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TESI DI DOTTORATO DI RICERCA

Bancassurance in the Italian life insurance industry.

An analysis of scale economies, concentration and risk profile.

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To Giovanni, who never gave up

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Premise

This dissertation is composed by three separated articles and carries out an analysis of the effects of bancassurance ties in the Italian life insurance industry from several perspectives. Departing from an analysis of the relevant literature, two separated empirical econometric analyses are developed focusing on the effects of bancassurance respectively on scale economies and on insurers' asset risk profile.

We consider the Italian market due to the importance of bancassurance ventures, its diversified life insurance sector, its recent volatility and its compliance with European and country-specific regulation. Our analyses focus on responses to regulatory and macroeconomic changes looking at competition (of which scale economies can be considered an indicator), concentration and investments' choices (asset risk profile).

The general literature on bancassurance has analyzed the optimal way to enter the insurance market mainly from the bank point of view. Less attention has been paid to insurers' standpoint. In the first part of the dissertation we critically discuss the main issues on bancassurance studied so far and we highlight existing gaps. In particular we suggest to study the cooperative agreements between banks and insurers by using. In our view this approach, which has already been applied to the analysis of the co- existence of several distribution channels, is also appropriate to explain the co – existence of different degree of integration between banks and insurance companies.

The second part of the dissertation investigates the existence of scale economies into the life insurance industry in Italy, looking for differences in the level of optimal scale across bancassurance groups. The originality of this study lies in fastening together two separated strand of literature: the general literature on financial conglomeration, in particular on bancassurance ventures, and the studies concerning the existence of scale economies in the life insurance market. In general, relying on the financial conglomeration literature, we expect that bancassurance groups are better able to exploit scale economies.

We considered the span 1998 – 2012 dividing the panel into three groups based on ownership linkages with banks. Relying on a micro - econometric procedure, two cost functions are estimated dividing the span into pre crisis and post crisis periods. Results show that, before the crisis hit, insurers independent from banks operated on their optimal scale while bancassurers operated at decreasing return to scale, thus no further conglomeration was needed within the sector, in particular with respect to bancassurance groups. After the crisis results indicate overall increasing return to scale although the industry has undergone substantial consolidation.

Taking into consideration the enhancement of managerial and supervisory actions on risk-taking activities of financial firms after the crisis, in the third part we analyse changes in Italian life insurers' asset risk profile in the span 2005 – 2011, accounting for the importance of effects of bancassurance ventures.

Through a pooled OLS panel data analysis we test the finite risk hypothesis which predicts a negative correlation between asset risk and other firm-specific factors determining the level of risk exposure such as bancassurance ventures, product mix, size and product diversification. In particular we contribute to the extant literature by considering the effects

of the adoption of specific bancassurance models on the level of asset risk. The hypothesis is developed relying on two strands of literature: the general literature that investigates the relationship between asset risk and capital and on the specific studies dealing with risk exposure determined by bancassurance ventures. Finally we test for the effects of external macroeconomic shocks (such as the last financial crisis and changes in regulation).

Our results show that Italian life insurers present a relatively prudent level of exposure, which is negatively correlated with firm factors influencing the overall risk profile. Stronger bancassurance models confirm this relationship. Finally, asset risk exposure did not decrease significantly as a result of the financial crisis, pointing at the effectiveness of regulatory restrictions on investments or a contingent search for yields.

A Survey of the literature on Bancassurance

1.Introduction

Since the Nineties, the entry of banks into insurance brought several innovations particularly in the life insurance market. Indeed, bank branches have become the main distribution channel for life insurance products in several European markets (CEA, 2009). Furthermore, looking at the primary market, new products have been developed such as unit and index linked policies which, given the high level financial content and standardization, can be considered as quasi banking products.

Several bancassurance models have been developed and coexist within the life insurance market such as distribution agreement as well as in the form of ownership linkages (banks' captive companies and joint ventures).

Earlier qualitative studies, focusing on a managerial perspective, consider the advantages of various bancassurance models from the banking perspective. According to this view, the most successful form of co operation is the one that better suits the bank's strategic plan and idiosyncratic situation (Hoshka, 1994). More recently, Van den Berge et al. (1999) consider the phenomenon in a more functionalistic framework aiming to override the same bancassurance and assurfinance concepts which are seen as too linked to an institutional approach. According to Van den Berghe et al (1999), the choice of the co operation model is finally guided by the choices on the distribution side which in turns depends on the consumers 'needs and on external market conditions.

On the other side, empirical literature is mainly devoted to test the conglomeration hypothesis which holds that more diversified firms are characterized by superior scope economies, higher efficiency and lower risk exposure. The main investigated issues concern the effects of cross sector M&A on shareholders' wealth (Staikouras, 2009; Dontis Charitos, 2011) and on risk reduction (Elyiasiani, 2010; Casu et al, 2011). Several quantitative studies also examine the effects of deregulation on competition in the insurance market (Carow, 2001 and Cummins, 2006) Finally, others examine effect of bancassurance ties on cost and profit efficiency as well as on technological progress in the life insurance sector (Fiordelisi and Ricci, 2010; Yuan and Phillips, 2008 and Cummins and Turchetti, 1996).

With respect to the quantitative part, we are aware that the selected papers are not exhaustive of the entire literature on bancassurance as we omitted the analysis of pioneer works based on simulated M&A[1]. Here we consider more recent works that rely on direct observation of conglomerates on which the two successive empirical papers presented in this dissertation are based.

The figure below (Figure 1) shows our categorization of the literature on bancassurance.

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[1] See Genetay and Molyneaux, 1998 for a deeper overview

Figure 1

DESCRIPTIVE STUDIES	QUANTITATIVE STUDIES		
1.INSTITUTIONAL PERSPECTIVE: ANALYSIS OF THE VARIOUS BANCASSURANCE MODELS BASED ON POSSIBLE BANKS' ADVANTAGES AND DISADVANTAGES IN ENGAGING INSURANCE BUSINESS 2. FUNCTIONAL PERSPECTIVE: ADOPTION OF A CONSUMER DRIVEN PERSPECTIVE DISENTANGLING THE FUNCTION PERFORMED FROM THE INSTITUTIONAL FORM	Bancassurance originates from the quest for cost economies efficiency and profitability **Method:** 1.Event studies 2.Microeconometric approach: comparison of cost and profit efficiency through DEA proframming and SFA **Findings:** Positive matrket reactions for banks acquiring insurers and negative reactions for insurers acquirers Superior cost efficiency and lower profit efficieincy for bancassurance joint ventures in Italy	Bancassurance arises from banks' quest for lower risk exposure: **Method:** Risk decomposition approach relying on portfolio theory **Results:** Mixed evidence on total and idiosyncratic risk exposure, higher exposure to systematic risk for banks entering insurance market	Effects of Bancassurance on competition into the insurance market **Method:** 1.Event studies 2.DEA Results: Competition injected by banks lowers insurers' value and lead to technical inefficiencies

In the last part of our work we evidence a relevant gap: neither theoretical nor quantitative literature investigate on why an insurer should prefer a more integrated bancassurance partnership and why more integrated forms should be more efficient from the insurers' point of view.

In order to override this gap in the literature, we suggest an application of the property right theoretical framework. This approach has already been applied in order to explain the co - existence of several distribution systems and organizational forms within insurance industry (Grossman and Hart, 1984 and Tennyson, 1997). We propose to extend this approach beyond distribution system and organizational forms to consider the choice of specific bancassurance model as linked to the characteristics of unit and index linked products. In

this framework we relate the choice of a specific bancassurance model to the optimal level of integration needed in order to sell quasi banking products.

Thus, departing from the investigation of relevant literature on insurance distribution system we consider joint ventures as a form of vertical integration and, given the bancassurance products characteristics, in accordance with the property right approach, we demonstrate that joint ventures are the best model for selling these kinds of product.

The first section of the paper gives an overview of the main qualitative studies on bancassurance focusing both on the causes of the phenomenon and on the examination of the various contractual forms. The second section offers a critical survey of recent quantitative literature evidencing the main investigated issues and underlining the main gaps and uninvestigated issues. The third part deals with studies on insurance distribution system focusing on the property right approach, which links specific distribution systems and organizational form to the characteristics of the products sold, extending this approach to the choice of a specific bancassurance model. In the last section we conclude.

2.Qualitative literature

The removal of barriers to banks' entry into the insurance market took place in Europe with the Second Banking Directive in 1989 and in the US with the Financial Services Modernization Act in 1999. This led to a process of *de jure* convergence between the bank and insurance sectors allowing for several new institutional models of bank-insurance ventures. However, the *de facto* co operation between the two institutions backs its roots well before the above mentioned regulation. Indeed, the provision of insurance products by banks or lending institutions has been developed in France in the mid Eighties; moreover, as

evidenced by Staikouras (2007), since the 1980's, in Greece, state owned banks were used as a major point for raising awareness of the various insurance products.

The convergence between bank and insurance is seen as a natural process due to similarities linking the activities of the two sectors and to the new orientation of financial institutions grouping all financial needs of their costumers instead of focusing on product lines (Genetay and Molyneaux, 1998). The similarities are more evident with regard to life insurance as these products are very similar from a technical standpoint and are offered either as an alternative or as complementary to savings and other investment products sold by banks (see Benoist, 2003). This natural process of convergence is reflected into the regulatory framework that, from both in Europe and in US the Nineties allowed banks to enter the insurance industry. Staikouras (2007) underlines how the *de facto* and *de jure* converge between the two financial institutions "*is a vibrant example where, in regulatory dialectic, the political process of regulation and economic forces of avoidance adapt to each other in a series of lagged responses*". Several counter arguments can be brought regarding the cost of coordination, as will be later highlighted.

Literature devoted to financial conglomerates holds that, at an idiosyncratic level, the main driving force that leads banks to perform insurance is the exploitation of synergies connected to the quest for profitability and scope economies.

Two kinds of scope economies are evidenced: cost scope economies on the production side and revenue scope economies on the consumption side (Berger, 1999). Scope economies on the production side refer to cost reductions achieved by producing a variety of outputs within a single firm rather than having these outputs produced in separated firms. Cost economies of scope arise due to shareable inputs, i.e. one input that can be employed for the production of several outputs. Revenue scope economies, exist if the firm can earn more

by producing several outputs than if the outputs were produced in separate, specialized firms.

In particular, cost scope economies in bancassurance ventures originate from sharing retail branches, distribution system, agency network, and asset management know how; revenue scope economies can be achieved by banks by expanding the product range to less risky activities, thus lowering risk exposure. On the other side, a relevant source of revenue scope economies is the "lock in effect": banks, by providing an integrated product range, raise the switching costs increasing costumers' loyalty, thus reducing the incentive for customers to turn to another firm for the same services. Moreover, looking at revenue scope economies, a vast literature evidences that consumer may be willing to pay more for the convenience of the "supermarket shopping" or "one stop shopping" for their bank and insurance needs as this formula lowers their transaction costs and satisfies their need for integrated solutions

Risk reduction, which can be considered among scope economies, is achieved through diversification as risks of banking and insurance are not fully correlated (Hoshcka, 1994). This can be seen as a form of revenue scope economy stemming from the diversification of banks into less risky activities.

