, while density compares insurance purchases across states/countries without adjusting for income. Penetration measures relative insurance consumption as the overall wealth effect is removed. It measures how GDP is allocated to insurance: two states/countries with similar GDP per capita may exhibit different insurance consumption patterns, an effect captured by penetration and not by density.

Social Insurance. As shown in other sections, there are different views about the role of social insurance. Ilmakunnas and Kanninen (2001) study the relationship between private sector firms and the resources that the public sector devotes to social insurance. They find that the availability of social insurance, which implies an increase of public sector spending, and social

regulation determine disincentives on risk-takers entrepreneurs. On the other hand, there are other studies and among them a recent study of Chen, Clarke and Roy (2013) that argue also in a broader perspective that improvements in health facilitate substantial economic growth.

Table 4. Measures of Insurance used in the Study

Definition of Insurance	Measure of Insurance	Reference	Brazilian Database	Global Data Base
Availability of Insurance	Penetration Ratio	Outreville (1990,1992,1996)	Volume of Premiums (SUSEP) and GDP (IBGE)	Penetration ratio (World Bank, OECD, ASSAL, IIF)
Knowledge of Insurance	Density Ratio	Kijosevski (2012); Park and Lemaire (2011)	Volume of Premiums (SUSEP) and GDP (IBGE)	Density ratio (Swiss.Re);Insurance and financial services as % of commercial service exports (World Bank)
Risk Aversion	Education	Outreville (1996); Szpiro and Outreville(1988)	IBGE	Education (World Bank, UNDP)
Social Insurance	Health Expenditure; and volume of health insurance premiums.	Ilmakunnas and Kannianen (2000, 2001)	IBGE and Social Insurance (SUSEP)	Social Insurance (World Bank, UNDP)

Table 4 above summarizes the insurance variables and their operationalization. The insurance variables included in the Brazilian database and spelled out in Chapter 9, Table 11,¹²⁰ are based on Table 4.

With respect to future work, the global database includes data for insurance variables, which are available from various sources listed at the end of this section.

Control Variables

¹²⁰ Table 11 reports all the variables used for this research for the Brazilian database.

This category includes a series of variables and particularly institutional setting that the literature and research consider relevant for the development of insurance markets and their inclusion is intended to assure that the relationship between insurance and entrepreneurship is not affected by model misspecification.

Institutional Setting

Institutional setting is the control variable that deserves attention. Institutional setting in short is defined as reliable and effective institutions and rules that are enforced. It represents the institutional quality in each Brazilian state, which is very relevant for economic activities. Scholars have long argued that institutional context significantly influences the propensity of firms to invest and their ability to grow (Greif, 2006; North, 1990; Porter, 1998b; Weingast, 1995). North and other authors (2012) articulate the relationship between various types of violence and political and economic development arguing that offering privileges to limit the use of violence by powerful groups or individuals hinders economic and political development. In contrast, open access to economic and political organizations, fostering political and economic competition, facilitates economic growth and development. Some authors (Borner et al., 2004) review the efficiency of economic and political institutions indicating among other aspects how different types of violence are related to efficient institutions. Woodruff (2006) addresses the question of measuring institutions. He identifies mortality and particularly that associated with forms of violence—including homicide—with a society that does not value human life and thus with an underdeveloped institutional setting. He also underscores that a society where labor regulations are weak—allowing, for instance, labor by underage workers or children—has a low quality of institutions. By the same token, a society that has large percentage of infant mortality implies a level of development particularly low. Along the same lines, Poe and Tate (1994) indicate that the abuse of internationally recognized human rights, specifically those having to do

with integrity of the person such as child labor are equivalent of weak institutional setting. The Cingranelli-Richards (CIRI) Human Rights Dataset (<http://www.humanrightsdata.org/index.asp>) contains standards-based quantitative information on government respect for 15 internationally recognized human rights for 195 countries, annually from 1981 to 2010. Scholars and students who seek to test theories about the causes and consequences of human rights violations are expected to be the main users of the data. Malesky and Taussig (2009) use various dimensions to measure the quality of institutions and governance in the provinces of Vietnam. They come up with a composite index ranking Vietnam's 64 provinces including a measure of labor and efforts by provincial authorities to promote safe labor places.

At the level of each Brazilian state, it is difficult to find appropriate measures of institutional setting that fully reflect what the literature shows. The task is thus to find a proxy that could be comfortably used in the model. The choice has to look at both what is meaningful to use given the literature and the availability of data. Based on the contributions found in the literature and considering the availability of data, the proxies used in the analysis for the institutional setting at the level of each Brazilian state are: people who die for homicide and violence per 1000 habitants (*MortHomicpermilhab*); percentage of people who die for infant mortality (*Taxamortinfpermil*); and share of jobs undertaken by children who are underage (*Taxtrabinf*). The decline of these measures implies an improvement of the institutional setting, i.e., an improved legal and social environment leads to a decline of homicides (*MortHomicpermilhab*), deaths of infants (*Taxamortinfpermil*) and work of children who are underage (*Taxtrabinf*). The source of these data is IBGE.

Instrumental Variables

Financial intermediation or financial markets is a critical variable that influences entrepreneurship and operates in conjunction with insurance. In this respect, the literature review surveys the main contribution of the financial sector to economic growth (see Chapter 6). Financial intermediation is used as instrument (i.e., the instrument Z is correlated with X , Insurance; and is expected to be uncorrelated with the error u_i). The overall size of the financial system can be measured by the value of financial assets in absolute terms and as a proportion of gross domestic product (GDP) (World Bank 2005, chap. 2). The normalization of financial assets to GDP facilitates the understanding of the level of financial development and allows comparison among countries at different stages of development. Other indicators of financial size and depth are: the ratio Monetary Circulation and GDP ($M2/GDP$), the ratio credit to the private sector and GDP (Credit Private Sector/GDP), and the ratio of bank deposits and GDP (deposits/GDP).

For the Brazilian database, the variable related to financial markets is the volume of financial intermediation (Intermediação Financeira, Seguros e Previdência Complementar e Serviços Relacionados, Preço Corrente-1 000 000 R\$—Source IBGE) over GDP for each Brazilian state and for each year. An alternative measure of financial markets for the Brazilian database is the balance of credit operations (Total Balance of National Financial System Credit Operations—Individuals and Corporations—R\$ (million)—Source: Banco do Brasil).

Event Variables

Legislation can be used as instrumental event variable. It involves measures of legislation and policy changes affecting branches of the insurance industry in the last ten years. For instance, in Brazil, in the year 2000, an autonomous regulatory body was created in the health insurance industry, i.e., in a market where no regulation existed until then. In 2001, it was introduced legislation that regulated financing mechanisms for the agricultural insurance industry. In the life

insurance industry, in 2001, regulation created more market alternatives; in 2004, taxation measures were introduced benefiting the industry, i.e., tax breaks for consumers and investors. All these policy changes can be used as instruments to assess whether insurance and entrepreneurship reacted to the introduction of these changes. Problem with events is that a significant amount of data before and after the event are needed, which might not be the case for the database available, and especially the Brazilian database.

At the global level, event variables that have an impact worldwide and that can be incorporated into the global database are more complicated to find, as they should have the characteristics of making significant differences before and after the event.

Table 5. Control, Instrumental and Other Variables

Control, Instrumental and other Variables				
	Variable	References	Brazilian Dataset	Global Dataset
Independent	Social Insurance	Ilmakunnas and Kanninen (2001); Chen, Clarke and Roy (2013)	GastosSaudePercapita	Public Expenditure for Health (World Bank)
			ContrPrevidenzaTrabajo	Contribution of Workers to Social Security (World Bank; ILO)
Control Variables	Institutional Setting	Greif(2006); North (1990); North and other (2012); Woodruff (2006); Poe and Tate (1994); Malesky and Taussig (2009)	Quality of Institutions at the state level -NA	Measures of Quality of Institutions (World Bank; Emory; Economic Freedom of the World; Transparency International and other).
			Taxamortinfpermil	Infant Mortality (UNICEF)
			Taxrabinf	Rate of infantile workers as percentage of population (World Bank-UNICEF)
			MortHomicpermilhab	Coefficient of death by Homicide - Number of dead people dead because homicides by 1000 people (United Nations: http://www.un.org/en/peacekeeping/publications/un_rule_of_law_indicators.pdf)
Instrument Variable	Financial Intermediation	King and Levine (1993); World Bank (2005)	fi	Financial Intermediation (World Bank)
			figdp	Financial Intermediation per capita (World Bank)
Interaction	Insurance and Financial Intermediation	Arena (2006)	Interins fi	Interaction between Insurance and Financial Intermediation (World Bank)

Part B: Sources

The following is a list of sources for data on insurance, entrepreneurship and other variables

(control, instrument):

- Insurance

Data for insurance variables, which are available from various open sources.

The OECD has a great deal of insurance data, limited to member countries that include developed countries, i.e., the so-called OECD countries. They include data on penetration, density, and premiums.

<http://stats.oecd.org/Index.aspx?DatasetCode=INSIND>

The Insurance Information Institute (III) has Information on international insurance, including world premiums, reinsurance. The Institute publishes annually the International Insurance Fact Book, which is a significant source of data and information.

http://www.iii.org/facts_statistics/international.html

Swiss.Re is a very important source of insurance data. Some data, e.g., penetration ratio is available through Sigma Publication, an annual publication available on the Swiss.Re web site for various years. Swiss.Re also sells insurance data.

http://www.swissre.com/sigma/Data_selling.html

Axco provides essential information on international insurance compliance, insurance premium taxes, laws, regulations, insurance statistics and much more for over 165 countries. Axco has a great deal of insurance data, not available, though, in the public domain.

<http://www.axcoinfo.com/ags.html>

The World Bank database has few data on insurance. A relevant data is that of insurance and financial services (% of commercial service exports). Insurance and financial services cover freight insurance on goods exported and other direct insurance such as life insurance; financial inter mediation services such as commissions, foreign exchange transactions, and brokerage services; and auxiliary services such as financial market operational and regulatory services.

<http://data.worldbank.org/indicator/TX.VAL.INSF.ZS.WT>

For European countries, insurance data including data on premiums and investments are available at the site of the European reinsurance federation, CEA. Its members are the national insurance associations in 34 European countries.¹²¹ <http://www.cea.eu/index.php/facts-figures/statistical->

121 Each European country maintains a regulatory and supervisory authority in which one can find specific data. For instance, in Italy the Istituto per la vigilanza sulle assicurazioni private e di interesse collettivo (ISVAP)—the Italian Supervisor of the insurance industry- represents the main source of insurance data for Italy. http://www.isvap.it/isvap/impreses_jsp/PageRelazioniList.jsp. Various data are included in the Annual Reports. It is possible to make specific searches.

[series](#). For the countries of the European Union, also Eurostat provides the largest amount of data. There are data for insurance services, including premiums, claims and also investments.
http://epp.eurostat.ec.europa.eu/portal/page/portal/european_business/data/database

The Asociación de Supervisores de Seguros de América Latina (ASSAL) has a very extensive database with lot of information on all Latin American and Caribbean countries.
http://www.assalweb.org/index_consulta.php

- Entrepreneurship

GEM:

GEM is the largest source of information on entrepreneurship around the world
<http://www.gemconsortium.org/>

A description of the variables is at

<http://www.gemconsortium.org/about.aspx?page=variables>

World Bank:

DataBank contains collections of time-series data on a variety of topics available including data on entrepreneurship and registered companies and insurance.

<http://databank.worldbank.org/data/home.aspx>

The IFC Database, i.e., World Bank Database. 2007, Micro, Small, and Medium Enterprises: A Collection of Published Data. Marta Kozak, International Finance Corporation (IFC), Washington, D.C provides data for the global database

http://rru.worldbank.org/Documents/other/MSMEdatabase/msme_database.htm

Doing Business:

Doing Business reports from the World Bank make public an expansive array of historical data dating back to 2003 (World Bank, 2012). Data are available at:

<http://www.doingbusiness.org/>

Among other data, *Doing Business* reports include data on:

Starting a business

Getting credit

Dealing with construction permits

Protecting investors

Enforcing contract

Registering property

OECD-Eurostat (OECD, 2009a) provides various entrepreneurship indicators:

<http://www.oecd.org/fr/industrie/statsentreprises/theentrepreneurshipindicatorsprogrammeeipbackgroundinformation.htm>

- Control, Instrumental and Other Variables

World Bank:

DataBank contains collections of time-series data on a variety of topics available:

<http://databank.worldbank.org/data/home.aspx>

World Statistics is a new portal that gives free and easy access to data provided by International Organizations, such as the World Bank, the United Nations, International Labor Organization, and Eurostat:

<http://world-statistics.org/>

IMF:

The IMF publishes a range of time-series data on exchange rates and economic and financial indicators. Manuals, guides, and other material on statistical practices at the IMF are also available.

<http://www.imf.org/external/data.htm>

United Nations Development Program:

<http://hdr.undp.org/en/statistics/>

Human Development Indicators (HDI):

The Human Development Indicators (HDI) can be found in the Database of the United Nations and in the annual Report, i.e., Human Development. Report 2011 Sustainability and Equity: Towards a Better Future for All, United Nations Development Program, UN Plaza, New York, NY 10017, USA(United Nations Development Program, 2011).

The link below takes to a window and for the countries selected,

<http://hdrstats.undp.org/en/tables/default.html>

United Nations:

The United Nations is a source of various data including those of Rule of Law indicators.

http://www.un.org/en/peacekeeping/publications/un_rule_of_law_indicators.pdf

UNICEF:

UNICEF measures the situation of children and women and tracks progress through data collection and analysis.

http://www.unicef.org/search/search.php?q_en=data

OECD:

<http://stats.oecd.org/>

Penn World Tables:

<https://pwt.sas.upenn.edu/>

Governance and Institutional Quality Resources:

<http://einstein.library.emory.edu/govinstlinks.html>

It includes a series of web site with various databases on institutional setting, including the Cingranelli-Richards (CIRI) Human Rights Dataset

<http://www.humanrightsdata.org/index.asp>. The dataset contains standards-based quantitative information on government respect for 15 recognized human rights for 195 countries, annually from 1981 to 2010. Scholars and students who seek to test theories about the causes and consequences of human rights violations are intended to be the main users of the dataset.

Economic Freedom of the World:

Economic Freedom of the World uses 42 distinct pieces of data to measure economic freedom in 141 nations. There are annual reports, i.e., Annual Reports: Economic Freedom of the World, by Gwartney James, Joshua Hall Robert Lawson.2011. Economic Freedom of the World 2010 Annual Report, Fraser Institute (Gwartney, Hall, and Lawson 2010)

<http://www.freetheworld.com/>

Index of Economic Freedom:

The Index measures 161 countries against a list of 50 independent variables divided into 10 broad factors of economic freedom. Low scores are more desirable. The higher the score on a factor, the greater the level of government interference in the economy and the less economic freedom a country enjoys. Areas covered include trade policy, monetary policy, property rights, banking and finance, and other issues. It constitutes a project of the Heritage Foundation and the *Wall Street Journal*. There is an annual publication by Miller Terry Ambassador and Kim R. Holmes. 2010. 2011 Index of Economic Freedom, by the Heritage Foundation and the *Wall Street Journal* (Miller and Holmes 2011).

<http://www.heritage.org/index/explore?view=by-region-country-year>

World Population:

The United Nations Department of Economic and Social Affairs, Population Division provides a data, estimates, and prospects on World Population and indicators for the period 1995-2011. The data can be downloaded (see link below) and can be found in World Population Prospects, the 2010 Revision, released in May 2011. Palgrave Macmillan Houndmills, Basingstoke, Hampshire RG21 6XS, United Nations 2011.

http://esa.un.org/unpd/wpp/unpp/panel_indicators.htm

Transparency International:

Since 1995, Transparency International (TI) publishes the Corruption Perceptions Index (CPI) annually ranking countries “by their perceived levels of corruption, as determined by expert assessments and opinion surveys.” The CPI generally defines corruption as “the misuse of public power for private benefit.” As of 2010, the CPI ranks 178 countries “on a scale from 10 (very clean) to 0 (highly corrupt).” The 2010 CPI draws on 13 different surveys and assessments from 10 independent institutions

<http://www.transparency.org/>.

Biz-Ed developed by the UK:
<http://www.bized.co.uk/dataserv/index.htm>

Table 6 reports the variables in the Brazilian and in the global data sets.

Table 6. Variables and Their Measures

Variables for the Analysis of Insurance and Entrepreneurship			
Variable	Operationalization		
	Brazil	Global	
Dependent Variable	Entrepreneurship and Economic Activity	Large firms and total number of companies. Source of data: Instituto Brasileiro de Geografia e Estatística (IBGE). http://www.ibge.gov.br/english/ .	Business Density. Source: World Bank http://econ.worldbank.org/WBSITE/EXTERNAL/EXTDEC/EXTRESEARCH/PROGRAMS/EXTFINRES/0,content0,DKQ1454003-pagePK-64166182-pPK-64166060-theSitePK-47806100.html
		Limited Liability Companies (LLCs). Source of data: Instituto Brasileiro de Geografia e Estatística (IBGE). http://www.ibge.gov.br/english/ .	
		Startups. Source of data: Instituto Brasileiro de Geografia e Estatística (IBGE). http://www.ibge.gov.br/english/ .	Business Ownership, i.e., Established Business Ownership Rate - Source: GEM http://www.gemconsortium.org/about.aspx?page=gem_datasets
			New Entries - Source: World Bank http://econ.worldbank.org/WBSITE/EXTERNAL/EXTDEC/EXTRESEARCH/PROGRAMS/EXTFINRES/0,content0,DKQ1454003-pagePK-64166182-pPK-64166060-theSitePK-47806100.html
		Total Factor Productivity at the state level - Source of data: Instituto Brasileiro de Geografia e Estatística (IBGE). http://www.ibge.gov.br/english/ . Calculation by the author.	Start Ups, Subentry - Source: GEM http://www.gemconsortium.org/about.aspx?page=gem_datasets
		Self Employment. Source of data: Instituto Brasileiro de Geografia e Estatística (IBGE). http://www.ibge.gov.br/english/ .	Total Factor Productivity (TFP) - to be calculated
Entrepreneurship	NA	Self Employment, Tentry - Source: GEM http://www.gemconsortium.org/about.aspx?page=gem_datasets	
Entrepreneurship by Economic	NA	Total Entrepreneurship Activity (TEA) - Source: GEM	
Entrepreneurship by Necessity	NA	Opportunity TEA - Source: GEM	
		Necessity TEA - Source: GEM	
Independent Variables	Availability of Insurance	The measure of the availability of insurance is Penetration Ratio (Premiums GDP) <i>Penetration2_Juvenil2</i> - Source of data: Instituto Brasileiro de Geografia e Estatística (IBGE). http://www.ibge.gov.br/english/ and Superintendência de Seguros Privados (SUSEP). http://www.susep.gov.br/principal.asp	The measure of the availability of insurance is the Penetration Ratio (Premiums GDP) - Source: OECD http://stats.oecd.org/Indext.aspx?DataSetCode=INDND_ASSAL , http://www.asahweb.org/indext_consultapipj_WB , http://data.worldbank.org/indicator/TX.VALINDSF.ZS.WT.Switzerland , http://www.swissre.com/signa/Data_selling.html
	Risk Aversion Propensity to Insurance	Risk aversion - Propensity to Insurance: the measure is the level of education (Oursville 1994, Späjo and Oursville 1998 - The variable used for the Brazilian database is <i>Propriedad2</i> - the percentage of literacy for people of 15 years, or <i>Taxa de analfabetismo 15 anos ou mais</i> - Rate of literacy for people of 15 years or older and also <i>Propriedad3</i> - average years of education for adults of 15 years of age or older. Source of data: Banco Central do Brazil http://www.bcb.gov.br/english/ and IBGE Instituto Brasileiro de Geografia e Estatística. http://www.ibge.gov.br/english/	Risk Aversion - Propensity to Insurance: level of education (Oursville 1994, Späjo and Oursville 1998, see section 9) - 1999-2006 - Source: World Bank and UNDP http://hdrstats.unep.org/entables/default.html
Control Variables	Institutional Setting	Indices for institutional setting: people who die for homicide and violence per 1000 inhabitants (<i>MortHowipermilab</i>), percentage of people who die for infant mortality (<i>TaxaMortInfPermila</i>), and share of jobs undertaken by children under age (<i>TaxaTrabalho</i>). The decline of these measures implies an improvement of the institutional setting, i.e., an improved legal and social environment leads to a decline of homicides (<i>MortHowipermilab</i>), deaths of infants (<i>TaxaMortInfPermila</i>) and work of children under age (<i>TaxaTrabalho</i>). Source of data: IBGE.	Governance and Institutional Quality Resources: http://einstein.library.emory.edu/govinstdata.html It includes a series of website with various databases on institutional settings, e.g., the Cingranelli-Richards (CIR) Human Rights Dataset http://www.humanrightsdata.org/indext.asp , which contains standards-based quantitative information on government respect for 15 internationally recognized human rights for 195 countries, including dignity of the individual, annually from 1981-2010.
Other Insurance Variables	Knowledge of Insurance	Density rate defined as total volume of premiums (life and non-life) per capita (i.e., premiums over population for different states and countries for various years) - <i>DPNUPI</i> - is a measure that can be related to the knowledge of insurance and that influences the availability of insurance. Source of data: Superintendência de Seguros Privados (SUSEP) and IBGE.	Density rate defined as total volume of premiums (life and non-life) per capita (i.e., premiums over population for different countries for various years) - Density Ratio is a measure that can be related to the knowledge of insurance and that influences the availability of insurance. Density Ratio (Premiums Population) - OECD. http://stats.oecd.org/Indext.aspx?DataSetCode=INDND_ASSAL , http://www.asahweb.org/indext_consultapipj_WB , http://data.worldbank.org/indicator/TX.VALINDSF.ZS.WT.Switzerland
		The number of insurance companies (and also the number of brokers) in a given state could also constitute a measure of knowledge of insurance. Number of insurance companies and also number of brokers - Source of data: Superintendência de Seguros Privados (SUSEP). These measures are not included in the Brazilian Dataset.	The number of insurance companies (and also the number of brokers) in a given country could also constitute a measure of knowledge of insurance. Number of insurance companies and also number of brokers - 1999-2006 - Source of Data: Swissre, Axa
	Social Insurance	The measures of social insurance include the Federal and state expenditures for social security and health - included in the model (Equation 1) - measured by the expenditure for social security per capita, <i>ContoSaudePerCapita</i> . Contributions of workers to Social Security (<i>ContoPrevidenteTrabalho</i>) is another alternative measure of social insurance used in the model. IBGE is the source of these data.	Insurance and financial services as % of commercial service exports. Source of Data: World Bank http://data.worldbank.org/data-catalog/world-development-indicators
Instrument Variables	Financial Intermediation	The measure of financial sector is the volume of financial intermediation (<i>IntermediacaoFinanceira</i> , <i>Seguros e Previdência Complementar e Serviços Bancários</i> , <i>Banco Central</i> - PS - source: IBGE) over GDP for each Brazilian state and for each year. An alternative measure of financial markets for the Brazilian database is the balance of credit operations. The measure used is <i>B</i> (absolute value) and <i>B/GDP</i> and <i>B/PIB</i> (standardized at the GDP and GEP per capita). By including the interaction variable following Arena (Arena, 2006), the model verifies the interaction between insurance and financial intermediation, i.e., <i>INSFININT</i> and <i>INSFININT/PIB</i> . IBGE and Banco Central do Brazil http://www.bcb.gov.br/english/ are the sources of the financial data.	Financial Intermediation by Country: 1999-2006 - Private Credit and Banking Credit Over GDP - Source: World Bank http://data.worldbank.org/data-catalog/world-development-indicators
Events	Event covariate (insurance) type of instrumental variable	In Brazil, in the year 2000, an autonomous regulatory body was created in the health insurance industry, i.e., in a market where no regulation was enforced until then; in 2001, it was introduced legislation that regulated financing mechanisms for the agricultural insurance industry; in 2001, regulation was enacted that created more market alternatives and competition in the industry; in 2004, taxation measures were introduced benefiting the industry, i.e., tax breaks for consumers and investors. All these policy changes can be used as instruments to assess whether insurance and entrepreneurship reacted to the introduction of these changes. Problem with events is that a significant number of data before and after the event are needed.	Event variables that have an impact worldwide and that can be incorporated into the Global database are more complicated to find as they should have the characteristics of making significant differences before and after the event.
		Mandatory Programs	