From a managerial perspective, the theoretical analysis of financial markets and institutions can be carried out within either the institutional (Hoshka, 1994) or the functional perspective (Van den Berge and Verweire, 2001).

The *institutional perspective* takes as given the existing institutional structures of financial intermediaries and views the objective of public policy as helping the survival of these institutions. In contrast, a functional perspective is one based on the services provided by the financial system, such as providing a way to transfer economic resources through time.

The *functional perspective* takes as given the economic functions performed by financial intermediaries and asks what the best institutional structure to perform these functions is. The theory relies on two premises:

- Financial functions are more stable than financial institutions

- Institutional form follows function

The financial services may be packaged differently both across competitive institutions and over time, but the functions are far more stable (Oldfield and Santomero, 1995). When studying the financial system, functions are the anchors and are exogenously determined, while institutions are endogenously determined.

In the next two paragraphs we categorize the relevant qualitative studies specifically devoted to bancassurance into these two perspectives.

2.1 Institutional perspective

Earlier studies are concerned with the issue of banks' activities diversification into the insurance market adopting a *bank centered* approach (see Hoshcka, 1994 and Genetay and Moulineaux, 1998) by focusing on the incentives and reasons for banks entering the insurance market. More recently, advantages for insurers have been evidenced (see Staikouras, 2006 and 2007 and Benoist, 2003).

From the insurers' point of view, Staikouras (2007) evidences how scale economies are pursued by insurers in order to reduce operating costs and increasing market supply through the use of bank branches, while the quest for economies of scale are considered by Hoshcka (1994) as a minor issue from the banks' point of view.

The analysis of the interface of bank and insurance also encompasses the costs and disadvantages of co operation between different institutions which are mainly linked to conflicts arising from different corporate cultures that can lead to scope diseconomies.

Hoshcka (1994) and Staikouras (2006) evidence the existence of different cultures characterizing banks and insurance. In this respect, insurers are more sales oriented while banks act as counsellors for their clients. Frictions can stem from different philosophies and behaviours both at corporate and retail level.

Benoist (2003) also evidences the risks and vulnerabilities associated with both *bancassurance* and *assurfinance* models. Dangers for banks distributing insurance products are linked to image risk, since lack of control over the handling of claims and possible delays in paying out settlements can damage a bank's image and relations with clients. Other risks concern cannibalization and costs associated to training sales force especially for selling non life insurance products. Moreover rivalries can arise among distribution networks (insurance agencies and bank branches).

This strand of literature looks at the existence of various forms of co operation as driven by the need of banks to adapt to changing financial environment and at the same time to minimize the costs arising from different strategic and operational approaches.

Hoshka (1994) goes in deep in the analysis of the various legal form of co operation identifying and analyzing four banks entry modes into insurance on the basis of the level of integration. The next figure as depicted in the next figure (figure 2).

Figure 2

| De novo entry | |
| Co operative distribution alliances | Integration level |

In order to identify the possible corporate drivers that distinguish one business venture from another in terms of being successful, Hoshka (1994) focuses essentially on idiosyncratic dynamics as the success of the mode of entry depends basically on strategic and operational factors.

Accordingly, in order for a bank to develop a successful strategic plan for entering the insurance market, the first step is to estimate the costumers' needs. Then from the analysis of customer needs will descend the further steps: the strategic positioning, the choice of information technology support and of distribution approach. Finally training of employees and incentive structures (i.e. the compensation system for branch employees and insurers counsellors in selling insurance) must be functionally adapted into the strategic plan. The most successful mode of entry will be the one that best fits the strategic plan and allows the greatest degree of flexibility and integration among bank and insurance activities and corporate cultures.

In this framework, exogenous factors are included into the analysis of costumers' needs that are at the basis of the strategic plan.

Hoschka considers two major issues in order to choose the best mode of entry: (i) the acquisition of know how in developing and selling insurance products and (ii) conflicts stemming from the diversity of insurers and banks corporate culture as insurers are traditionally sales and commissions driven while banks are less sales-oriented, mainly

providing a counselling service to customers. The optimal choice of the entry mode is characterized by a trade off between a fast acquisition of know how (which is best achieved through distribution agreement, joint ventures and M&A) and avoidance of frictions due to the different corporate cultures (which is best achieved through de novo entry).

According to Hoshka the most successful model is "de novo entry" as it allows the highest degree of strategic flexibility, implying that in this way banks are able to design a tailored entry strategy into insurance which best suits specific competitive environment and internal structure, avoiding conflicts at corporate level arising from the combination of different cultures, strategies and management styles. The disadvantages can arise from the initial lack of know-how as managers start low on the learning curve. One way to reduce problems stemming from lack of know how could be the recruitment of experienced personnel. Hoshka, on the basis of the distribution approach emerging from several case studies also hypothesizes an evolution in term of product complexity offered by de novo entering banks. Indeed, initially these institutions choose simple insurance product that do not require specialized skills and that can be distributed by bank branch employees; subsequently as know how is acquired, these institution opt for a more sophisticated product range designated by specialized insurance product counsellors. Thus, this model turns out to be flexible in designing new products and tailoring products and distribution approach towards the specific situation of the bank.

Strategic alliances are seen as the least successful mode of entry. According to Hoshka, two are the main sources of problems: the instability of long term contracts that leads to opportunistic behaviours and the divergence of strategic intents of the bank and insurance partners. Indeed, as underlined above, traditionally insurers are sales oriented while banks are more counselling oriented. In this respect, strategic intents may diverge as insurers

traditionally tend to maximize the sales of products with high commissions while banks may stress that branch employees should tailor their sales recommendations to the costumer's specific needs in order to secure long term costumer relationship. The co operative alliances are usually more advantageous for insurers, as they can enjoy the banks' comparative advantage in distribution due to a higher frequency of customer interaction and the perception of banks as financial counsellors acting in the costumer's best interest.

Regarding joint ventures, the advantage over the co operative alliances is a clearer organization structure and a well defined incentive scheme. The joint venture is not a stable organization, usually, banks tend to chose these structures in order to acquire know how faster. After acquiring know-how banks tend to increase their stake ending up with the acquisition.

Finally mergers and acquisitions provide the potential to combine banks and insurers' know how. The disadvantages regard the possible frictions at the board and at the branch levels arising from the two different corporate cultures. At the management levels the board may spend time and effort bargaining on power position and strategic intents. At the branch level there can be issues regarding the different compensation system concerning the bank and insurance personnel as bank employees work on salary basis while insurers are commission oriented.

According to Santomero and Dean (1993) banks would prefer to own insurers in order to access to the founding base associated with deferred liabilities and in order to report on a clear consolidated basis for all product owned and distributed through their network.

Falautano and Marsiglia (2003) see the integration models proposed by Hoshka in an evolutionary framework. The development of the various bancassurance corporate forms is seen in a diachronic framework hypothesizing that the models range from the loosest entry

adopted during the first stages of *bancassurance* to synergies involving the acquisition by banks of the entire production and distribution cycle.

As already evidenced, the functional perspective is well suited for analyzing the dynamic and changing environment of financial system, as the functions of the financial system are considered far more stable than the identity and structure of the institutions performing them.

Van den Berge et al. (1998, 1999 and 2000) look at bancassurance from a pure functionalistic view instead of concentrating on institution advantages. As evidenced by the authors, the same concept of *bancassurance* which is defined as the provision by banks of insurance services, is not completely disentangled from an institutional framework. Indeed Van den Berge et al (1999, 2000) try to override the *bancassurance and assurfinance* concepts with the concept of *all finance*, which is completely disentangled from the traditional and institutional definitions of the banking and insurance products and strategies.

The authors distinguish between the concepts of *assurfinance* i.e. the strategy where an insurance company or intermediary cross sells financial products and *bancassurance* i.e. the strategy of banks to cross sell insurance products through its own distribution channels. Their approach aims at overriding these concepts which are seen as too narrow for an in depth analysis of the convergence process in the financial industry. The definition of *bancassurance* and *assurfinance* indeed stems from the traditional definitions of most financial and insurance services which are based on technical criteria and institutional sector

barriers. In order to develop an analysis of the convergence in the financial markets, Van den Berghe et al. (1999) start from the point that the real market needs are often not in accordance with these traditional concepts. They argue that "*the growing convergence in the financial services industry is taking place because financial institutions reconsider their core business and come up with appropriate strategic answers. One of these answers is what we call "all finance""* (*Ibidem*, p.20). All finance refers to a product and market-oriented approach in considering financial products and is considered as the highest form of integration between financial services. Through the concept of "all finance" the authors override previous studies that considered the convergence process from the point of view of the different institutions either banks or insurers. By stressing the importance for financial conglomerates to redefine the core business and primary activities of financial institutions from a technical (product) point of view to a client oriented (functional) approach, this framework overrides the previous studies on integration both in term of retail and in terms of product development. In terms of retail, Van den Berghe et al (1999) envisage an integrated distribution system where costumers are free to select the distribution channel they want within the same financial conglomerate, either the banks or insurers according to their needs. In terms of product development, according to the all finance approach, "*products produced in different 'factories' are unbundled and rebundled to tailor them to the needs of specific client segments in order to offer them an integrated personalized solution*" (*Ibidem*, p. 24). In this framework, *bancassurance* and *assurfinance*, referring only to cross selling strategies, are considered as the lowest form of integration, while, through *all finance,* institutions move towards fully integrated services. The all finance approach at the production and primary activities side leads to integration at the level of support activities. Support activities are corporate governance, capital policy and IT. Accordingly, legal, capital

and organizational structures are created in order to support the primary and support activities. New organizational structures are created that override the limits posed by legislation which does not allow for a full integration of banks and insurance. In order to better understand the functionalistic approach and the leading role of the all finance concept within the convergence process, the authors develop a scheme which is called the Corporate Control Board, which is illustrated in the next figure.

Figure 3

Source: Van den Berghe and Verweire (1998)[28]
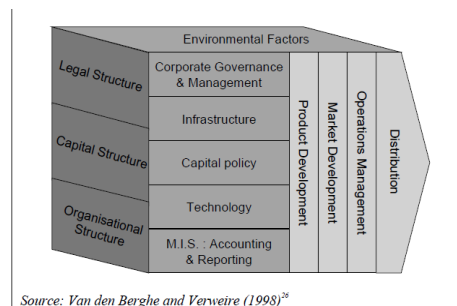
The front arrow depicts the primary activities which must be developed within the *all finance* approach. The choice of integration of primary activities leads the choice of the integration level of the support activities. Following, the structural factors that lie on the back of the figure must be adapted. In this framework, the choice of legal, capital and organizational structure, thus the choice of the co operation model, will be driven by the distributional choice.

3.Empirical studies

A wide literature exists on financial conglomerates that focuses on benefits and costs of diversification in non – interest income for financial holding companies as well as on the benefit for insurers to operate both in the life and non life markets. Vander Vennet (2000) finds that, in terms of cost efficiency, specialized banks appear to exhibit no disadvantage

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relative to financial conglomerates in traditional intermediation activities When looking at non traditional banking activities, conglomerates are on average more cost and profit efficient than non universal institutions. In term of scale efficiency, small banks exhibit unexploited scale economies, while for universal banks and conglomerates no scale benefits or advantages have been found. On the contrary, Stiroh (2005), looking at US for the years 1997 – 2002, finds that diversification gains are more than offset by the costs of increased exposure to volatility that characterizes non - interest income activities. Finally, looking at insurers diversification into several activities, Cummins et al (2010), considering the US Life - Health insurance market from 1993 to 2006, indicate that strategically focused firms (i.e. firms that do not diversify into property-liability activities) are significantly more efficient for all types of efficiency except for scale efficiency, thus results clearly indicate that there are clear diseconomies of scope in life insurance.