Table 7. List of Countries: Global Database

List of Countries										
	Countries	High Income	Middle Income	Low Income	OECD Countries	BRIC Countries	European Union	Central and South America	Asia	Africa
1	Algeria									x
2	Argentina		x					x		
3	Australia	x			x					
4	Austria	x			x		x			
5	Belgium	x			x		x			
6	Brazil		x			x		x		
7	Canada	x			x					
8	Chile		x					x		
9	China					x			x	
10	Colombia		x					x		
11	Cote DIvoire									x
12	Czech		x		x		x			
13	Denmark	x			x		x			
14	Ecuador			x				x		
15	Egypt		x							x
16	El Salvador							x		
17	Finland	x			x		x			
18	France	x			x		x			
19	Gemany	x			x		x			
20	Greece		x		x		x			
21	Guatemala							x		
22	Hungary		x				x			
23	Iceland									
24	India					x			x	
25	Indonesia		x							
26	Italy	x			x		x			
27	Japan	x			x				x	
28	Kenya									x
29	Korea Rep of	x							x	
30	Malaysia								x	
31	Mexico				x			x		
32	Morocco									x
33	Netherlands	x			x		x			
34	New Zealand	x			x					
35	Nigeria									x
36	Pakistan								x	
37	Panama							x		
38	Peru							x		
39	Philippines								x	
40	Poland				x		x			
41	Portugal				x		x			
42	Russia					x				
43	Singapore								x	
44	South Africa									x
45	Spain	x			x		x			
46	Sweden	x			x		x			
47	Switzerland	x			x					
48	Taiwan								x	
49	Thailand									
50	Trinidad and Tobago									x
51	Tunisia									x
52	Turkey									
53	United Kingdom	x			x		x			
54	United States	x			x					
55	Uruguay							x		
56	Venezuela							x		
57	Zimbabwe									x

Missing Data

Conventional methods for missing data, like listwise deletion or regression imputation, are prone to three serious problems:

- Inefficient use of the available information, leading to low power and Type II errors.
- Biased estimates of standard errors, leading to incorrect p-values.
- Biased parameter estimates, due to failure to adjust for selectivity in missing data.

More accurate and reliable results can be obtained with maximum likelihood or multiple imputations. These new methods for handling missing data have been around for at least a decade, but have only become practical in the last few years with the introduction of widely available and user-friendly software. Maximum likelihood and multiple imputations have very similar statistical properties. If the assumptions are met, they are approximately unbiased and efficient—that is, they have minimum sampling variance.

What is remarkable is that these newer methods depend on less demanding assumptions than those required for conventional methods for handling missing data. Maximum likelihood is available for linear models, logistic regression and Cox regression. Multiple imputations can be used for virtually any statistical problem.

Part B: Lists of Variables Included in the Databases

The lists of variables included in the Brazilian and global databases are given below.

Brazilian Database

The Brazilian database is used for the study. The sources of the Brazilian database are: IBGE

(Instituto Brasileiro de Geografia e Estatística) <http://www.ibge.gov.br/home/default.php>;

SUSEP (Superintendência de Seguros Privados) <http://www.susep.gov.br/principal.asp>; and IPEA

(Institute of Economic Research of the Ministry of Planning) <http://www.ipea.gov.br/portal>.

The data are for each of the 27 states and the period of time is from 1995 to 2011.

Population

The data for 2008 is the projection that appears on IBGE, the real data was not available.

Population—Demographic Projections divided by states, from IBGE.

The data for 2008 is the projection that appears on IBGE, the real data was not available.

Financial Intermediation

In this data set, the data from 1995 to 2001 are based on data from 1995, and the data from 2002 to 2008 are based on data from 2002. The following two columns were added and could be useful as financial indicators:

Rural Credit Flow (base 2000). Time Series found: 1995–2006.

Financial intermediation—value added State GDP—basic prices—Rs. year 2000 (thousand)—Deflated by the GDP Implicit Deflator. Time Series found: 1995–2007.

Health and Education

The data from 1995 to 2001 are based on data from 1995, and the data from 2002 to 2008 are based on data from 2002. A new column, with the added value from health and education to the GDP, was included. This information was found at IPEA data.

Health and education market—value added State GDP—basic prices—Rs. year 2000 (thousand)—Deflated by the GDP Implicit Deflator. Time Series Found: 1995–2007.

Transportation

Data from 1995 to 2001 are based on data from 1995, and the data from 2002 to 2008 are based on data from 2002. In addition, the grouping of activities in the GDP for transportation activities changed from 2002, to this activity were added activities like mail and shipments. This information was not available by states, so the population of each state per year weights the data.

Number of passengers transported by AIR—Brazil—Not States Calculated based on Ppl.

Air Transportation—Cargo ton. By km. Brazil—Not States Calculated based on Ppl.

Waterway Transportation—Cargo Qty. Ton. Brazil—Not States Calculated based on Ppl.

Railway Transportation—Cargo Qty. 1000 Ton—Brazil—Not States Calculated based on Ppl.

Communication and Information Services

The data from 1995 to 2001 are based on data from 1995, and the data from 2002 to 2008 are based on data from 2002. The value added on the GDP by transportation and communication was added to the database.

Transportation and Communication

Value added State GDP—basic prices—Rs. year 2000 (thousand)—Deflated by the GDP Implicit Deflator. Time Series Found: 1995–2007

Public Administration, Defense and Social Security (APU)

The data from 1995 to 2001 are based on data from 1995, and the data from 2002 to 2008 based on data from 2002.

Valor de Production

The data from 1995 to 2001 are based on data from 1995, and the data from 2002 to 2008 are based on data from 2002. There are some differences between the production total value and the GDP by states, IBGE informed me that the difference was to federal taxes.

State GDP in reais (Brazilian real) nominal value. Data from IBGE.

GDPPC

Premium

t includes data on:

Total State Insurance Premiums. Data from the Insurance Regulator in reais (Brazilian real) at nominal value

- Premiums All
- Premiums Life
- Premiums Non–Life

Number of people with private health insurance coverage on each state of Brazil.

Health Insurance premium on each state of Brazil. Data in reais (Brazilian real) nominal value

Penetration: Calculation of premiums divided by GDP.

Total Revenue of SMEs on each state. This table measures SMEs in the formal sector, paying federal taxes under the SIMPLES tax system. Data from the Brazilian Internal Revenue Services Department. Data in reais (Brazilian real) at nominal value.

Other Data by State

State Tax Revenue. Data includes taxes under state jurisdiction, (i.e., excludes federal taxes).

Data from IPEA (Institute of Economic Research of the Ministry of Planning) Database.

State Budget. Data from IPEA Database. Data in reais (Brazilian real) at nominal value

Households on each state. Data from IPEA Database.

Percentage of households on each state with access to pipe water. Data from IPEA Database.

Percentage of households with access to sewage system. Data from IPEA Database.

Percentage of households built with durable materials, on each state. Data from IPEA Database.

Average years of education for adults (25 years of age or older), on each state of Brazil. Data from the IPEA Database.

Modifications: The data for 2000 and 2008 were not available; it was calculated by the average growth percentage from the previous three years.

Electricity Consumption

It is measured in Megawatts, on each state of Brazil. Data from IPEA Database: this information is not available from 2005 but the electricity consumption by households was available. The data for 2005 to 2008 were calculated using the growth rate from the consumption by households for those years.

Financial Intermediation in Rural Operations.

It includes lending, investments and trading. Data from the Central Bank in reais (Brazilian real) from the year 2000. This data was reviewed, although it was only available to 2004.

Unemployment Index

In order to calculate the TPF, I searched for the most complete time series of employed population, which was until 2005. But, I found the unemployed population until 2007, which I used to calculate the employed population for 2006 and 2007.

Unemployed Population

Employed Population

Average hours worked by year

On average a year has 101 days between Saturdays and Sundays, plus Brazil has in average 17 holidays per year. In total the average of weekends and holidays per year are 118 days, which means that there is 247 working days per year. 247 days multiplied by 8 working hours per day, for a total of 1976 hours worked by person each year in order to calculate the average hours worked by year, 1976 hours was multiplied by the employed population in each state by each year.

TPF-Calculated: GDP was divided by the number of hours worked by year.

Total Number of Units

The data for 1995 were calculated by the average growth rate of 1996 and 1997. The detailed survey for enterprises started on 1996 that is the reason why the data was not available for 1995.

Total Number of Start-ups: start-ups are legal entities registered each year on State Trade Registries.

Total number of Start-ups LLCs. Start-ups LLCs registered each year on State Trade Registries. The format of this data was corrected. There was not data available for the registered LLC after 2005.

The Total Number of SMEs in each state: SMEs in the formal sector, paying federal taxes under the SIMPLES tax system. Data from the Brazilian internal revenue service Department.

The data found at <http://www.mpedata.com.br> for 2008 did not match with the total number of units, and then this variable was not included.

ULMGE

MPE

The result of the MPE column is the subtraction of medium-sized and large enterprises to the total of units. I could not find these values anywhere; I do not know what the source of these data is and I fail to find this data.

Companies: Data Disaggregated:

- Number of companies in financial sector
- Number of companies 0 to 4 employees
- Number of companies 5 to 9 employees
- Number of companies 10 to 29 employees
- Number of companies 30 to 49 employees
- Number of companies 50 to 99 employees
- Number of companies 100 to 499 employees
- Number of companies more than 500 employees

The data for 1995 was calculated by the average growth rate of 1996 and 1997. The detailed survey for enterprises started on 1996 that is the reason why the data was not available for 1995.

Global Database

The global database utilized for the research is created with information from various sources.

The countries selected and included in the global database are those for which data for entrepreneurship exist as measured by the World Bank, IFC and GEM databases. In other words, the variables included in the database (e.g., Credit/GDP ratio, Judicial Independence, Protection of Property rights, Legal enforcement, Penetration Ratio, etc.) are collected for those countries that have data for the measures of entrepreneurship in the World Bank, IFC and GEM database.

The sources used to build the global database are indicated below.