Here we deepen the analysis of a sub sector of the literature on financial conglomeration considering specific bancassurance ventures.

Quantitative literature dealing specifically with bancassurance is relatively recent and departs from studies on banks' diversification into non banking activities or from the more general literature on financial conglomerates. In our overview, we partially follow the classification proposed by Ricci (2012) considering the more recent results.

Among empirical studies we can distinguish three major issues:

- the first encompasses the determinants of value creation of bancassurance in terms of profitability for shareholder and in terms of profit and cost efficiency for institutions,

- the second focuses on risk profiles of aggregations between banks and insurers, finally

- the third strand attempts to answer questions about the effect of deregulation on competition.

Following we go in depth in the analysis of the most recent studies devoted to the three abovementioned research areas.

3.1. Profitability for shareholders, cost economies and efficiency

The first issue analyzed by quantitative literature devoted to financial conglomerates and bancassurance is the quest for profitability, cost economies and efficiency as the main leading force for bancassurance mergers.

The two main hypotheses that are tested within this research area are the conglomeration hypothesis and the strategic focus hypothesis (see Berger et al., 1996). The conglomeration hypothesis holds that owning and operating a broad range of businesses may add value either from exploiting cost scope economies by sharing inputs in joint production or taking advantage of revenue scope economies enhancing profitability. According to the conglomeration hypothesis, conglomerates in the financial sector can achieve cost scope economies by sharing information of a large costumers' base and by sharing distribution channels, risk management techniques or IT resources. Revenue scope economies can also be achieved through consumption complementarities as costumers may be willing to pay more for the convenience of the "supermarket shopping" for their bank and insurance needs as this formula lowers their transaction costs. In contrast, the strategic focus hypothesis holds that firms can maximize value by focusing on core businesses and core competencies.

Two are the main quantitative methodologies adopted in this research field: the event study approach, based on the analysis of stock returns response to M&A across financial institutions and the analysis of cost and profit efficiency at the firm level through statistic and mathematic programming approaches.

Following we analyze recent studies dealing with the abovementioned approaches.

3.1.1 Event studies

The event study analysis relies on the assumption that any change in the expected economic profit of an industry is immediately incorporated in firm stock prices (Fama and MacBeth, 1973). If bancassurance M&A result in a reduction or enhancement of future cash flows for the involved institutions, the expectation will be reflected by stock value on the date of the announcement.

Accordingly event studies analyze stock returns of institution involved in bancassurance M&A around the operations' announcement date in order to find out significant market responses in terms of abnormal returns. Thus the methodology aims to unveil whether bank-insurance initiatives (mergers, acquisitions, joint ventures etc.) trigger trading movements that significantly affect stock prices and consequently equity returns of the involved institutions.

Conglomeration hypothesis holds if substantial positive abnormal returns are found around the announcement date.

Considering recent studies, Staikouras et al (2009), for a global sample of bancassurance deals involving mainly European and North American countries between 1990 and 2006, find out that M&A announcements lead to positive market reactions around the event days and create wealth for stockholders of banks bidding. The abnormal returns turn out to be

statistically significant for banks bidders, while it seems that insurer bidders are not positively affected by bancassurance activities.

The determinants of eventual abnormal returns are modeled as functions of the bidder's characteristics and deal-specific factors in order to find out the main drivers of value creation. This is done through a regression analysis with the abnormal returns as dependent variables and a number of deal's characteristics simultaneously considered as independent variables. Looking at the determinant of value creation, Staikouras et al (2009) identify profitability (measured by ROE) and size of the deal (relative size of the target) as the major determinants of value creation, while abnormal returns and functional diversification (non interest income as a percentage of total operating income) exhibits a negative relationship. Thus results show that it is not diversification per se which leads to wealth enhancement. Indeed, intrinsic characteristics of the institutions such as the profitability of the bidder and the size of the target seem to be the major determinants of the positive market reactions.

Dontis Charitos et al (2011) also look at all available bancassurance deals (including insurance agency targets) occurring in 1990 – 2006 separating the sample on the basis of the sector of the acquiring firm in order to shade light on possible different effects of deals on either banks or insurers bidder. A control sample is included which encompass major public deals where one of the counterparts is either a bank or an insurer. Among value drivers geographic diversification and different culture are included. Results are consistent with Staikouras (2009) showing positive abnormal returns for bank bidders and though insignificant or negative abnormal returns for insurers.

Dontis Charitos et al (2011) also find that larger banks are positively affected when acquiring insurer targets as the deal's size relative to the bidder market value positively affects abnormal return throughout the event window, while geographic diversification is negatively

related to abnormal returns. Consistently, Leaven and Levine (IMF, 2012) find that geographic diversification is value destroying for bank holding companies due to enhanced complexity in monitoring firms executives for shareholders and creditors.

Elyasiani (2010) looks at a sample of major international bancassurance deals with public banks as bidders and insurers as targets in the period 1990 – 2006. Their findings show positive abnormal returns throughout the event window implying positive wealth effects for bank bidders. Looking at the determinants of value creation, the analysis does not reveal a significant role for the market to book value, profitability, geographic diversification, or activity diversification (non-interest income ratio).

3.1.2 Micro – econometric studies

On the other side, the micro - econometric approach looks at empirically testing the existence of scope economies or higher efficiency level in financial conglomerates relying on estimates of cost, revenue and profit function calculating scores for scope economies based on estimated value of economic functions. Others rely on efficiency frontiers methodologies and look for differences in cost, profit and scale efficiency across institution that show different level of diversification or different levels of involvement in bancassurance operations.

Thus, for a given technology, the conglomeration hypothesis is satisfied when diversified firms show positive scope economies scores or operate with a higher level of efficiency with respect to their more specialized counterparts.

Looking at studies that adopt the micro econometric approach we consider Yuan and Philips (2008) for the U.S. insurance sector and Fiordelisi and Ricci (2010) for the Italian life insurance industry.

Yuan and Philips (2008) carry out the first study that analyses cost and revenue scope economies arising from bancassurance in the US through a cost and profit function in order to assess if universal type organization override their specialized peers exploiting scope economies. The data sample ranges over the period 2003 − 2005, and identify financial conglomerates and all the licensed subsidiaries: commercial banks, thrift or insurance companies. The dataset comprises 260 observations of diversified firms jointly producing banking and insurance products, 613 insurance specialists and 1450 bank specialists..

A cost function is estimated for banks subsidiaries, insurance subsidiaries and joint producers, thus considering that these firms employ different production technologies. Accordingly, three outputs are considered: banking, life-health insurance and property liability insurance. Input and input prices are also considered separately for the three sectors. Then cost (revenue,) economies are measured as the percentage of costs (revenue) that firms could save (increase) by producing multiple output jointly instead of producing separately. To calculate cost, revenue and profit scope economies the values of the respective functions at the output and input prices median are considered. The critic value is given by the value of the function for the specialist less the value of the function for divisions of joint producers divided by the value for joint producers. Scope economies are present if the values are positive, while diseconomies are present if the value is negative. Scope economies estimates are then regressed on specific firm characteristics such as size, the weight of banking activities for conglomerates, the range of insurance and banking activities performed by conglomerates and distribution channels.

The results are in favour of conglomeration hypothesis. In particular, for joint producers consumption complementarities can be observed (one stop shopping). Small firms are more likely to benefit from cost saving by sharing important or costly resources in conglomeration

(exploitation of scale and cost scope economies) while large firms are more likely to benefit from revenue and profit increases when jointly producing banking and insurance products. Traditional banking firms are more profit scope efficient when conducting simultaneously both life and PL insurance business, thus it seems that, for the US market, diversification of banks into all insurance business is cost efficiency enhancing. Finally the degree of integration of distribution system has no effect on scope economies among conglomerates.

Fiordelisi and Ricci (2010) analyze the effect of *bancassurance* on efficiency in the Italian life insurance market in the years 2005 and 2006 employing s stochastic frontier methodology. The analysis aims at unveiling if, among insurers, those participated by banks show an higher level of profit and cost efficiency with respect to their independent peers. Accordingly, the sample of insurers is divided into three groups on the basis of banks equity participation, and a common frontier is estimated for all the three groups. The groups are sorted as: insurers that are not participated by banks (independent insurers), insurers totally owned by banks and joint ventures Two specifications are adopted: a base model and a model that considers firms specific factors. The base model grasps determinants of firms performance linked to pure managerial ability in combining production factors. The specification of a frontier including firms specific factors allows for an in depth explanation of differences in efficiency across groups considering the impact of the distribution through bank branches, the financial contents of products sold, the market share and the product diversification. The base model (that does not consider specific factor into the frontier) show models difference in cost efficiency in favor of joint ventures and no differences in profit efficiency. The results for the extended model clearly show significant differences in cost efficiency in favor of bancassurers with respect tot. the independent peers. The success of bancassurance in terms of cost efficiency is explained by a high share of premiums collected through bank

branches and the high level of financial content of the products sold. When looking at profit efficiency, joint ventures significantly under perform both insurers controlled by banks and independent insurers. The results show that the specialization in high financial content products is negatively related to profit efficiency. This in turn implies that the hypothesis of revenue scope economies does not hold.

The significant difference in profit efficiency across *bancassurance* models is thus explained by product characteristic and distribution channel. Indeed policies with high financial contents are usually considered as more standardized. Joint ventures into the Italian life insurance market in 2005 and 2006 were mainly involved in the class III policies market. Class III policies are less risky products as the insured directly bears the risk of investment, as the return of these kind of policies is linked to either investment funds, stock indexes or to specific stocks, whilst the insurers bears only the demographic risk., as the insurance service must be related to the human life duration. The distribution of these policies is strongly affected by various phases of capital markets which in these years undergone a less euphoric phase.

We point out that this is the first study that analyzes the costs and benefits resulting from the adoption of a specific bancassurance model from the insurers' point of view. Nevertheless, cost and profit efficiency differences across models are found to be dependent upon firms' characteristics that are not specific to bancassurers, such as distribution through bank branches and production of unit and index linked products. Indeed, independent insurers also engage into cross selling agreements for bank branches distribution and are involved in the unit and index linked market. So why an insurer should prefer to engage in joint ventures with banks instead of relying on flexible distribution agreements? The question remain still open.

3.2 The effect of bancassurance deals on risk exposure of involved institutions

As already mentioned, the quest for risk exposure reduction is seen as one of the main motivation of banks entry into the insurance sector.

In particular the risk measures derive from the variance of stock returns around the M&A's announcement date also adopting risk decomposition techniques such as Generalized Auto-Regressive Conditionally Heteroskedastic (GARCH) asset pricing model in order to decompose total risk in its main components: systematic and idiosyncratic risk.

Recent results show mixed evidence about the reduction of systematic and idiosyncratic risk exposure (Elyasiani et al, 2010; Casu et al., 2011), although there is agreement that the increasing scale of bank operations should not be an advantage in this sense as it increases banks' systematic risk.