World Bank

The 2010 World Bank Group Entrepreneurship Snapshots (WBGES) includes various measure of entrepreneurship:

<http://econ.worldbank.org/WBSITE/EXTERNAL/EXTDEC/EXTRESEARCH/EXTPROGRAMS/EXTFINRES/0,,contentMDK:21454009~pagePK:64168182~piPK:64168060~theSitePK:478060,00.html>

The global data set includes:

- New Firm (most of them from 2004 to 2008)
- Entry Density (most of them from 2004 to 2008)
- MSME Participation in the Economy, (found in the IFC MSME Database)
- MSMEs
- MSMEs per 1,000 people

MSME employment % total

International Financial Corporation (IFC)

The IFC Database, i.e., World Bank Database. 2007, Micro, Small, and Medium Enterprises: A Collection of Published Data

http://rru.worldbank.org/Documents/other/MSMEdatabase/msme_database.htm

The data include, for the years 1991-2011,

GNI per Capita, Atlas Method

Global Entrepreneurship Monitor (GEM)

Full GEM data sets for 1999–2009 are in the public domain and can be accessed at

http://www.gemconsortium.org/about.aspx?page=gem_datasets.

GEM Data are made available to the public three years after the end of an annual data collection cycle, e.g., GEM 2009 data will be made available in January 2013.

The description of the data included is reported below (Global Entrepreneurship Monitor, 2011b).

Established Business Ownership Rate—Percentage of 18-64 population who are currently owner-manager of an established business, i.e., owning and managing a running business that has paid salaries, wages, or any other payments to the owners for more than 42 months.

Suboanyy—Nascent Entrepreneurship Rate—Percentage of 18-64 population who are currently a nascent entrepreneur, i.e., actively involved in setting up a business they will own or co-own; this business has not paid salaries, wages, or any other payments to the owners for more than three months.

Teanec_p—Necessity-Driven Entrepreneurial Activity: Relative Prevalence—Percentage of those involved in TEA in entrepreneurship because they had no other option for work.

Babybuyy—New Business Ownership Rate—Percentage of 18-64 population who are currently an owner-manager of a new business, i.e., owning and managing a running business that has paid salaries, wages, or any other payments to the owners for more than three months, but not more than 42 months.

Teayy—Total early-stage Entrepreneurial Activity (TEA)—Percentage of 18-64 population who are either a nascent entrepreneur or owner-manager of a new business

World Development Indicators (WDI)

The World Bank makes available a large database, so-called World Development Indicators (WDI) that covers all the countries of the world. WDI constitute the most current and accurate global development data available; include national, regional and global estimates (World Bank, 2011). The World Bank compiles development indicators from officially recognized international sources such as the World Bank, International Labor Organization, Eurostat and the United Nations (<http://data.worldbank.org/data-catalog/world-development-indicators>).

WDI provides data on financial intermediation:

- Private credit over GDP
- Infrastructure
- Education and social infrastructure

Economic Freedom of the World

Economic Freedom of the World uses 42 distinct pieces of data to measure economic freedom in 141 nations. <http://www.freetheworld.com/index.html>

The data can be downloaded. The following statistics are included in the global database:

Area 2

- Judicial Independence
- Protection of Property rights
- Legal enforcement of contracts

Area 5

- Private-Sector Credit
- Business regulations
- Bureaucracy Costs

Index of Economic Freedom

The Index measures 161 countries against a list of 50 independent variables divided into 10 broad factors of economic freedom. <http://www.heritage.org/index/explore?view=by-region-country-year>

There are 10 variables, for the period 1995–2011, included in the global database:

- Overall score
- Business Freedom
- Trade Freedom
- Fiscal Freedom
- Government Spending
- Monetary Freedom
- Investment Freedom
- Financial Freedom
- Property Rights
- Freedom from Corruption and Labor Freedom

Human Development Indicators (HDI)

The Human Development Indicators (HDI) can be found in the Database of the United Nations and in the annual Report. The link below takes to a window and for the countries selected,

<http://hdrstats.undp.org/en/tables/default.html>

Data included for the years 2000–2011:

- Adult Literacy Rate
- Expected years of Schooling
- Expenditures on Education
- GDP per capita (2008 PPP US\$)
- HDI

World Population

The United Nations Department of Economic and Social Affairs, Population Division provides a data, estimates, and prospects on World Population and indicators for the period 1995-2011. The data can be downloaded (see link below) and can be found in World Population Prospects, the 2010 Revision, released in May 2011.(United Nations, 2011b)

http://esa.un.org/unpd/wpp/unpp/panel_indicators.htm

The data included in the global database are:

Life Expectancy at birth and populations in cohorts (0-4, 0-14,5-14,15-24,15-59,over 60,over 65, over 80).

The data in this indicator is a medium variant by periods of time of five years and not by each year. For this reason, I did not add these data.

Doing Business

Doing Business of the World Bank makes public an array of Historical Data dating back to 2003 (World Bank, 2012). Data are available at: <http://www.doingbusiness.org/custom-query>

The data for the years 2004–11 included in the global database are:

Starting a business
Getting credit
Dealing with construction permits
Protecting investors
Enforcing contact
Registering property

Each of these topics has about 5 different indicators; in total 27 variables, although there is no data for the established period.

Transparency International

Since 1995, Transparency International (TI) publishes the Corruption Perceptions Index (CPI) annually ranking countries “by their perceived levels of corruption, as determined by expert assessments and opinion surveys.” <http://transparency.org/research/cpi>

The data for the years 2001–11 included in the global database is the Corruption Perception Index.

The global database is thus created out of the data obtained from the sources indicated above. The global database includes 140 countries normally available for the period from 1995 to

2008.

All the variables of the global database are listed below. Most of the variables can be grouped into the three most relevant categories of insurance, financial intermediation and capital markets, institutional setting.

1. Population; Source: World Bank.
2. GDP (current US\$); Source: World Bank.
3. GDPPC (current US\$); Source: World Bank.
4. GDP per capita (constant 2000 US\$); Source: World Bank.
5. Official exchange rate (LCU per US\$, period average); Source: World Bank.
6. Foreign direct investment, net (BoP, current US\$); Source: World Bank.
7. International debt issues / GDP; Source: WB Fin. Structure.
8. Tax revenue (% of GDP); Source: World Bank.
9. Revenue, excluding grants (% of GDP); Source: World Bank.
10. Net taxes on products (current US\$); Source: World Bank.
11. Compensation of employees (current LCU); Source: World Bank.
12. Cost of business start-up procedures (% of GNI per capita); Source: World Bank.
13. Firms formally registered when operations started (% of firms); Source: World Bank.
14. New businesses registered (number); Source: World Bank.
15. Total businesses registered (number); Source: World Bank.
16. Workers' remittances and compensation of employees, paid (current US\$); Source: World Bank.
17. Workers' remittances and compensation of employees, received (current US\$); Source: World Bank.

18. Health expenditures, private (% of GDP); Source: World Bank.
19. Electric power consumption (kWh per capita); Source: World Bank.
20. Improved sanitation facilities (% of population with access); Source: World Bank.
21. Improved water source (% of population with access); Source: World Bank.
22. Labor force, total; Source: World Bank.
23. Labor force with primary education (% of total); Source: World Bank.
24. Labor force with secondary education (% of total); Source: World Bank.
25. Labor force with tertiary education (% of total); Source: World Bank.
26. Public spending on education total (% of GDP); Source: World Bank.
27. Bank cost-income ratio; Source: WB Fin. Structure.
28. Bank credit / bank deposits; Source: WB Fin. Structure.
29. Bank deposits / GDP; Source: WB Fin. Structure.
30. Bank ROA; Source: WB Fin. Structure.
31. Bank ROE; Source: WB Fin. Structure.
32. Bank Z-SCORE; Source: WB Fin. Structure.
33. Deposit money bank assets / (deposit money + central) bank assets; Source: WB Fin. Structure.
34. Financial system deposits / GDP; Source: WB Fin. Structure.
35. Portfolio equity, net inflows (Bop, current US\$); Source: World Bank.
36. Liquid liabilities (in millions of 2000 US\$); Source: WB Fin. Structure.
37. Private credit by deposit money banks and other financial institutions / GDP; Source: WB Fin. Structure.
38. Private credit by deposit money banks / GDP; Source: WB Fin. Structure.
39. Other financial institutions' assets / GDP; Source: WB Fin. Structure.

40. Bank overhead costs / total assets; Source: WB Fin. Structure.
41. Central bank assets / GDP; Source: WB Fin. Structure.
42. Bank concentration; Source: WB Fin. Structure.
43. Deposit money bank assets / GDP; Source: WB Fin. Structure.
44. Liquid liabilities / GDP; Source: WB Fin. Structure.
45. Net interest margin; Source: WB Fin. Structure.
46. Loans from non-resident banks (amt. outstanding) / GDP; Source: WB Fin. Structure.
47. Loans from non-resident banks (net) / GDP; Source: WB Fin. Structure.
48. No. of listed companies per 10K population; Source: WB Fin. Structure.
49. Offshore bank deposits / domestic bank deposits; Source: WB Fin. Structure.
50. Public bond market capitalization / GDP; Source: WB Fin. Structure.
51. Private bond market capitalization / GDP; Source: WB Fin. Structure.
52. Stock market capitalization / GDP; Source: WB Fin. Structure.
53. Stock market total value traded / GDP; Source: WB Fin. Structure.
54. Stock Market Turnover Ratio; Source: WB Fin. Structure.
55. Remittance Inflows / GDP; Source: WB Fin. Structure.
56. General gov't consumption as share of total consumption; Source: Economic Free World.
57. Gov't enterprises and investment as a share of gross investment; Source: Economic Free World.
58. Size of government; Source: Economic Free World.
59. Judiciary independence; Source: Economic Free World.
60. Impartial courts; Source: Economic Free World.
61. Protection of intellectual property; Source: Economic Free World.
62. Law and order; Source: Economic Free World.

63. Legal enforcement of contracts; Source: Economic Free World.
64. Regulatory restrictions on the sale of real property; Source: Economic Free World.
65. Legal system & property rights; Source: Economic Free World.
66. Legal system & property rights—adjusted; Source: Economic Free World.
67. Avg. growth of money (last 5 yrs.) minus growth of real GDP (last 10 yrs.); Source: Economic Free World.
68. Standard deviation of annual inflation (last 5 yrs.); Source: Economic Free World.
69. Annual inflation (most recent yr.); Source: Economic Free World.
70. Sound Money; Source: Economic Free World.
71. International trade tax revenues (% of trade sector); Source: Economic Free World.
72. Mean tariff rate; Source: Economic Free World.
73. Standard deviation of tariff rates; Source: Economic Free World.
74. Tariffs; Source: Economic Free World.
75. Hidden import barriers; Source: Economic Free World.
76. Costs of importing; Source: Economic Free World.
77. Regulatory trade barriers; Source: Economic Free World.
78. Actual vs. expected size of trade sector; Source: Economic Free World.
79. Access of citizens to foreign capital markets / foreign access to domestic capital markets (GCR); Source: Economic Free World.
80. Restrictions in foreign capital market exchange / index of capital controls among 13 IMF categories; Source: Economic Free World.
81. International capital market controls; Source: Economic Free World.
82. Freedom to trade internationally; Source: Economic Free World.
83. Freedom to Trade Internationally-Adjusted; Source: Economic Free World.

84. Competition in domestic banking; Source: Economic Free World.
85. Extension of credit; Source: Economic Free World.
86. Interest rate regulations (leading to neg. rates); Source: Economic Free World.
87. Interest rate controls; Source: Economic Free World.
88. Credit market regulation; Source: Economic Free World.
89. Impact of minimum wage; Source: Economic Free World.
90. Hiring and firing practices; Source: Economic Free World.
91. Labor force share with wages set by centralized collective bargaining; Source: Economic Free World.
92. Unemployment insurance; Source: Economic Free World.
93. Mandated dismissal costs; Source: Economic Free World.
94. Labor market regulations; Source: Economic Free World.
95. Administrative conditions / entry of new business; Source: Economic Free World.
96. Time with government bureaucracy; Source: Economic Free World.
97. Starting a new business; Source: Economic Free World
98. Irregular payments; Source: Economic Free World.
99. Licensing restrictions; Source: Economic Free World.
100. Tax compliance; Source: Economic Free World.
101. Business regulations; Source: Economic Free World.
102. Regulation; Source: Economic Free World.
103. World market capitalization; Source: *Standard & Poor's Emerging Stock Markets Fact Book*.
104. Stock market total value traded to GDP; Source: World Bank Financial Structure Database (Using IFS).

105. Number of companies listed on stock exchange; Source: *Standard & Poor's Emerging Stock Markets Fact Book*.

106. Stock market price indices (end of the year); Source: *Standard & Poor's Emerging Stock Markets Fact Book*.

107. Market Weights (S&P-IFCG); Source: *Standard & Poor's Emerging Stock Markets Fact Book*.

108. Pension fund assets under management; Source:

http://www.fiap.cl/prontus_fiap/site/edic/base/port/inicio.html.

For insurance, there are about 100 countries with detail information on insurance. Depending on the country, the source was OECD or ASSAL and also the World Bank Financial Structure Database (non-life insurance premium volume / GDP and life insurance premium volume / GDP).

109. Total gross premiums; Source: OECD.

110. Total gross premiums life; Source: OECD.

111. Total gross premiums non-life; Source: OECD.

112. Insurance density total; Source: OECD.

113. Insurance density life; Source: OECD.

114. Insurance density non-life; Source: OECD.

115. Insurance penetration total; Source: OECD.

116. Insurance penetration life; Source: OECD.

117. Insurance penetration non-life; Source: OECD.

118. Life insurance share; Source: OECD.

119. Direct total gross premiums / number of employees of insurance companies; Source: OECD.

120. Direct premiums non-life; Source: ASSAL.

121. Direct premiums life; Source: ASSAL.
122. Direct premiums total; Source: ASSAL.
123. Premiums per capita; Source: ASSAL.
124. Direct premiums % GDP; Source: ASSAL.
125. Non-life insurance premiums volume / GDP; Source: WB Fin. Structure.
126. Life insurance premiums volume / GDP; Source: WB Fin. Structure.

Appendix 3: Methodology

The method of research relies on publicly available data, e.g., “macro data.”¹²² This chapter describes the various steps and specific techniques to test the hypotheses related to the relationship between insurance and entrepreneurship.

The section draws heavily from various authors (Baum 2006; Wooldridge 2008, 2010; Drukker 2003; Yaffe 2003).

Panel Data

This section outlines the issues related to panel data and identifies the various steps and procedures that are used to analyze panel data, i.e., Brazilian database.

Panel data include a group of multiple cases observed, surveyed, or computed periodically over a given time span, i.e., space and time. The combination of time-series with cross-sections is termed panel data—also called longitudinal, or cross-sectional time-series data, i.e., there are T observations for each N , thus $T*N$ observations. Panel data improve the number of data and the quality (Gujarati, 2002, p. 68; Yaffe, 2003, p. 1). Thus, panel data analysis uses both spatial and temporal dimensions. The spatial dimension relates to the cross-sectional units of observations (e.g., state and country in this research) and the time dimension constitutes the various years for which data are available. Panel data is appropriate to deal with the issue of unobserved heterogeneity and helps to solve it. The expressions balanced and unbalanced describe whether a panel data set is missing some observations (Stata, 2011). Panel data contains a time dimension or variable, thus panels are considered to be strongly balanced in case the same periods are included in each panel (e.g., each panel has the same length in terms of time, for

¹²² Macro data derive from existing sources and are collected by organizations at an aggregate level, e.g., aggregate time series data such as GDP collected by the International Monetary Fund. Micro-level data can be also collected by organizations or by researchers for a specific analysis and purposes and constitute large survey data sets on individuals. Micro-level data include industry-level or firm-level data and individual-level data. They can be interviews of different people in different years (repeated cross-section), or interviews of the same people each year (panel data).

instance years); panel data is considered weakly balanced if with respect to time not all the periods are covered (e.g., some years have for some variables missing values) but each panel has an equal number of observation; and unbalanced otherwise (Stata, 2012a).

The relationship between insurance and entrepreneurship is studied using the Brazilian database. The database includes 27 states (N) observed over a period of 17 years (T) (i.e., 1995–2011), i.e., a total of $27*17 = 459$ observations. The data structure confers upon the variables two dimensions: state, i , and time, t (year). The unit of analysis is the state.

This study also lays the foundation for a global database for future research. The design of the global database is expected to include 100 countries for the period 1995–2011, i.e., 17 years, i.e., a total of $100*17$, or 1,700 observations. The country is the unit of analysis of the global database. Under these circumstances, the two databases respond to the characteristics of “large N , small T ” (Baum, 2006, pp. 73–4).

Given the features of the study, e.g., heterogeneity, states (Brazilian database) and countries (global database), panel data provide a large number of observations and a set of variables capturing the time and spatial dimension of the data, i.e., the cross-sectional information reflected in the differences between units (e.g., Brazilian states; countries); and the time-series information included in the changes within states over time (years), which constitutes the information within unit (states). Panel data regression techniques allow taking advantage of these different types of information.

Cross-sectional time-series models are as follows

$$Y_{it} = b*X_{it} + \text{error term} \quad [1]$$

The main issue of panel data is to deal with the error term.

The basic structure of the panel data model is the following:

$$Y_{it} = B_k*X_{it} + D*Z_i + e_{it} \quad [2]$$

Y is the dependent variable (i.e., entrepreneurship). As indicated on Chapter 9, Measures, there are several measures of the dependent variable Y , entrepreneurship, e.g., SMEs, start-ups, self-employment. Number of start-ups (start-ups) is the measure used for the Brazilian database.

X represents the set of vectors of variables that vary over state (country) (i) and over time (t). X includes the main independent variable, insurance, as well as control variables that are not time invariant. B_k is the vector of coefficients on X . To be more specific, the Brazilian database (and the global database)—includes a set of independent variables, X , such as:

- insurance (e.g., penetration ratio, social insurance);
- control variables (e.g., financial intermediation; institutional setting/quality of institutions).

Z represents the set of vectors of time invariant variables that vary only over the unit (state and country) and not time (i.e., Z has only the indicator i and not t); D is the set of vectors of coefficient on Z ; and e_{it} is the disturbance term.

With respect to the vector of Z , time constant (or time invariant) variables, i.e., a time constant variable is associated with given and static features of the unit (e.g., sex in the context of people). A time constant variable in the Brazilian database could be a dummy of states depending of their region—i.e., South, North, Southeast, Northeast, and Center-East—that represent the geographical areas to which the unit (state) belongs. In the global database, regions—e.g., Europe, Asia—would represent geographical areas to which the unit (country) belongs.

A time effect can be analyzed (Baum, 2006, p. 225). Financial intermediation is a relevant variable, correlated with insurance (the main independent variable X). In practical situations, there are cases in which finance and insurance go together, and the availability of financing will presuppose that the borrower will buy some relevant insurance product (e.g., life or business insurance). Considering the goal of the study, e.g., insurance should be provided

separately from financial institutions.¹²³ The research tries to isolate the impact of insurance on entrepreneurship.

The Pooled Regression Model: Pooled OLS

The constant coefficient Model has constant coefficients for intercepts and slopes. In the case that there are no significant effects at the unit (state) level and also no significant effects at the time level (time effects), we could put together all the data (pool all of the data) and run an ordinary least squares (OLS) regression model. However, given that we have a panel data, usually unit (state) or time (temporal) effects are present. However, in some instances, the unit (state) or time effects are not significant and the ordinary multiple regression techniques on panel data, i.e., pooled OLS, can be used, even though not the optimal choice.

The estimates of coefficients derived from OLS regression may be subject to omitted variable bias-unobserved heterogeneity—a problem that arises when some unknown variable or variables¹²⁴ cannot be controlled for that effect on the dependent variable.

The typical ordinary least squares (OLS) regression equation for panel data follows the model indicated above under [2]:

$$Y_{it} = a + B_k * X_{it} + D * Z_i + e_{it}$$

[2]

and $\text{Cov}(X_{it} + e_{it}) = 0$ is an unbiased estimator.

This condition is violated when there is a time-constant variable that is correlated (i.e., covaries) with X , and that variable is omitted and unobserved, i.e., it is not included in the

regression and therefore will be part of e and violate one of the assumptions of OLS, i.e., $\text{Cov}(X_{it}$

¹²³ In fact, when the two activities are combined, the insured often complain that their premiums are too high and their coverage is not regarded as essential.

¹²⁴ Financial intermediation is a variable that could be excluded in the equation and considered an omitted variable. In this case, it would be possible to control for an omitted variable (e.g., financial intermediation) even without observing them, and pay attention to the changes in the dependent variable over time.

+ e_{it}) $\neq 0$ and creates a heterogeneity bias to the coefficient B , which then is not consistent and not efficient (Baum, 2006, pp. 74–5).

In our case, the pooled OLS can be tested with the control variables and particularly the variable financial intermediation.

The shortcomings with the Pooled OLS can be corrected by creating a composite error term:

$$e_{it} = v_i + \varepsilon_{it}$$

[3]

also called as an error-components model.

The term v_i is the time-constant omitted variable (there is no subscript t) correlated to X that creates the fixed effect and ε_{it} is the idiosyncratic effect.

This leads to the fixed effects model, i.e., controlling for omitted variables that differ between units, but are constant over time.

Panel data could inherently have an endogeneity problem and fixed effect address the problem.

Fixed and Random-Effect Models: Fixed-Effects Regression

- One-Way Fixed Effects (FE)

Fixed-effects regression is the model used to control for omitted variables that differ between units (state/country) but are constant over time, i.e., in the case of the Brazilian database, the omitted variables would diverge between states but are constant over the time periods considered. The fixed effects use the changes over time that take place in the independent variables are used to estimate the of the independent variables on the dependent variable, i.e., this represents one of techniques used for the analysis of panel data. This corresponds to producing dummy variables

for each unit (state) and putting them in a standard linear regression to control for fixed “unit (state) effects” of the dummies. This works best when one has relatively fewer units and more time periods, i.e., for each dummy variable the model loses one degree of freedom. Including a dummy variable by unit (state/country) would require many variables and would lose degrees of freedom.

In the panel data for Brazil, given that there are 27 states, the dummy variable for states implies that degrees of freedom would be lost.¹²⁵ For the global database, the dummy variable by country would be less problematic of losing degrees of freedom, given the larger database.

Given [3] and [4], the equation to be estimated for the fixed effect becomes:

$$Y_{it} = B_i * X_{it} + D * Z_i + v_i + \varepsilon_{it}$$

[4]

It is assumed that v_i are correlated with the regressors X and this is a fixed effects model (instead a random effects model is when v_i are not correlated with the regressors X); ε_{it} is uncorrelated with the X and $\text{Cov}(X_{it} + \varepsilon_{it}) = 0$.

The *FE* model allows each unit (state/country) to have its own constant term (the intercept that varies by unit, or by time), while the slopes of the estimates B are constrained across units.

In effect, equation [4] is manipulated and the v_i and the other control time invariant variables will disappear and the fixed effects will be estimated only considering the X . This is done by running the regressions of the difference, i.e., taking the averages of X and Y and then subtracting it from the individual X and Y for each observation. By doing so all the action is restricted to the within unit (state/country) and the action across or between the unit is eliminated.