Elysiani and Staikouras (2010), looking at international deals that involve banks as acquiring firms between 1990 and 2006, through Generalized Auto-Regressive Conditionally Heteroskedastic (GARCH) asset pricing model, decompose total risk into its systematic and idiosyncratic components, finding a decline in the overall risk exposure for bank bidders. Looking at the separate components of the total risk, they find that reduction is driven by the decline in exposure to unsystematic risk while there is not a substantial drop in systematic risk. This is interpreted as a consequence of the increased market share of financial conglomerates in the total market basket: indeed the relative importance of market risk increases in the post deal period as M&A operation bring these institutions closer to the large firm index, thus increasing their market risk exposure and their co movements with the overall market.

A recent study by Casu et al (2011), employing a risk decomposition technique, analyzes an international sample of deals involving banks, insurers and insurance agencies for the period

1990 – 2006. One of the more interesting features of this work is that results are tested on the basis of the nature of the bidder (bank or insurer) which turns out to be a relevant variable in order to determine the risk profile of the conglomerates. Results on the overall sample indicate no significant effect on the total risk. Nonetheless, the importance of the components of total risk, which are systematic and idiosyncratic risks, is found to change after the deal announcement depending on the nature of the bidder. Indeed the analysis provides evidence of an increasing exposure of banks bidders to systematic risk and a decreasing idiosyncratic risk following a *bancassurance* partnership, although results turn out to be statistically significative only when the target is an insurance agency. On the contrary, the insurer bidders are subjected to a drop in systematic risk and a rise in idiosyncratic risk exposure.

The study also looks for the determinants of risk exposure by regressing the indicators for risks on firms' specific characteristics of the bidders such as product diversification, loan risk, profitability, leverage and size.

Looking at specific determinants of risk, Casu et al (2011) find out that the raise of systematic risk for banks is not driven by diversification into insurance activities but rather by the increasing scale of bank operations. On the other side, diversification is not found to significantly affect banks exposure to idiosyncratic risk after the announcement, while size seems to have a negative effect on idiosyncratic risk both pre and post deal announcement, consistently with the hypothesis of scale and scope economies.

Overall, Casu et al (2011) suggest that bancassurance offers banks opportunities to rebalance risk exposure sheltering from idiosyncratic risk but at the same time facing a higher systematic risk.

3.3 Effect of bancassurance into competition in the life insurance market

Another issue investigated by quantitative studies is how deregulation affects competition into insurance industry. In this context the entrance of banks can be considered as a removal of entry barrier that may increase competition and reduce economic rent for incumbent insurers and agency networks. Increased competition and spread reduction entail insignificant long-run economic rents for banks entering the insurance industry which may force incumbent insurers to lower their earning spread (Carow, 2001 and Cummins, 2006).

These dynamics are reflected and incorporated into the value of company stocks at deregulation announcement date. Analysis of the effect of competition brought by banks 'entrance into insurance industry are based on U.S. data and rely on event studies and look at difference in stock returns of banks and insurers around the announcement date of deregulation.

Carow (2001) analyzes the effect of regulation allowing bank to sell insurance products before the GLBA Act of 1999 which allowed for mergers between banks and insurance underwriters. Indeed, since the mid Eighties six provisions were ruled by Office of the Comptroller of Currency (OCC) and Supreme Court that allowed banks to sell various insurance products. The analysis focuses on the value of banks' and insurers' stock returns around the announcement dates of deregulation that range from 1984 to 1996. Results show a loss in insurers' value and no effect on banks' value. Results are explained within the contestable market theory. Thus results are consistent with contestable market theory as the fall of barriers to bank entry into insurance market is perceived by stockholders as reducing insurers' value as a consequence of enhanced competition and reduced long term earnings.

Carow (2001) also regards at the effect as dependent upon distribution system and product segment (life or P-L). Considering that in the analyzed years banks can only distribute insurance products and are expected to sell annuities underwritten by insurance companies. Thus banks are expected to be direct competitors with subsidiary insurance agencies, affecting insurers that distribute directly through subsidiaries. Accordingly, results show that companies with insurance agencies are negatively affected by deregulation while the effect is moderate on insurers relying on brokerage (not direct) distribution system.

At the same time, product specialization of insurers into either life or P-L seems to be a relevant characteristic in order to assess the effect of banks' competition. Indeed, given the similarities of life insurance policies to banking products, life insurers are more threatened by competition and this is revealed by lower returns of life insurers.

Cummins (2006) analyses the effect of bank entry into the insurance intermediary (distribution) industry in the US. The considered span ranges from 1995 to 2005 as since 1999 US regulation allowed banks to directly underwrite insurance. The bank entry is considered by Cummins as a shock that led to a series of M&A in the agency/brokerage industry. Indeed, intermediary market has undergone a major restructure in the nineties in response to the increasing number of bank owned agencies. Following, insurance companies face competition both by banks and by the increased bargaining power of insurance intermediaries through M&A. The response of insurance companies has been a diffuse internalization of distribution costs. Cummins (2006) also finds out that consolidation has positive wealth effects especially for shareholders of banks that pursue bancassurance strategies. The wealth effects of M&A between banks and P-L insurance agency/brokers generate higher abnormal returns than the acquisition of life – health insurance agency/brokers. The acquisition by banks of P-L insurance intermediaries is perceived as

value enhancing because P-L products deserve a more specialist insurance know how, while the affinity of L-H investment products with the traditional bank products permits banks to directly sell this kind of products. On reverse, vertical integration for P-L insurers is rather seen as a mere defense strategy to deal with the increased bargaining power of the intermediaries, thus it is perceived as not providing significant wealth gains to shareholders.

This is consistent with more recent studies that find negative correlation between the banks and insurers' stock returns at the time of the bank-insurance M&A announcements (Dontis Charitos, Molyneux and Staikouras, 2011 and Staikouras,2009). According to the contestable market theory, in particular looking at the insurance industry, the stock market perceives the entrance of new structure into the business arena as reducing the long-term profits of the existing firms. In this framework, bancassurance could inject more competition into the insurance business and divert premium cash flows to banks.

The entrance of banks into insurance market have brought several innovations that affected the technology and productivity of the insurance industry.

In this respect Cummins, Turchetti and Weiss (1996) carry out a pioneer study which, applying micro econometric methodologies, analyses the bancassurance phenomenon in the Italian insurance market. The analysis raises the issue of bancassurance as part of the technological changes investing the Italian insurance industry in the Nineties. The focus is on technical efficiency, changes in technical efficiency over time, technical change, as well as productivity growth over time for a sample of Italian insurers for the period 1985 – 1993. To shade light on the effects of changes on productivity and efficiency, the study, conducted through a mathematical programming methodology, tests hypotheses about the coexistence of alternative distribution systems and organizational forms within the industry. Results show no efficiency changes over the span, as well as a significant decline in productivity,

attributable to technological regress (i.e. insurers needing more inputs to produce the same level of output). The technological regress characterizing the whole Italian insurance market during the end of the Eighties and the Nineties is tied to the dynamically changing environment that characterized the considered period. During this span, the Italian insurance industry has undergone major changes: in particular, since 1990, when banks were allowed to own controlling interests in insurers, and this could be considered as an external shock that hit the structure of insurance industry. Indeed, large declines in productivity and technological regress occurred in the years affected by deregulation process (i.e. 1990 to 1993): thus, from this study emerges that deregulation and bank entry into the insurance industry negatively affected the whole industry. This can be related to wrong technological choices. It is interesting to note how results differ when only the motor insurance industry is taken into consideration (Turchetti and Daraio, 2004). Indeed Italian motor insurers, which were not significantly affected by bank access into the market, did not experience strong variations either in the efficiency change dimension or in the technological change dimension during the period 1982 - 1993.

Given that the bank access into insurance industry hit in particular life insurance industry, it can be inferred that this has in fact been an important determinant of technological change within Italian insurance industry.

4. Gaps in the existing literature and proposal for further research

The co existence of several bancassurance models has been raised by the qualitative literature. The analysis of bancassurance ventures in this respect is carried out from a banking perspective (Hoshka, 1984) or from a pure functionalistic perspective (Van den Berghe et al, 1999). Empirical research based on event studies does not consider distribution

agreements and does not divide the operation in order to distinguish across different models. Moreover, specific empirical studies dealing with difference in efficiency across various models in the Italian life insurance market, find that efficiency is not given by managerial skills of the specific venture. Indeed, firm characteristics such as distribution through bank branches and production of quasi banking policies do not pertain only to bancassurers, since either independent insurers distribute through bank branches and are involved in unit and index linked policies production. Thus, there are no specific studies dealing on why an insurer should prefer a higher integration level rather than a simple distribution agreement.

Following we analyze this issue relying on the literature devoted to the choice of the optimal distribution system and organizational form.

4.1 Earlier literature dealing with insurance distribution systems

Academic literature that deals with insurance distribution systems is mainly focused on the U.S property liability market. Basically, distribution systems can be categorized into two types: direct writing and independent agents. Direct writing encompasses exclusive agents or insurers own selling workforce and can be considered as a form of vertical integration. Independent agency encompasses agents and brokers that represent multiple insurers and act independently in delivering clients and assessing risk. Literature on this topic is concerned with finding explanation of the co existence of these two systems.

Pioneer empirical studies departed from the study of costs differences between the two systems finding out that insurers working with independent agent incur much higher costs than vertically integrated insurers (Joskow, 1973; Cummins and VanDerhei, 1979). Earlier explanations of the survival of a cost inefficient system rely on the existence of market

imperfections. Nevertheless, this explanation, which is referred to as the *market imperfection hypothesis*, does not grasp the underneath causes of the coexistence of the two forms of distribution in the long run.

In order to override the market imperfection approach, an alternative hypothesis has been developed: the *product quality hypothesis* which, relying on the tradeoff between cost efficiency and product quality, states that higher costs of independent agency reflect a higher product quality (Barrese, Doerpinghaus and Nelson, 1995), greater services intensity and reduction of search costs for costumers (Regan and Tennyson, 1996).

Since the end of the Nineties, empirical studies that dealt with the issue mainly tried to find a relationship between costs data and product quality. The major limit of this type of studies is that product quality is relatively unobservable by researchers. Since 1997, the limit has been overridden through the examination of differences in efficiency between the two types of insurers through frontiers methodologies (see Berger et al., 1997).

Berger et al (1997) investigate both cost and profit efficiency through SFA analysis in the US property liability insurance industry in the period 1981 - 1990. The analysis of profit efficiency permits to control for differences in expenditures on service quality for which the firm is compensated on the revenue side, thus bringing to light how higher costs may be compensated by higher revenues. The analysis is carried out by comparing average efficiency between direct and indirect integrated insurers. Moreover, the hypotheses are tested by regressing cost and profit inefficiency on several firm characteristics. In this way the effect of distribution system on cost and profit inefficiency is isolated from other characteristics such as organizational form, business mix and size. Although independent agency insurers are found to be less cost efficient on average, difference in profit inefficiency is found to be not statistically significant on average. The same results are obtained testing the hypothesis

through regression analysis. Differences in cost inefficiency between the two groups appear to be statistically significant, but looking at profit inefficiency the difference is much smaller and statistically not significant. The results support the product quality hypothesis. Indeed, the difference in measured cost inefficiency appear to reflect unmeasured difference in product quality, thus cost difference among insurers are mostly attributable to services differences rather than to inefficiency and therefore do not represent social costs.

Trigo Gamarra and Growitsch (2012) extend the analysis to multichannel insurers, which exploit both independent agents and exclusive agents to single channel insurers, employing just one of the two distribution systems. In their study of the German life insurance market in the period 1997 – 2005 they compare cost profit and scale efficiency of multichannel and single channel insurers. The hypothesis is that insurers employing a multichannel distribution system are overridden in terms of cost efficiency by direct writers and in terms of profit efficiency by insurers employing independent agency. Advancing the product quality hypothesis, the authors hypothesize that independent agency system, albeit less cost efficient, recoup the disadvantage in terms of cost efficiency with higher revenues resulting from higher service quality. The results clearly contradict the initial hypothesis, clearly indicating that the multichannel strategy override the direct writing in cost efficiency and at the same time overrides independent agency in service superiority. In particular, in the German life insurance market, direct writers have not reached their optimal size to exploit their cost advantage. This is partly due to product distribution strategies. Indeed, while multichannel strategies are utilized to sell several products which can be either counseling intensive or standardized, direct writing strategy is well suited only for standardized products.

4.2 Long run equilibrium: the property right approach to the choice of optimal distribution system

Grossman and Hart (1986) analyze the choice of direct writing or independent agents in a property right approach. Grossman and Hart approach aims at determine the optimal initial contractual relationship between two firms, given the range of possible circumstances that can arise subsequently. The specific circumstances that can arise after signing a contract are not known at the time the contract is signed, thus the future production decisions and investments which are not foreseeable are referred to as *noncontractibles*. The expected distribution of profit that the two firms gain from the initial contract may be affected by circumstances arising from new production choice and investments. Thus in this framework, the optimal initial contractual relationship is the one that minimize the effect of *noncontractible*s on the distribution of final gains.

The initial investment choice defining a contractual relationship between insurers and distributor relates to the ownership of one specific asset: the list of policyholder, for sake of simplicity, now on we will call this choice "the initial investment choice". In this respect, the choice of direct writing and dependent agents entails that insurance company owns the list of policyholders, while the choice of independent agents or brokers entails that the insurer does not own the list. The final gain is related both to insurer's profit and to the compensation of agents. This in turns depends upon an ex ante unobservable variable: the effort of the agent to acquiring and keeping clients. An agent that works well and raises insurer's profits is an agent that gets renewal of policies. In order to induce to spend effort in policy renewal, the insurance company will give the agent an initial commission somewhat

lower than the acquisition cost of a client but renewal commissions that are in excess of the agent's servicing costs associated with obtaining renewal, this is called a back loaded commission structure. *Noncontractibles* refer to opportunistic behaviors and actions taken by the two parties, given the initial investment choice, can affect the final commissions (i.e. the profit of agents) as well as the effort of agents in delivering good clients (i.e. the profit of company). The range of these possible actions is known by both parties.

Consequently, the authors individuate two kinds of *noncontractibles* :(1) *noncontractibles* that can hurt the agent if the company owns the list and (2) *noncontractibles* that can hurt the company if the agent owns the list. Type (1) relate to insurer making the product it is selling less competitive, making the client more likely to want to switch company. In this case, if agent does not own the list and commission structure is back loaded as illustrated, the agent won't be able to recover the acquisition cost, as it will lose the renewal premium, thus loosing incentive to deliver persistent clients. As a consequence, if the renewal is important and the company owns the list, then agent will not put effort in delivering persistent clients as there is the risk of possible actions taken by the company that can make clients to switch to other companies. Type (2) relate to the fact that, if the agent owns the list and the company develops an unanticipated new insurance product, then the clients cannot be solicited without the agent's permission. Moreover, the agent who owns the list can encourage, he can encourage his clients to switch to other companies, if this seems advantageous for him, thus increasing agent's profit at the expense of the company. The risk of this agent's behavior distorts the ex ante investment of the company, i.e. the company, fearing the possible opportunistic behavior of the agent under invests in the relationship.

The optimal initial investment i.e. the ownership of policyholders list, given the potential *noncontractibles*, is finally determined by the sensitivity of the clients to agent's actions and by the uncertainty of policy renewals.

These variables are in turn affected by the kind of product offered by insurer. Indeed, in products in which the renewal is not guaranteed and is sensitive to the agent's actions, the agent will be more likely to own the list, whereas for product in which the renewal is more certain and is less sensitive to the agent's actions, the company will be more likely to own the list.

For some kind of insurance products, the effort devoted by agents to servicing clients and the persistence in the renewal is less important. A good example can be whole life insurance, which is characterized by long duration and no occurrence of renewals. In this case, once the contract is signed, there is no need for agents to keep effort in order to retain the client, and the client has fewer incentives to switch insurance company. Data for 1986 in the US market show that for property liability insurance, i.e. for product with short duration and high renewal uncertainty, agents that own the list represent the main distribution channel with 65% of total premium collected. While for life insurance where duration of contract is higher and renewal is not necessary or is not determined by agent's effort, agents who own the list collect only 12% of total premiums.

Regan (1997) sustains that both exclusive dealing and independent agency insurers will coexist in Property – Liability insurance market, but they will specialize in segments of the market in which the respective organizational form is optimal. In her study of Property – Liability insurance market, Regan (1997) develops the approach of Grossman and Hart (1986) deepening the analysis of the possible sources of opportunistic behaviors which can be:

- The need for asset specific investments. Asset specificity in insurance distribution concerns proprietary data processing, communication hardware and software and investments in advertising. Information systems that connect the various insurers to agencies are relationship specific as agency personnel must spent time, effort and money to use specific insurer related software. Thus investments in such specific technology are more likely to be made by exclusive dealing agents, while independent agents, representing more than one insurer have no incentives in pursue this investment. Also investments in brand name are more likely to be carried out by exclusive dealing agents as when an insurer invests in brand name rather than generic product advertising, it attracts costumers to its distributors and there is the possibility that an independent agent could free ride on these investments promoting a non advertising insurer over an advertising one. Relationship specific investments are more important for exclusive dealing insurers;

- Complexity of the risk evaluation that is directly related to retention and management of specific information on insured riskiness. Independent agents enjoy greater advantages in this respect as information collected by the agent on a potential insured who is not acceptable under one insurer's contract is retained for other insurers. The advantage for the agent is that risk classification effort is not wasted and is always compensated. On the other side insurers enjoy lower risk of misclassification.

- Uncertainty, or exposure to underlying risk. On this side, it can be expected that the compensation of an independent agent for bearing risk is lower than that required by exclusive agency, as independent agents can diversify their portfolio both across insurers in a particular line and across insurance lines. Moreover independent

agents share the risk by participating both to gain and losses of the various insurers. Independent agency is preferred when environmental uncertainty is higher.

Regan (1997) and Regan and Tennyson (1996) find out that independent agency system will be preferred by insurers marketing complex products or operating in lines and markets where uncertainty is higher, while exclusive dealing insurers are able to invest in relationship specific assets that lower production costs and give them advantage in relatively standardized lines and markets. Indeed, independent agents, owning the policyholders list put more effort in collecting information on clients as they have several outside placement opportunities being more suited for risky and not standardized products which require an higher effort in gathering information. In contrast, exclusive agency will be worthwhile only if there are a sufficient number of consumers within easily categorized risk classes.

The empirical results confirm the dependence of the optimal contractual relationship to the characteristics of the different insurance products and lines of market.

On the basis of property right theory and the analysis of *noncontractibles*, Regan and Tzeng (1999) clarify the relationship between distribution channel and ownership form. Regan and Tzeng (1998) aim at searching for correlation between ownership form and distribution system on the basis of:

- Underlying uncertainty or exposure to risk:

- Complexity of products

- Concentration by line of business (business mix)

The results show that both stock and independent agency insurers allocate a large portion of their underwriting capacity to riskier product lines (commercial lines). Regarding specialization, there is a correlation across distribution system and ownership forms but

evidence shows relevant difference in business mix across stock owned firms and independent agency.

4.3 Proposed explanation of the co − existence of joint ventures and contractual agreements

We try to relate the property right framework developed for the insurance distribution system to the choice of insurers' integration level with banks. In particular we suggest an explanation about why joint ventures and distribution agreements co exist within several life insurance markets.

Joint ventures between banks and insurance are seen by the qualitative literature as a step toward further integration (Hoshcka, 1994) but these agreements co exist since the Nineties and, moreover, results on the Italian life insurance market show that joint ventures' characteristics such as product specialization and distribution form lead to higher cost efficiency, even compared to higher forms of integration such as wholly bank owned companies (Fiordelisi and Ricci, 2010). Looking at the framework proposed by Tennyson (1997), we will conclude that the joint ventures are the optimal organizational form for the segment of market in which they are specialized.

Indeed, we can think that joint ventures between banks and insurers as an optimal form of vertical integration for insurance conglomerates that aim at specialise into unit and index linked policies.

In order to reach this conclusion we look at the specific characteristics of unit and index linked products within the framework proposed by Tennyson (1997).

The unit and index linked products are very standardized, with high financial content underlying risk borne by policy holders.

Looking at the need for assets specific investment, we consider that the unit and index linked product show a high level of product standardization. In this case we can assume that brand name of the supplier will be crucial in order to reach market share, thus specific investments are needed, leading to higher form of vertical integration.

Moreover, given that unit and index linked products are not tailored on specific insurers' need, the complexity of the risk evaluation is very low, and thus even in this case, vertical integration with banks as distribution channel is the best option in order to minimize opportunistic behaviours.

Uncertainty, or exposure to underlying risk is also very low for these products as the investment risk is borne by policyholders and not by the insurers. Even in this case, according to the property right approach, more integrated distribution systems suits better.

6. Conclusions

The paper gives an overview of the qualitative and quantitative literature on bancassurance. It is evidenced that a gap exists as the co existence of different bancassurance ventures is not considered within the insurers' standpoint.

Qualitative studies that analyse the co existence of different bancassurance forms of co operation adopt either an institutional bank centered approach or a functionalistic approach. The first approach stresses the need not only for contractual agreement that are in tune with a customer driven strategic plan, but also that are in tune with the idiosyncratic

situation of the bank engaging into insurance activities (Hoschka, 1984). The functionalistic approach emphasizes the leading role of the distribution as leading force in determining the choice of the contractual agreements (Van den Berge et al, 1999),

The quantitative literature analyzes the *bancassurance* phenomenon looking at costs, revenues and risk synergies brought by diversification as well as the effects of financial conglomerates on competiton. Still there is a gap in the analysis of the co existence of the several *bancassurance* forms. The only study we are aware of in this field regards the Italian market for life insurance (Fiordelisi and Ricci, 2010) and finds out that cost and profit efficiency differences across joint ventures and insurers totally own by banks which can be determined by the characteristic of product specialization and distribution system.

We propose to use the property right framework already applied to intra sector dynamics on the co existence of several insurance distribution systems in order to explain the co existence of the various bancassurance models.

Given the high involvement of bancassurers in unit and index linked products which are characterized by high level of standardization and low underlying risk, the analysis of non contractibles as carried out by Regan (1997) lead us to say that higher forms of integration such as joint ventures are more efficient than simple contractual agreements when the company is specialized into quasi banking products.