In other words, the panel level averages are taken out from each side of the equation [4], which

125 Regions could operate as dummy variables—i.e., in Brazil there is a highly developed southern region (and also the populous centers), and there are backward northern and northeastern regions. Dummy variables could reflect these regions (possibly 1 to 4 regions).

basically takes out the *FE* from the model (Baum, 2006, p. 221). The procedure will also remove the time invariant variable *Z* (Baum, 2006, p. 221). After the manipulations and removing the panel level averages from [4], the equation becomes

$$Y_{it} = B * X_{it} + \varepsilon_{it}$$

[5]

The model will have explanatory power only if the units (state or country) above or below the unit's mean (mean of the state or the country) are significantly correlated with the states or country's *X* values above or below the state (or country) vector of mean *X* values. It is not important if some states or countries have very high *Y* values and very high *X* values because it is only the *within variation* (within the unit state or country) that will show up as explanatory power (Baum, 2006, p. 221). Therefore, the *FE* effect is also called the within estimator because it depends on within unit (state) variation.¹²⁶

The equation for the fixed effects from [5] would be following:

$$Y_{it} = \text{Insurance} + \text{Social Insurance} + \text{Institutional setting} + v_i + \varepsilon_{it}$$

[6]

Time-invariant variables are not available in the model. The variable financial intermediation (*figdp*) can be left out as it will be part of the unobserved variable correlated with insurance. Thus, the fixed effects model will concentrate on time varying covariates (e.g., insurance, social insurance, institutional setting). These variables, e.g., institutional setting, do not vary across states, but vary across time (e.g., thus institutional setting is one of the variables in the set *X*).

¹²⁶In the model the variables constant over time, i.e., the time invariant variables (i.e., those variables are not present in our model) for each unit (state or country) are absorbed by the unit specific intercept term, which absorbs all the heterogeneity in *Y* and *X* that is function of the identity of the unit (state/country) and any variable constant over time will be perfectly collinear with the unit (state/country) indicator's variable.

The fixed effects eliminate the between unit (states and countries) unobserved heterogeneity; it uses only within states (and countries).¹²⁷ The test is if the state specific heterogeneity of v_i is necessary, i.e., are there distinguishable intercept terms across states? To test the effects of the fixed effects, model the pooled regression model is used as the baseline for comparison.

First test is the group state (or country) effects. This significance test is performed with the F test. The response comes with the F test with the null hypothesis that the constant terms are equal over time. A rejection of this hypothesis (p less than 0.05) means that there are significant state (or country) effects and this implies that the OLS model is not appropriate.

The configuration as one-way FE works on the assumption that errors are not contemporaneous correlated across unit (state/country) of the panel. This can be done in Stata with *xtscd* (De Hoyos & Sarafidis, 2008).

Various tests can be run under the Stata specification *xt*. For instance, a departure from the assumed heteroskedasticity of ε_{it} across units of the panel (state) may be tested with a Lagrange multiplier (LM) statistic (W. H. Greene, 2008) as *xttest3* (Baum, 2006).¹²⁸

- Two-Way Fixed Effects (FE)

The use of a two-way fixed effects model (2WFE) means to consider one effect at the level of each unit (state) and one effect at the level of each time period (*xt*).

To get two-way fixed effects in Stata, one must add the year dummies. This is done in Stata with a term like *i. Year*—considering that “Year” is the variable name in the Brazilian

¹²⁷ In Stata, the FE procedure can be executed with the syntax: *xtreg* depvar, *fe*, options requesting the options: *robust* and *cluster*.

¹²⁸ By performing *xtsum* followed by the name of the variables, the variables that have a within standard deviation of zero can be checked, i.e., they will be dropped from the model (Baum, 2006, p. 223). The coefficients on variables with small within standard deviation are not well identified. It should be noted that the between standard deviation of year is 0 by construction, i.e., the standard deviation from one state (or country) to another state (or country) for the same year; and the within standard deviation is very small (the variation between one year and the other is 1!!). In fact, for year there is a reverse situation than the case of time invariant variables where the within standard deviation is zero and the between is what counts.

database.

Considering that the main variables are entrepreneurship (dependent variable), insurance (main independent variable), state/country and year, the syntax in Stata is:¹²⁹

```
xtreg entrepreneurship insurance i.statebra i.Year
```

Using Stata, dummies are automatically created for all but one of the states as well as for the year and then run the fixed effects regression. This procedure needs at least two observations per state (i.e., the regression will drop out state with one observation) and various years of observations.

Assuming that the number of periods is small, a two-way FE model requires “time dummies” time indicators variables to include in the regression, except one, the base. The test of the significance of time in FE is a joint test that all the coefficients on those indicators are zero.

As the state (or country) FE model requires regressors’ variation over time within each state, a time FE (i.e., including a time indicator variable) requires variation of the regressors over units (state) within each period. The syntax *xtsum* checks that the between standard deviation is not zero.

Fixed and Random-Effect Models: Between-Effects Regression

Another estimator for a panel data set is the so-called between estimator (BE), in which the group means of Y are regressed on the group means of X given a regression of N observations. The between-effects models the mean response and for each unit the means are calculated (i.e., to use this model, the data set should have many units.)

¹²⁹ Baum (2006, pp. 224–226) shows another procedure under older version of Stata.

This analysis corresponds to taking the mean of each variable across time for each unit and running a regression on the collapsed data set of means. This method implies loss of information and for this reason between effects is infrequently used.¹³⁰

This estimator ignores all the unit-specific variation in Y that the within estimator considers, and it replaces each observation for a unit (state) with the mean.

The BE (between estimator) is the OLS estimator of B_1 and B_2 in the following model:

$$Y(m)_i = B_1 * X(m)_i + B_2 * Z(m)_i + v_i + \varepsilon(m)_i$$

[7]

The subscript m in the equation above indicates the mean. It also implies that if v_i are correlated with any of the regressors (as in the case of the FE , within estimator), then the assumption of the zero-conditional mean is not supported and the results of the between estimator (BE) will be inconsistent.

The estimator is not widely used. It is useful when the time series for each unit might not be accurate, or when they might include random deviation from long-term means. If inaccuracy is expected to have a mean zero over time, this measurement error problem can be corrected by taking the mean of the data over time and retaining only 1 observation per unit (state).

The syntax to perform the between estimator in Stata is:

```
xtreg, dep var indevar, be
```

Like in the case of two-way fixed effects and also one-way, any macro factor that is constant over units (state) does not make sense to include in the model of the between estimator because the average of the macro factor will not differ by units.

130 The between-effects estimator is mostly important because Stata's random-effects estimator is a weighted average of a fixed effects and a between-effects coefficient. Thus, implicitly, the Hausman test assesses whether fixed effects and between effects produce the same coefficients. If they do, it is appropriate to combine them into a random effects model.

The model to which to apply the between estimator (*be*) is the first *FE* model (one-way fixed effects) because the second *FE* model (two-way FE) is not appropriate since the time dimension would be then suppressed by the between estimator (*BE*).

Panel data allow identifying whether the sources of variation are in units' variation around their means or in those means. The within estimator (*FE*) takes account of only the former, whereas the between estimator (*BE*) considers only the latter.¹³¹

Considerations on Fixed Effects (FE) Models

Fixed-effects models have drawbacks. The fixed-effects models may have an excessive cross-sectional unit of observations, and this will require a disproportionate number of dummy variables. Too many dummy variables—as it would be the case for the Brazilian database (and the global database)—may weaken the model with low degrees of freedom for statistical tests. Moreover, a model with many such variables may be afflicted with multicollinearity and the standard errors would increase and lower the significance of the parameter. If these models contain variables that do not vary within the groups, parameter estimation may be precluded. Even though the residuals are normally distributed and homogeneous, there could be state-

131 The equation

$$Y_{it} = X_{it} * B + \text{noise}$$

is equivalent to equation [5], i.e., $\text{noise} = v_i + \varepsilon_{it}$

Focusing on *B*, and on one of the *X* variables, say, x_1 :

$$Y_{it} = x_{1_it} * b_1 + x_{2_it} * b_2 + \dots + \text{noise}$$

b_1 indicates that an increase in x_1 of one-unit leads, in all cases, that y will increase by b_1 .

The emphasis here is on “in all cases,” i.e., one can expect the same difference in y if one observes two different subjects with a one-unit difference in x between them, and one observe one subject whose x value increases by one unit.

Some variables might act like that, but there is no reason to expect that all variables will. For example, assuming that y is income and x_1 is “lives in the South of the United States”: If one compare two different people, one who lives in the East ($x_1 = 0$) and another who lives in the South ($x_1 = 1$), one expects the earnings of the person living in the South to be lower because, on average, all prices and wages are lower in the South. That is, one expects the coefficient on x_1 , b_1 , will be less than 0. On the other hand, if a person living in the East ($x_1 = 0$) moves to the South ($x_1 = 1$), the expectation is that the earnings increased, or why else would that person move? That is, the expectation is that b_1 will be greater than 0. This confirms the importance of the two kinds of information in cross-sectional time-series data: the cross-sectional information reflected in the changes between units; and the time-series or within-subject information reflected in the changes within units.

specific (groupwise) heteroskedasticity or autocorrelation over time that would further plague estimation.

Fixed effects do produce same estimates as the “state” (or country) dummy” model, but what actually do is to subtract the mean of a variable from each case (state/country). So, it treats the endogeneity problem caused by an unobserved variable.

Specific limitations of fixed effects approach:

- a. It cannot estimate effects of variables, which vary across individuals but not over time, i.e., time invariant variables.
- b. It controls for omitted variables by excluding all cross-section variation s ;
- c. Effects in levels cannot be predicted outside of sample as prediction in levels needs prediction of fixed effects;
- d. The use of fixed effects is inefficient if “ ν ” is uncorrelated with x_{it} (i.e., if appropriate model is random effects);
- e. Fixed effects can worsen biases from other specification problems, e.g., measurement error.

Fixed and Random-Effect Models: Random-Effects Regression (RE)

If some omitted variables are constant over time but vary between units’ states, and other variables may be fixed between units but vary over time, which means that the errors (due to the omitted variables) are uncorrelated with X , then random effects (RE) are used.

One way to deal with the error is to consider the intercept as a random outcome variable. The random outcome depends on the mean value plus a random error. This cross-sectional specific error term v_i indicates the deviation from the constant of the cross-sectional unit (state) that cannot be correlated with the errors of the variables. The time-series cross-sectional regression model is with a random effect given by the intercept.

Rather than considering the unit (state/country)—specific intercept as a FE of that unit, the random effects (RE) model specifies the unit effect as a random draw that is uncorrelated with the regressor and the overall disturbance term.

The equation is the same as [4],

$$Y_{it} = B_k * X_{it} + D * Z_i + v_i + \varepsilon_{it}$$

[4]

The term $(v_i + \varepsilon_{it})$ is a composite error term, and the v_i are the unit effects.

A critical assumption of the RE model is that the v_i are uncorrelated with the regressors X_{it} and Z_i . This assumption of orthogonality implies that OLS and the between estimator (BE) can consistently estimate the parameters, but neither OLS or BE estimator is efficient. The RE model assumes that the v_i are uncorrelated with the regressors so that a more efficient estimator can be created. If the regressors are correlated with the v_i , it means that they are correlated with the composite error term and thus the RE estimator is inconsistent.

The RE models use the orthogonality between the v_i and the regressors to reduce the number of the parameters estimated. In a large data set, with thousands of units the coefficients of the RE are $k+p$ and the variance parameters are two; while the coefficients of an FE model are $k+1+N$ and the variance parameter is one.

Under these conditions, time invariant variables are identified in the RE model. Given that the RE model identifies the population parameters that describe the unit (state) heterogeneity, inference from the RE relates to the underlining population of units. In contrast, because the FE model cannot estimate the parameters that describe the unit-level heterogeneity, inference from the FE model is conditional on the FE in the sample. Therefore, the RE model is more efficient and allows a broader range of statistical inference.