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Bancassurance and scale economies: evidence from Italy

1. Introduction

Consolidation and convergence processes impressively animated the evolution in the financial sector in recent years. Increased removal of barriers between industries and mobility of capital flows together with enhancements due to the development of prudential supervision allowed firms to seek for higher performance and efficiency in order to cope with increased competition. On the other side, from a consumers' perspective, an easier access to a wider range of financial products enhanced the demand for less expensive, better performing and more sophisticated investment opportunities.

Within this framework bancassurance can be definitely considered a major issue. Early innovations toward the convergence of banks and insurers date back to 1965 in the UK, although a wider development in this direction was already achieved in France and Spain in 1970s and 1980s. Distribution of insurance products through bank branches has been recently preferred by an increasing number of European insurers, in spite of a high degree of heterogeneity in models and differences in market shares across countries. Among potential explanations,, cost synergies and distribution advantages still represent the main benefits and risks associated to bancassurance, originating from cross-selling opportunities and joint back-office activities (asset management, human resources and IT).

At the same time, different models of bancassurance exist and influence the variety of advantages and successes across time and countries, in particular considering the level of

integration reached by various ownership models (distribution agreements, joint ventures and acquisitions, captive companies, mergers) [Hoschka (1994); Locatelli *et al*. (2003)].

In this study we focus on the effects of bancassurance ownership models on scale economies. Despite a wide literature on scale economies as well as on the determinants of bancassurance exists, we contribute to previous research by jointly considering these two aspects and by testing previous findings in the post-crisis scenario, when we expect to find that adverse systemic market conditions increased scale inefficiencies.

Our paper focuses on the Italian market and considers it a proper testing ground for several reasons. Since the 1990s the Italian insurance industry has undergone major changes after deregulation took place that allowed banks to own controlling interests in the insurance sector. Unlike several other countries, banks entered an already mature marketfostering a significant product diversification and a noticeable reduction of distribution costs. The Italian life insurance market has been strongly influenced by bancassurance, as bank branches in 2012 represent a comprehensive market share of 50 per cent, after having exceeded 60 per cent in 2006 [ANIA (2013)], whereas their importance is even higher when considering policies with higher levels of financial risks. The entrance of quasi-banking insurance products reshaped the industry in the 1990s throughout the mid 2000s and increased the exposure of market players to the financial crisis. Finally, all bancassurance models are present and active in the Italian market, allowing a comparative analysis of their performance.

The remainder of this paper is structured as follows. Section 2 provides a review of the most relevant literature on this topic. In Section 3 we describe our data and methodology. In Section 4 we discuss our findings. Section 5 concludes our paper and provides our policy considerations and suggestions for further research.

2. Literature review

Within the European financial sector the removal of regulatory barriers, the integration and harmonization processes within the single market and the evolution of the securities' industry pushed market players to pay greater attention on their efficiency in allocating resources in a more competitive environment. At the same time more sophisticated financial needs contributed to the fast and heterogeneous expansion of bancassurance. Literature in this area can be connected to the broader field of mergers and acquisitions, where bancassurance is investigated from a number of different perspectives.

We distinguish two main streams of research.

The first stream involves qualitative and theoretical literature exploring the foundations and development of bancassurance. According to Chen *et al.* (2009) this is the most numerous if compared to more recent quantitative research. Banks and insurers express several similarities [Voutilainen (2005)] that underline potential benefits of convergence and cross-sector linkages [Bergendahl (1995); Kist (2001); Falautano and Marsiglia (2003); Staikouras (2006)], however with strategic and managerial challenges [Benoist (2002); Dorval (2002); Van den Berghe and Verweire (2001)]. Within the same stream several authors have focused on specific markets to describe similarities or to compare evolutionary trends across countries, also encompassing convergence models between banks and insurers [Morgan *et al.* (1994); Verweire (1999); Benoist (2002); Dorval (2002); Lymberopoulos *et al.* (2004); Chevalier *et al.* (2005); Staikouras (2006); Kalotychou and Staikouras (2007); Artikis *et al.* (2008); Bikker and Van Leuvensteijn (2008)].

The second stream focuses on quantitative and empirical research with a number of different methodological perspectives. Within this literature we can distinguish between

three major issues: the first encompasses equity wealth effects of bancassurance deals and the determinants of value creation, the second focuses on risk profiles of aggregations between banking and non-banking entities, while the third specifically addresses scale economies for insurance market.

Regarding the first subset few studies have provided evidence of positive size-related effects of mergers across the financial sector [Johnston and Madura (2000); Carow (2001a and 2001b); Carow and Heron (2002)]. Diversification within financial conglomerates provides mixed evidence [Cowan et al. (2001)], from positive effects due to scale economies [Templeton and Severiens (1992); Estrella (2001)] and market responses [Cybo-Ottone and Murgia (2000)], or even finding evidence of discount factors placed on conglomerates due to agency conflicts [Laeven and Levine (2005)].

Recent research focused on bancassurance evidences positive market reactions to mergers highlighting benefits in terms of economies of scale, scope and geographical diversification [Fields et al. (2007)]. Staikouras (2009) examines a global sample of major bancassurance ventures between 1990 and 2006 through an event study methodology, finding significant positive returns for bank bidders and significant losses for insurance-bidders. Moreover, results indicate that profitability and size of the deal are the major value drivers, while abnormal returns and functional diversification exhibit a negative relationship. These results are consistent with Dontis-Charitos *et al.* (2011) who find positive stock market reactions to bancassurance deals for bank bidders, while for insurer bidders results are not significant. This could be explained within the contestable market theory: as the deal might reduce long-term profits for existing insurers and increase competition in the insurance market.

The second subset focuses on the analysis of risks associated with bancassurance deals and provides mixed results. Casu *et al.* (2011) find that, despite total and idiosyncratic risks of acquiring institutions are not affected significantly, an increase of systematic risk exposure of banks is observed. Looking at specific determinants of risk they also find that results are driven by the size of operations. Elyasiani et al. (2010) investigate international deals with banks as acquirers between 1990 and 2006, finding a decline in the overall risk exposure for the acquirer due to a decrease in unsystematic risk. This is interpreted as a consequence of the increased market share of conglomerates which raises concerns about greater post-deal systemic risk exposure.

The third quantitative subset investigates cost benefits of bancassurance and their link with competition: in this sense conglomerization is expected to grow until scale economies are depleted. On the role of bancassurance in Italy, Cummins *et al.* (1996) provide a pioneer study which, applying micro-econometric methodologies, investigates the effects on technical efficiency of technological changes in the insurance industry over the period 1985-1993. Results show no effects on efficiency and a significant decline in productivity, noticeably in years following banks' entrance in the insurance market and attributable to a technological regress. Consistently, Turchetti and Daraio (2004) show that for motor insurance, not being affected by banks' entry, results do not show strong variations either in efficiency or technological change over the period 1982-1993. Fiordelisi and Ricci (2011) employ a stochastic frontier methodology to analyze cost and profit efficiency due to distribution and bank ownership for the life insurance market in 2005-2006. They find evidence in favor of bancassurance in terms of cost efficiency originating from firm-specific factors such as share of premiums collected through bank branches and proportion of quasi-banking products, whereas joint ventures' specialization in financial products is negatively

related with profit efficiency. Although looking at the relationship between bancassurance and efficiency, previous studies do not consider the effects on scale economies.

Scale economies within the insurance sector have been investigated by several studies. Fecher *et al.* (1991) analyze the French life and non-life insurance market to address the optimal scale and productive efficiency of various institutional forms (stock, foreign, mutual and public companies), arguing that scale economies contribute to relatively high prices and finding overall scale economies in life insurance, except for public entities. Bikker and Van Leuvensteijn (2008) and Bikker (2012), studying the Dutch life insurance industry, measure competition by looking at scale economies through a translog cost function and find the existence of substantial unused scale economies. Bikker (2012), following the structure-conduct-performance paradigm, stresses the relevance of scale economies as a measure of competition and thus inefficiency. In the US, Houston and Simon (1970), Prichett (1971) and Cho (1986) find some evidence of increasing scale economies in the life sector in different years. Results on a more comprehensive sample provided by Grace and Timme (1992) show positive returns to scale for most firms (except for the largest agency companies). Kellner and Mathewson (1983), instead, find that firm size for the Canadian market is consistent with zero profits. More recently, Fenn *et al.* (2008) provide a cross-country research for Europe between 1995 and 2001, arguing that over this period most insurers were operating under increasing returns to scale. Focusing on the Italian market, Focarelli (1992) uses a translog cost function with cross-section data for 1987, i.e. before deregulation allowed banks to enter the insurance market finding modest scale economies that increase moderately with company size which can be attributed to the maturity of the market.

In Table 1 we provide a brief summary of the main output and input variables and proxies adopted by prominent literature on insurance and scale economies.

[Insert Table 1 about here]

Although the choice of output proxies for the analysis of insurance industry has been widely debated, the majority of papers focused on insurance adopt the production approach [Fiordelisi and Ricci (2011); Bikker and Van Leuvensteijn (2008); Fenn *et al.* (2008)], consistently with Cummins and Weiss (1998) who define insurance output by looking at the value added in three main areas:

- Risk pooling/risk bearing activity: by insuring, life policyholders benefit from a risk pooling mechanism for the risks of premature death or survival. The actuarial and underwriting expenses incurred are important components of the value added by the industry, including holding equity capital to bear residual risks.

- Real financial services relating to insured losses: insurers provide a variety of specialized services for policyholders, including financial planning and management of collective annuities and health insurance plans.

- Intermediation: insurers invest premiums' proceeds in assets that are not available to most investors (for instance privately placed bonds and structured securities). Insurers' value added is reflected in the net interest margin between returns earned and those credited to policyholders.

According to Cummins and Weiss (1998) output can be proxied by premium income or by the present value of incurred losses, incurred benefits can proxy the expected present value of future claims and, to take into account the intermediation function, additions to provisions are added to incurred claims. A minor stream in the literature refers to the intermediation approach [Focarelli (1992); Berger and Humphrey (1997); Brockett *et al.* (2005)], seeing financial institutions as primarily intermediating funds between savers and investors. Accordingly, the main insurers' activity is to borrow funds and transforming

liabilities into assets, receiving and paying interests as a compensation for the time value of funds.

3. Data and Methodology

We employ the database INFOBILA published by ANIA (Italian National Association of Insurance Companies). The database gathers financial statements and segment reporting for about 90% of licensed companies in the Italian market. The raw sample consists of all direct life insurers collecting premiums from 1998 to 2012, leading to 1,314 firm-year observations. After eliminating unreliable (negative or zero values, since our models requires logarithms), not relevant (i.e. subject to liquidation processes) or missing data we came to a refined unbalanced panel of 1,303 firm-year observations, with individual data deflated at 2012 prices.

Companies are then divided in groups depending on their ownership model, consistently with Fiordelisi and Ricci (2011). We reconstructed each company's history through four main sources of information:

- publicly available data from "*Le Principali Società Italiane*" edited by *Mediobanca*, which identifies insurance groups and related participating interests;

- the database *Zephir* from *Bureau Van Dijk* for data on mergers and acquisitions;

- reports from the Italian Antitrust Authority (AGCM) on non-controlling participating interests;

- companies' websites and press releases.