The key assumption is that the v_i is uncorrelated with the regressors and this assumption can be tested. The syntax in Stata is:

xtreg, dep var indevar, re.

Under these circumstances, the random error v_i is heterogeneity specific to a cross-sectional unit—state/country. This random error v_i is constant over time. Therefore, the random

error e_{it} is specific to a particular observation. The v_i are correctly specified, if they are orthogonal to the individual effects. Because of the separate cross-sectional error term, these models are also called one-way random effects models. Owing to intra-panel variation, the random-effects model has the advantage that time-invariant variables are among the regressors.

Error Components Models

If, however, the random-effects model depends on both the cross-section and the time series within it, the error components (sometimes referred to as variance components) models are denoted to as a 2-way random-effects model. In that case, the error term should be uncorrelated with the time-series component and the cross-sectional (group) error. The orthogonality of these components allows the general error to be decomposed into cross-sectional specific, temporal, and individual error components.

The component, v_i , is the cross-section specific error. It affects only the observations in that panel. Also, e_t is the time-specific component. This error component is peculiar to all observations for that time period, t . The third η_{it} affects only the particular observation. These models are sometimes referred to as two-way random effects models (Yaffe, 2003).

Specification Tests: Random- or Fixed-Effects Models: The Hausman Test

Fixed effects (FE) constitute a standard approach with panel data. They give consistent results, but FE is not the most efficient model. Random effects will give one smaller p-values because they are a more efficient estimator.

The question is whether there is significant correlation between the regressors and the unobserved unit (state) specific random effects. If the regressors are not correlated, then the random-effects model may be more powerful and parsimonious. If the regressors are correlated,

the random-effects model would be inconsistently estimated and the fixed-effects (FE) model would be more appropriate to use.

The correlation compares the covariance matrix of the regressors in the fixed-effects model with the co-variance matrix in the random-effects model. The null hypothesis is that there is no correlation. If there is no statistically significant difference between the covariance matrices of the two models, then the correlations of the random effects with the regressors are statistically insignificant. The Hausman specification test is the standard test for deciding between the fixed- or random-effects models, i.e., the Hausman test allows to choose between the two models. The Hausman test is in the category of *Wald* χ^2 test; it has $k-1$ degrees of freedom (k = number of regressors) on the difference matrix between the variance-covariance of the two models: the fixed-effects model and the random-effects model.

Under the Hausman test, the null hypothesis that the coefficients estimated under the efficient random-effects estimator are the same as the coefficients estimated under the consistent fixed-effects estimator. If they are (insignificant p -value, probability $>$ chi-square larger than .05), then random effects can be used. If the p -value is significant, one should use fixed effects; i.e., the equality of the fixed- and random-effects coefficients is rejected using a Hausman (Hausman, 1978) (Hausman & Taylor, 1981) test, and that suggests that the random-effects model is misspecified and that the fixed-effects estimates are preferred.

Under the Hausman test, the null hypothesis is that the conditions of extra orthogonality imposed by the RE estimator are valid. If the test rejects the null hypothesis, then the RE model is rejected and the FE is preferred.¹³²

¹³²Stata contains the Hausman specification test and the syntax is as follows:

```
quietly xtreg depvar indevars, fe
estimators store fix
quietly xtreg depvar indevars, re
estimators store ran
hausman fix ran
```

If the regressors are uncorrelated with the v_i , then the FE estimator is still consistent, but inefficient, while the RE estimator is consistent and efficient.

If both FE and RE generate consistent point estimates of the slope parameters, they will not differ significantly. If the orthogonality of the RE model is violated, the inconsistent RE estimates will significantly differ from the FE counterparts.

Instrumental Variables and Simultaneous Equations

If the Hausman test shows that the RE v_i cannot be considered orthogonal to the unit (state/country)-level error, an instrumental variable (IV) can produce consistent estimates of the coefficients on the time invariant variables.

A model that can be used is the Hausman-Taylor. The assumption of the Hausman-Taylor estimator (Hausman & Taylor, 1981)¹³³ is that some of the regressors in X_{it} and Z_i are correlated with v but that none are correlated with ε .

The problem has to do with exogenous and endogenous variables.

The equation to consider is as follows:

$$Y_{it} = B_k * X1_{it} + B_k * X2_{it} + D * Z1_i + D * Z2_i + v_i + \varepsilon_{it} \quad [8]$$

Where X are the time varying variables; Z are the time invariant variables. The variables with “1” are exogenous, and the variables with a “2” are endogenous and correlated with v_i .

Applying the IV circumvents the problem that X_{2it} and Z_{2i} are correlated with v_i . However, instrumental variables can be found that are not correlated with the unit (country/state)-level effect.

In the case of the Brazilian database, instrumental variables (IV) can be included to clarify the strength of any correlation observed. The simultaneous equations are reported below

133 The syntax in Stata is *xhtaylor*.

and the independent variables included in [B] are the IVs proposed:

$$\text{Entrepreneurship} = a_0 + a_1 \text{Availability Insurance} + a_2 \text{Social Insurance} + a_3 \text{Control Variables} + \text{error} \quad [\text{A}]$$

$$\text{Availability Insurance} = a_0 + a_1 \text{Propensity Insurance} + a_2 \text{Knowledge of Insurance} + a_3 \text{Institutional Setting} + a_4 \text{Financial Intermediation} + a_5 \text{Control Variables} + \text{error}$$

[B]

The IV model is conceptualized as two separate stages of equations: one specifies the relationship between the relevant independent variable (availability of insurance) and the outcome (entrepreneurship), the second specifies the relationship between the instrumental variables and the independent variable.

In this study, the issue could also be that availability of insurance explains entrepreneurship by capturing some effect of financial intermediation. To estimate an IV model, a variable (the excluded instrumental variable(s), or excluded instrument) that affect the key independent variable (insurance) is financial intermediation that impacts the outcome (entrepreneurship) through the key independent variable.¹³⁴

However, financial intermediation and availability of insurance could be highly correlated so that a third stage of simultaneous equations where financial intermediation is a dependent variable may be needed.

Several factors influence the structure of a financial system, and usually with a gradual impact over many years. Levine, Loyaza and Beck (2000) find that the legal environment, enforcement and accounting standards are key significant variables that affect the development of financial markets and financial intermediation. Following the work of Reid (R. Reid, 2010)—see Chapter 6, the literature review, and the section on financial market development and economic

¹³⁴Also, the roles of insurance and financial intermediation could be reversed and insurance would be the IVs. Fixed effects could take care of this aspect.

growth—it may be more useful for economies to focus on the experience of development of financial markets in developed economies but also consider variables that reflect the society, the politics and the institutions that are related to the specific demands of the domestic economy.

In this respect, the financial intermediation is related to a series of variables: type of economy, stage of development, macroeconomic shocks, social environment, legal and regulatory environment, enforcement, innovation, status of supervision, role of government on the economy, availability of microfinance, access to global markets.

A limited number of these variables would be available for the Brazilian database.

Equation 3

$$\begin{aligned} \text{Financial intermediation} = & \text{Type of Economy} + \text{Stage Development} + \text{Legal and} \\ & \text{Regulatory environment} + \text{Enforcement} + \text{Innovation} + \text{Accounting Standards} + \text{Microfinance} + \\ & \text{Role of Government in the economy} \\ & \text{[C]} \end{aligned}$$

Dynamic Models

Autocorrelation in the model can be dealt with.

First, one or more of the several tests for residual autocorrelation can be used.

The Durbin-Watson (DW) test is used to identify first-order autocorrelation in the residuals. Bhargava and other authors have modified DW to handle balanced panel data (Bhargava, Franzini, & Narendranathan, 1982). Baltagi and Wu (1999) modified it further to handle unbalanced panel and equally spaced data.

The data can have panel specific autocorrelation, or there may be autocorrelation across all panels. There are provisions for specifying the type of autocorrelation. Alternatively, an auto regression on lags of the residuals may indicate the presence or absence of autocorrelation and the need for dynamic panel analysis.

In case of autocorrelation from one time period to another, the “differences in differences” of the observations can be analyzed, using the first or last as a baseline (Wooldridge, 2010). If autocorrelation exists across these observations, the model may need first partial differences to control for the autocorrelation effects on the residuals (W. H. Greene, 2008).

For the Brazilian study, the dynamic effects of Arellano-Bond (AB) can be utilized. Arellano and Bond (1991) introduced lagged dependent variables into their model to account for dynamic effects. The lagged dependent variables can be introduced to either fixed or random effects models. Their inclusion assumes that the number of temporal observations is greater than the number of regressors in the model.

Even if one assumes no autocorrelation, problems from the correlation of the lagged endogenous and the disturbance term may plague the analysis. Bias can result especially when the sample is finite or small. If one uses general methods of moments, with instrumental variables, the use of the proxy variables or instruments may circumvent problems with correlations of errors. Moreover, there are a large number of instruments provided by lagged variables. GMM with these instruments and larger orders of moments can be used to obtain additional efficiency gains.

The approach of Arellano and Bond (1991) – Dynamic Panel Data -DPD- is that all the information in the sample is not used with the IV approach. They do so in a GMM context and it is considered an extension of the Anderson-Hsiao approach (Anderson & Hsiao, 1981).

AB starts from the equation:

$$Y_{it} = B_1 * X_{it} + B_2 * W_{it} + e_{it} \quad [9]$$

and

$$e_{it} = v_i + \varepsilon_{it}$$

where X_{it} are exogenous regressors and W_{it} are other regressors, which may include lags of Y , and endogenous regressors, all of which may be correlated with v_i , the unobserved individual effect.

First differencing the equation removes the u_i and its omitted-variable bias. The AB estimator presents the model as a system of equations and allows the instruments applicable to each equation to differ (for instance, more lagged values of the instruments are available). The instruments include lags of the endogenous variables, in differenced form, the exogenous regressors and any other variable that may be specified. This estimator generates many instruments and all lags prior to t , say $t-1$ might be individually considered as instruments. If T is not trivial, the maximum lag of an instrument can be used to avoid that the number of instruments become too large to be used.

The estimator is available in Stata with the syntax *xtabond*.

Later work (M. Arellano & Bover, 1995; Blundell & Bond, 1998) revealed some weakness of the approach. The lagged levels are frequently poor instruments for first differenced variables, particularly if the variables follow a random walk. Their modification involves lagged levels and lagged differences. The original estimator is called difference GMM and the expanded estimator is called system GMM, which involves additional constraints.

All these features are available with the new version of the Stata with syntax *xtabond2* (Roodman, 2006).

To illustrate the use of DPD estimators using the databases available *xtabond2*
entrepreneurship L.entrepreneurship insurance year,

```
Gmmst (...) ivstyle (year) two-step robust nolevelq
```

Causality

The causal relationship between insurance and entrepreneurship in the context of panel data and the direction of causality is also examined. To this end, the Granger causality test on time-series

permits to investigate whether lagged values of one variable “Granger cause” another variable.

Spatial Analysis

The data of Brazil and particularly those for entrepreneurship and insurance have a spatial dimension and can be mapped representing the measures of penetration and entrepreneurship, at the beginning (1995) and at the end (2011) of the period.

These measures represent the so-called gap, which measures the difference over time. The gaps for insurance and entrepreneurship provide a graphical picture and show the interaction and the evolution over time of these measures by each state of Brazil.

Further analysis addresses spatial autocorrelation. Spatial autocorrelation analysis tests whether values of a variable in one place (state) are independent of values of other variable at neighboring places (state). A potential problem with insurance and entrepreneurship in Brazil is that a spatial component might exist. For example, insurance in neighboring states might be similar and the spatial autocorrelation would be present and create problems about the assumption of the independence of residuals (a residual is the difference between an observed and a predicted value).