Companies are divided in three groups[2]: independent insurers, insurers totally owned by banks[3] and joint ventures. Companies that are part of financial conglomerates are considered held by banks or insurers on the basis of the prominent activity of the whole group and their leading supervisory authority.

Differences in output production and specialization across bancassurance models are summarized by Figure 1, presenting the relative market share of our three groups.

[Insert Figure 1 about here]

Until 2005 bancassurers eroded independent insurers' market shares. Then, just before the triggering of the financial crises, the latter recovered at the expense of insurers owned by banks, whereas more recently joint ventures' seem to steadily lose ground compared to other groups. This evolution can be explained by considering product differentiation at the firm's level. The financial crisis impacted heavily the banking sector and affected quasi-banking insurance products, such as unit-linked policies, which are mainly distributed by bancassurers. As a result bancassurance groups and joint ventures in particular switched to more traditional and with-profits policies, especially those with guaranteed minimum returns where independent insurers are still market leaders.

To grasp these time-effects, we further detail our sample by considering two sub-periods based on output growth and composition as well as M&A waves that took place in this market and effects due to the financial crises:

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[2] In an earlier version of this paper we divided our sample in six groups, considering intermediate levels of integration. However, additional groups showed poor statistical significance and a reduced number of observations: therefore we focused on these three major models.

[3] Due to its particular nature this group includes *Postevita* (controlled by *Poste Italiane*) which distributes insurance products exclusively through post branches.

- 1998-2006: in this period unit- and index-linked products grew substantially and peaked in 2005-2006. The market experienced in 2004-2005 a wave of mergers and acquisitions: active companies were on average 94 per year.

- 2007-2012: the post-crisis period sees traditional policies leading the overall output. The average number of active players is 76 per year.

Table 2 shows the size of our sample, underlining how consolidation mainly invested independent insurers and companies owned by banks if compared to joint ventures.

[Insert Table 2 about here]

Figure 2 shows the evolution of average total costs for the three bancassurance groups.

[Insert Figure 2 about here]

Total costs significantly increased in the analyzed span but at different paces, supporting the hypothesis of ownership model's effects on cost efficiency. Independent insurers experienced a lower level almost constantly growing, whereas the two integrated groups behaved similarly until 2005 and diverged significantly after 2009.

In order to analyze scale economies we adopt the traditional translog cost function [Christensen *et al*. (1973)], which, for the *s*-th company, can be written as:

$$\ln TC_s = \alpha + \beta_1 \ln(y_s) + \beta_2 \ln(distr_s) + \beta_3 \ln(adm_s) + 1/2\beta_{11} \ln(y_s)^2 + 1/2\beta_{22} \ln(distr_s)^2 +$$
$$+ 1/2\beta_{33} \ln(adm_s)^2 + \beta_{12} \ln(y_s) \ln(distr_s) + \beta_{13} \ln(y_s) \ln(adm_s) + \beta_{23} \ln(distr_s) \ln(adm_s) + \varepsilon_s$$

with $\varepsilon_s \sim i.i.d.(0, \sigma_\varepsilon^2)$ (1)

TC are total costs (incurred claims and benefits, change in technical provisions, bonuses and rebates, acquisition costs, administrative expenses, financial charges including those arising from contracts where the investment risk is borne by policyholders, other technical expenses, other operating expenses, non-operating expenses and income taxes, all gross of reinsurance); *y* represents gross written premiums [Bikker and Van Leuvensteijn (2008);

Fecher *et al.* (1991)]; *distr* is the ratio between distribution costs and gross premiums as a proxy for the price of distribution channels [Fecher *et al.* (1991); Focarelli (1992)]; *adm* is the ratio between administrative expenses and gross written premiums as a proxy for the price of human resources, marketing and IT activities. Unlike Fenn *et al.* (2008) and Fiordelisi and Ricci (2011) we do not extend the model to variables exogenous to accounting data, such as proxies for investment returns, debt capital or labor costs, because of scarce availability of market data able to discriminate between production technologies for our three groups.

Estimations are carried out through a mixed-effect panel data model [Laird and Ware (1982)] where the individual company effect is treated as a random effect: the individual-specific constant terms are seen as randomly distributed across cross-sectional units. Data are grouped in order to consider individual firms throughout time: every group is composed by the various observations of the same individual in different years.

For the single group or firm (*s*) the model takes the following form:

$$
\ln TC_{st} = \alpha + \gamma_t + D_{2s}\psi_2 + D_{3s}\psi_3 + \beta_1 \ln(y_{st}) + \beta_2 \ln(distr_{st}) + \beta_3 \ln(adm_{st}) + 1/2\beta_{11}\ln(y_{st})^2 +
$$
$$
+ 1/2\beta_{22}\ln(distr_{st})^2 + 1/2\beta_{33}\ln(adm_{st})^2 + \beta_{12}\ln(y_{st})\ln(distr_{st}) + \beta_{13}\ln(y_{st})\ln(adm_{st}) +
$$
$$
+ \beta_{23}\ln(distr_{st})\ln(adm_{st}) + b_s + \varepsilon_{st}
$$

(2)

with
$$
\varepsilon_{st} \sim i.i.d.(0,\sigma_\varepsilon^2)
$$
$$
b_s \sim i.i.d.(0,\sigma_b^2)
$$

The term $b_s + \varepsilon_{st}$ is the stochastic part of the model encompassing the stochastic error ε_{st} and the random-effect b_s, which depends only from the individual and is randomly distributed. The term γ_t is the dummy fixed-effect for time, independent from the individual company. The term $D_{2s}\psi_2 + D_{3s}\psi$ is a dummy for the bancassurance model treated as a fixed-effect (respectively, for insurers owned by banks and joint ventures). The other terms

are the independent variables of the translog cost function. We estimate the coefficients of the model using a restricted maximum likelihood estimator (REML)[4].

In order to check for the existence of scale economies we employ a typical measure of output's cost-elasticity [Clark (1988)]. In the case of a multiproduct firm, scale economies or diseconomies exist if the derivative of total costs with respect to output is significantly different from the unity:

$$\sum_{i} \frac{\partial \ln(TC_s)}{\partial \ln(y_i)}$$
(3)

Since our production function considers only one output:

- $\frac{\partial \ln(TC_s)}{\partial \ln(y_i)} > 1$ indicates diseconomies of scale;

- $\frac{\partial \ln(TC_s)}{\partial \ln(y_i)} < 1$ indicates economies of scale.

The statistical significance is based on a Wald Chi-square test with the null-hypothesis being the elasticity equal to one and with constraints vectors fixed to mean values for each bancassurance group.

Given the translog function described by Equation 1, elasticity results as follows:

$$\frac{\partial \ln(tc)}{\partial \ln(y)} = \beta_1 + \beta_{11} \ln(y) + \beta_{12} \ln(distr) + \beta_{13} \ln(amm)$$
(4)

Looking at the translog specification, the change in elasticity as output changes is given by β_{yy}. The coefficient of the squared output is determinant in analyzing the existence of scale economies: if positive it indicates that smaller firms experience larger cost benefits on additional production.

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[4] For a review of restricted maximum likelihood estimators see Harville (1977). More details on the methodology used in this paper are provided in the Appendix.

4 Empirical findings and discussion

Table 3 provides the descriptive statistics for our data.

[Insert Table 3 about here]

The mean of the dependent variable (i.e. total costs) for the two spans is higher for groups II and III in comparison to the sample mean. All three groups experienced an increase in total costs in the second sub-period but with different sizes: independent insurers by almost 58 per cent, companies owned by banks by 67 per cent and joint ventures by almost 9 per cent. Insurers linked to banks are on average larger in terms of premiums than independent insurers. The average output growth is higher for independent insurers and bank-owned entities in more recent years (respectively, by around 65 and 60 per cent), whereas joint ventures decreased in output by 3.5 per cent. The incidence of distribution and administrative costs on premiums appears lower for bancassurance models, although insurers owned by banks show a higher dispersion in terms of distribution prices in more recent years. Finally, distribution costs have been slightly increasing over the period 1998-2012, whereas administrative costs decreased only in more recent years.

The first set of results obtained from our regression is summarized in Table 4.

[Insert Table 4 about here]

Distribution costs as a share of written premiums do not explain the variability of total costs. Written premiums and the administrative costs ratio, instead, are positive and significant for both periods. However, the two sub-periods present different cost functions. In early years the cost function is homothetic: output-prices cross-products coefficients β_{12} and β_{13} are not significantly different from zero. In more recent years, instead, β_{13} is significantly different from zero and exhibits a negative sign. Moreover, in 2007–2012 the own output elasticity β_{11} reveals a negative sign. In presence of a negative coefficient, as in

our case for 2007-2012, unexhausted scale economies are more likely for bigger firms, possibly implying that further consolidation would not be efficient. The more recent sub-period is also characterized by a higher volatility attributable to the systemic shock due to the financial crises.

Table 5 presents results referred to the time-effect.

[Insert Table 5 about here]

Coefficients for the time dummy consider the first year in each sub-period as its benchmark. We find significant coefficients only for 2008 and 2009, following the triggering of the financial crises. We argue that changes in the demand and turbulence in financial markets impacted heavily the whole bancassurance market and enhanced differences in cost efficiency across firms regardless of their ownership model.

Table 6 presents the group-effect, analyzed by taking independent insurers as our benchmark: dummies' coefficients therefore measure if bancassurers on average show differences in total costs if compared to independent insurers.

[Insert Table 6 about here]

Our three groups do not show significant cost differences in the first sub-period, while bancassurance models diverge significantly from independent insurers in the aftermath of the financial crises. These results might reinforce the hypothesis that, despite diversification benefits for bancassurance ventures normally exist, the financial crises exposed higher cost levels for more integrated models.

The latter finding should be completed by investigating the existence of scale economies: results deriving from Equation 4 are presented in Table 7.

[Insert Table 7 about here]

Our first sub-period is characterized by the presence of scale diseconomies for bancassurance groups due to average higher premium collection mainly through bank branches while independent companies show constant returns to scale. The higher cost efficiency and lower profit efficiency of bancassurers before the financial crisis [Fiordelisi and Ricci (2011)] may have led these groups to overcome the optimal production scale within a slightly increasing demand for unit- and index-linked products. In more recent years, however, we find diffused scale economies, which is consistent with recent results for other European countries [Bikker (2012)]. The crisis that hit the financial industry led to wide changes in the demand for quasi-banking and traditional insurance products, as well as a shift across these products as investors moved from riskier investments to safer traditional or with-profit policies. This temporary shock on institutions and demand seems to have restored some scale economies that are lower for bancassurance groups. Finally, since the market showed an overall good level of competition and consolidation in 1998-2006, from our results it could be argued that scale inefficiency emerging from the financial crises might fade in forthcoming years as market players adapt to new market conditions.

5 Conclusions

The theoretical literature predicts the existence of cost-efficiency benefits for life insurers adopting bancassurance models despite empirical contributions do not always lead to consistent findings. Different forms of bancassurance integration co-exist (distribution channels, back-office activities, conglomerates) and alternative ownership models may influence advantages and risks for banks and insurers.

Examining a unique dataset on all active Italian life insurers from 1998 to 2012, we search for cost benefits and scale economies explained by ownership models. We focus on the

Italian market because of the relevance of bancassurance, the presence of all integration forms, its importance within Europe and the reshape of an already mature insurance sector.