The Moran statistic measures spatial autocorrelation. The statistic is equivalent to the ordinary correlation coefficient, with a numerator that measures the deviations about the mean of the data of each variable, and a standardized denominator.

However, spatial analysis and spatial autocorrelation would be more effectively analyzed at the district levels, which require a distinct and costly collection of data and could be left to future research.

Appendix 4: Stata Code and Procedures

1. Ramsey test for omitted variable in OLS regression

Syntax:

estat ovtest

2. Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

Syntax: *hettest*

Ho: Constant variance

Variables: fitted values of *logtotnumbrstartups*

Breusch-Pagan/Cook-Weisberg test for heteroskedasticity

Ho: Constant variance

Variables: fitted values of *income*

$\chi^2(1) = 0.12$

Prob > $\chi^2 = 0.7238$

The null hypothesis is that the error variances are all equal versus the alternative that the error variances are a multiplicative function of one or more variables.

In this example, the chi-square value is small, indicating heteroskedasticity was probably not a problem, i.e., we do not reject the Ho of constant variance.

3. Hausman Test

To procedure for the Hausman test is first estimate the fixed effects model, save the coefficients, estimate the random effects model, store them and then do the comparison.

Syntax:

```
. xtreg dependentvar independentvar1 independentvar2 independentvar3 ... , fe  
. estimates store fixed  
. xtreg dependentvar independentvar1 independentvar2 independentvar3 ... , re  
. estimates store random  
. hausman fixed random
```

4. Random over Pooled OLS

Syntax:

```
xttest0
```

Testing for random effects: Breusch-Pagan Lagrange multiplier (LM) helps to decide between a random effects regression and a simple OLS regression. The null hypothesis in the LM test is that variances across entities are zero, i.e., there is no significant difference across units (i.e., no panel effect).

5. Serial Correlation

Wooldridge test for autocorrelation in panel data

Syntax:

```
xtserial depvar indvar
```

H0: no first-order autocorrelation.

6. Testing for cross-sectional dependence/contemporaneous correlation

According to Baltagi (2008), cross-sectional dependence is a problem in macro panels with long time series (over 20–30 years). This is not much of a problem in micro panels (few years and large number of cases). The null hypothesis in the Breusch-Pagan LM test of independence B-P/LM test of independence is that residuals across entities are not correlated.

Syntax:

```
xtreg y x1, fe  
xttest2
```

Given that the data set has $N = 27$ and $T = 11$, then the *xttest2* cannot be performed, since it requires $T > N$, i.e., the output return: “singular matrix and the test cannot be performed.”

Pasaran CD (cross-sectional dependence) is the test is used to test whether the residuals are correlated across states. Cross-sectional dependence can lead to bias in tests results (also called contemporaneous correlation). The null hypothesis is that residuals are not correlated.

Syntax

xtreg y x1, fe
xtcsd, pesaran abs

Appendix 5: Policy Uncertainty

Keynes (1937b) indicates that uncertainty prompts reductions in real activity and hits investments, which are based on anticipations about the future and have the greatest volatility among the components of the aggregate demand. Bernanke (1983) shows that when investment in projects are irreversible and information is available in pieces over time, there is uncertainty about future returns and investors and entrepreneurs prefer making a small initial investment to have the option to wait, see what happens and then make final decisions. The option to wait is valuable because the alternative would be to do nothing, or make large investments that are difficult to reverse.

In situations of uncertainty, investments are reduced, even when agents are risk-neutral,¹³⁵ with depressing effects on the economy. Moreover, uncertainty prompts firms to shrink the workforce and decrease or even eliminate hiring. Uncertainty has other effects: it brings about a decline in the anticipated rate of return of investments; it diminishes the value of assets and collaterals; it makes harder to obtain debt financing, i.e., creditors raise the interest rates to align them to the level of risk, with negative multiplier effects on the economic activity and further lending. Under these circumstances, the cycle deepens as investments are further cut (including investments in innovations, technology and R&D). In turn, this does not help the productivity, which declines. It does not comfort families that reduce spending and savings.

This scenario is quite familiar in a period of financial and economic crisis.

It is relevant that uncertainty and particularly economic, or macroeconomic uncertainty is now widely recognized and accepted. The *World Economic Outlook* (IMF, 2012d) of October 2012 devotes an entire section to the issue of uncertainty. It stresses that the rate of growth of

¹³⁵ In passing, a literature on so-called real options has developed and provided contribution mainly in the field of valuation of investments.

output is negatively correlated with macroeconomic uncertainty, i.e., 1 standard deviation increase in uncertainty is associated with a decline in output growth of between 0.4 and 1.25 percentage points depending on the measure of macroeconomic uncertainty (IMF, 2012d, p. 52) .

In these years and particularly starting at the end of 2007, policy makers and researchers have started to investigate the so-called policy uncertainty.

Policy uncertainty is defined as the uncertainty due to unclear strategies and policies of the Government, which affects the behavior of firms and families, i.e., firms delay investments and families reduce their expenditure. Policy uncertainty can become explosive in countries that reached at the crisis with an inefficient, wasteful economic system, excessive intrusive role of the government, plenty of rent-seeking behavior, high debt and extraordinary cost to service it. This is the case of countries of the Southern Europe, i.e., Greece, Italy, Spain: policy uncertainty adds up to and fuels macroeconomic uncertainty, reducing growth, but also creating profound wounds in the social fabric of the country.

The literature on policy uncertainty has started to become relevant.

Bloom (2009), Baker and Bloom (2011), and Baker, Bloom and Davis (2013) contribute to review and give relevance to the literature on policy uncertainty. Baker, Bloom and Davis (2013) make a significant contribution by looking at the various aspects of policy uncertainty and referring to various early studies - Friedman (1968), Rodrik (1991), Higgs (1997), Hassett and Metcalf (1999) and Bernanke (1983) - that review the harmful impact on the economy due to the uncertainty of monetary, fiscal, and regulatory policies.

With respect to the current financial and economic crisis, Born and Pfeifer (2011) and Fernandez-Villaverde et. al. (2011) examine the impact of policy uncertainty, finding moderately negative impacts; Pastor and Veronesi (2012) define the links among business cycle, policy uncertainty, and stock market volatility. Empirical papers on policy uncertainty: Gulen and Ion

(2012) stress the negative impact of policy uncertainty on firms' investments; Julio and Yook (2012) show that investment falls around national elections due to policy uncertainty in election years and not to stock-prices (Durnev, 2010); Brogaard and Detzel (2012) argue that policy uncertainty reduces asset returns; Handley and Limão (2012) discover that trade-policy uncertainty delays the decision of firms to enter the market. Nicholas Bloom, Kose, and Terrones (2013) focus on the increased policy uncertainty in the United States and Europe, especially on fiscal policies (tax, spending), regulations, health-care, monetary policy, and banking. They underline that policy uncertainty has exacerbated the recession and slowed the recovery prompting businesses and households to postpone investments, hiring and consumption expenditures.

Thus, the literature is consistent and in agreement that policy uncertainty in a situation of macroeconomic uncertainty has an adverse impact on output and economic growth.

Causality between uncertainty and the business cycle and the role of policy uncertainty is difficult to establish, i.e., does uncertainty cause recessions or do recessions cause uncertainty? Empirical findings on this point are not conclusive. Bachmann and Moscarini (2011) argue that causality runs from recessions to uncertainty. Baker and Bloom,(2011), instead, using disaster data as instruments find evidence that causality runs from uncertainty to recessions. The experience of the Southern European countries shows that when markets discover that the fundamentals of the countries are not right and realize that there is no clear political and policy direction, they lose confidence on the countries unleashing a crisis. The economic factors and the policy uncertainty reinforce each other and deepen the status of recession.

Under the current crises, the countries of the Euro area and also the United States are obvious candidates for the study of policy uncertainty. The *World Economic Outlook* of October 2012 (IMF, 2012d, Chapter 5) argues that policy uncertainty is a most significant cause of

mounting financial tension and recession in the Euro area, unemployment in the United States, and reduced growth in emerging market and developing economies.

The relevant question is: How to measure economic uncertainty and policy uncertainty?

The *World Economic Outlook* of October 2012 (IMF, 2012d) and Bloom et.al. (2013) review the contributions to the measurement of economic uncertainty. Drawing from the *World Economic Outlook* of October 2012(IMF, 2012d) and from Kose and Terrones (2012), the definition of economic uncertainty refers to an environment in which little or nothing is known about the future of the economy. Shocks that lead to economic uncertainty can stem from a variety of sources, including changes in economic and financial policies, dispersion in future growth prospects, productivity movements, wars, acts of terrorism, and natural disasters (N. Bloom, 2009). Uncertainty has a latent nature and it is difficult to quantify. However, it can be measured making reference to separate aspects of uncertainty related to macroeconomic uncertainty including the volatility of stock returns, variation in productivity, dispersion in unemployment forecasts, and the abundance of the term “uncertainty”, “economic uncertainty” and similar in the media. Other measures of uncertainty, which are also used, refer to dispersion around national or sectorial output, firm profits and sales (Nicholas Bloom et al., 2013).

Some of the measures are:

- i. Monthly standard deviation of daily stock returns in each advanced economy;
- ii. Chicago Board Options Exchange Volatility Index (VXO), which is an indicator of the implied volatility of equity prices calculated from S&P 100 options;
- iii. Uncertainty at the global level is measured by the series of the major standard deviations of daily returns indicators of the six most advanced economies.

With respect to policy uncertainty, the Economic Policy Uncertainty Index (EPU Index) is built use a weighted average of three measures (the frequency with which terms like “economic policy” and “uncertainty” appear together in the media; the number of tax provisions that will expire in coming years; and the dispersion of forecasts of future government outlays and

inflation)(Baker et al., 2013). The EPU index spikes near momentous presidential elections and main events, e.g., the Gulf wars and the 9/11 attacks. It also rises steeply from 2008 onward, i.e., the economic policy uncertainty index has increased by more than 50% since 2007. The current version of the EPU Index captures policy uncertainty in the United States. The Economic Policy Uncertainty Index is updated monthly and can be found at www.policyuncertainty.com.

In line with the topic of this study, policy uncertainty adds another dimension to the issue of uncertainty as unfolding in the *KuU* framework (see Chapter 6, literature review). No investigation exists yet on the relationship between policy uncertainty and entrepreneurship. However, the evidence amassed so far does not lead to any favorable impact of policy uncertainty on entrepreneurship. There is little doubt that policy uncertainty affects negatively investments in machinery, equipment, automobiles, houses, and furniture. The impact of policy uncertainty differs across sectors and countries and is expected to be less severe in advanced economies than in emerging market economies, possibly because the second group tends to have less sophisticated and resilient financial markets and institutions (Carriere-Swallow & Cespedes, 2011). Therefore, the possible impact of policy uncertainty confirms the importance of implementing an institutional system, which includes the development of insurance markets that may mitigate the impact of policy uncertainty.

Along these lines, future work should look at extending the measurement of policy uncertainty to more countries. For emerging market countries, Yan Carrière-Swallow and Luis Felipe Céspedes (2011) model the effect of uncertainty - measured with indexes based on developed countries - on investment and consumption and include the local monetary policy and credit channels. The authors find that contraction in credit loans in emerging markets following uncertainty shocks account for about one-third of the drop in investment. They see uncertainty as deriving from advanced economies and therefore exogenous for emerging market economies.

Therefore, the amplitude of the drop in investment is correlated with the quality of business institutions, the depth of the local financial sector, and the degree of financial dollarization. These empirical findings suggest that financial frictions may have important interactions with the transmission of global uncertainty shocks.

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