We distinguish between three groups of entities based on the strength of their integration with the banking sector. We test for the existence of scale economies within each group through a mixed-effect model of a translog cost function. In order to assess the effects of product diversification, consolidation and the financial crises, we consider two separate time spans: therefore we are able also to control for industry-wide time-effects.

We contributed the extant literature finding that bancassurers do not overperform independent insurers in terms of scale economies. Before 2007 insurers owned by banks and joint ventures seem to have exceeded the optimum level of output and show modest scale diseconomies. On the contrary, independent insurers appear in equilibrium in the same period. The post-crisis period, however, shows that changes in demand and shocks in the financial sector generated scale economies for all groups but in particular for independent insurers. The life insurance market operated with different cost functions before and after the crisis, with no significant explanatory power of distribution costs. Therefore, we provide additional evidence that the level of scale economies can change significantly in a mature market when external shocks reshape market conditions. Moreover, a product mix favoring traditional and with-profits policies could imply a more stable environment for independent insurers. Finally, unexhausted scale economies in the post-crisis sub-period and the negative coefficient for the own output elasticity might suggest to competition authorities and policymakers that a new consolidation phase within the life insurance industry would not be efficient.

This analysis is limited because we do not consider specific exogenous variables to control for effects of bank branches in distribution channels as in Fiordelisi and Ricci (2011),

i.e. we do not cross-selling agreements for which scarce data is publicly available.. Finally, we acknowledge that future developments of this stream of research should include variables exogenous to accounting data and able to discriminate between production technologies across bancassurance groups.

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Tables and figures

Table 1: Input and output metrics

	Output	Output proxies	Input/netput	Input prices proxies
Focarelli (1992)	(i) flow of direct insurance (ii) flow of reinsurance (iii) flow of financial management (iv) flow of real estate management	Attribution of operating revenues and expenses to the four output areas	Labor Capital Commercial network	HP of perfect competitive labor and capital markets. Cross section one year data: distribution costs as ratio between commercial expenses and premiums
Fiordelisi and Ricci (2011)	Expected present value of future claims	Net claims paid, plus bonuses and rebates, plus addition to provisions	Equity Technical Provisions (as netputs) Business services and materials (as inputs) Investments	Ratio of net operating expenses and technical charges on total assets (technical costs) Ratio of investment charges on total assets (investment costs)
Fenn *et al.* (2008)	Expected present value of future claims	Net claims paid, plus bonuses and rebates, plus addition to provisions	Total capital and reserves Total technical provisions Debt capital	HP of competitive input markets. Nominal insurance wages. Long term government bond rates as price of debt capital
Bikker and Van Leuvensteijn (2008)		Premium income	Reinsurance Distribution	Reinsurance ratio Acquisition ratio
Fecher *et al.* (1991)		Premium income Claims	Reinsurance Distribution	Reinsurance ratio Acquisition ratio

Source: own elaboration

Figure 1: Life insurance market share and ownership model
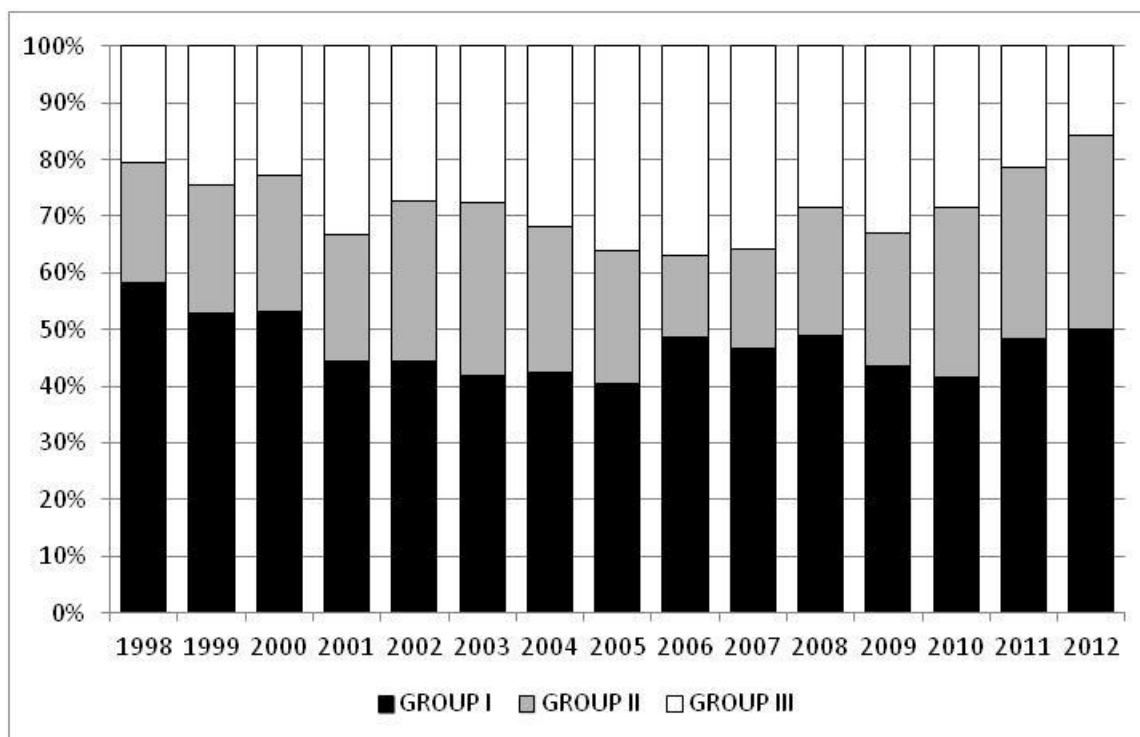
Source: own elaboration on ANIA-INFOBILA database

Groups are defined as follows: Group I are insurers independent from banks, Group II are insurers totally controlled by banks, Group III are insurers jointly held by banks and other insurers. Market shares are based on gross written premiums.

Table 2: Sample size

	Group I	Group II	Group III	Total
1998	67	15	15	**97**
1999	65	15	16	**96**
2000	65	14	17	**96**
2001	61	16	20	**97**
2002	61	19	18	**98**
2003	61	17	17	**95**
2004	58	15	19	**92**
2005	55	14	20	**89**
2006	54	13	20	**87**
2007	51	14	20	**85**
2008	47	14	21	**82**
2009	43	13	21	**77**
2010	40	14	21	**75**
2011	41	11	19	**71**
2012	38	10	18	**66**
1998-2006	*547*	*138*	*162*	***847***
2007-2012	*260*	*76*	*120*	***456***
Total firm-year obs.	**807**	**214**	**282**	**1,303**

Groups are defined as follows: Group I are insurers independent from banks, Group II are insurers totally controlled by banks, Group III are insurers jointly held by banks and other insurers.

Figure 2: Average total costs and ownership model
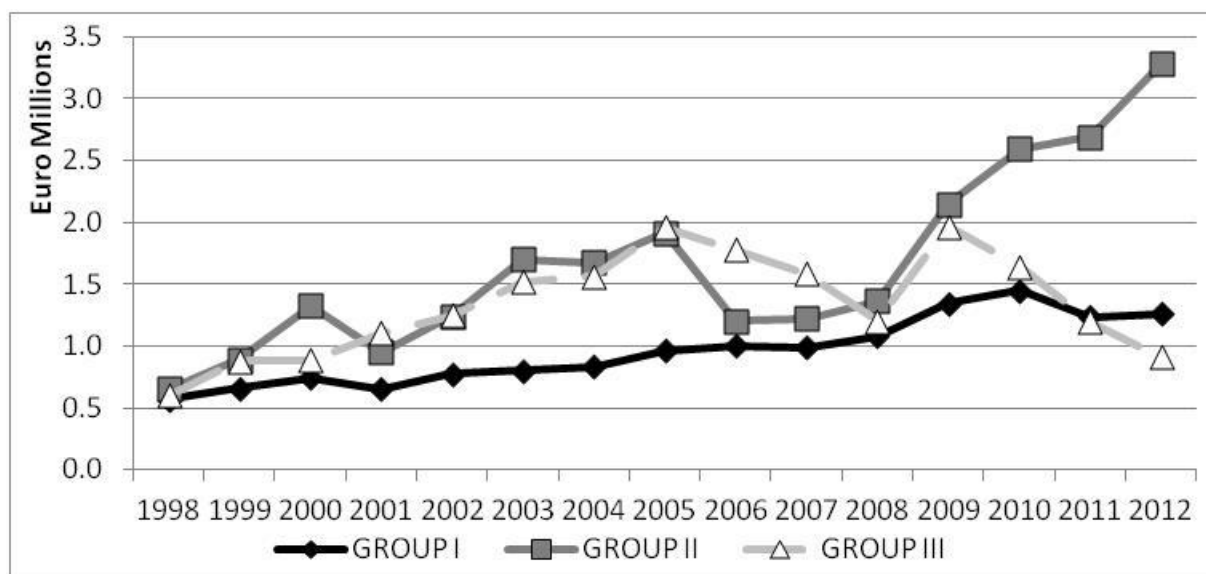

Source: own elaboration on ANIA INFOBILA Database

Groups are defined as follows: Group I are insurers independent from banks, Group II are insurers totally controlled by banks, Group III are insurers jointly held by banks and other insurers. Average total costs are calculated as the within-group average of incurred claims and benefits, change in technical provisions, bonuses and rebates, acquisition costs, administrative expenses, financial charges including those arising from contracts where the investment risk is borne by policyholders, other technical expenses, other operating expenses, non-operating expenses and income taxes, all gross of reinsurance.

Table 3: Main descriptive statistics

TC: Total costs ('000 Euro)

| | 1998-2006 | | | | | 2007-2012 | | | | |
	Mean	St. dev.	Median	Min	Max	Mean	St. dev.	Median	Min	Max
Group I	771	1,409	210	<1	9,280	1,215	2,163	286	1	11,345
Group II	1,284	1,702	578	26	8,139	2,145	3,313	695	20	13,335
Group III	1,316	1,777	722	7	10,812	1,432	1,634	793	27	6,495
TOTAL	**959**	**1,554**	**344**	**<1**	**10,812**	**1,427**	**2,298**	**460**	**1**	**13,335**

Y: Output ('000 Euro)

| | 1998-2006 | | | | | 2007-2012 | | | | |
	Mean	St. dev.	Median	Min	Max	Mean	St. dev.	Median	Min	Max
Group I	504	912	137	<1	6,810	829	1,574	194	<1	9,418
Group II	1,028	1,341	468	24	6,763	1,641	2,610	499	11	10,517
Group III	1,103	1,474	589	6	9,104	1,064	1,259	534	17	5,432
TOTAL	**704**	**1,147**	**272**	**<1**	**9,104**	**1,026**	**1,742**	**355**	**<1**	**10,517**

DISTR: Distribution costs ratio

| | 1998-2006 | | | | | 2007-2012 | | | | |
	Mean	St. dev.	Median	Min	Max	Mean	St. dev.	Median	Min	Max
Group I	0.0852	0.0684	0.0701	0.0014	0.4890	0.0840	0.1157	0.0540	0.0003	0.7194
Group II	0.0569	0.0663	0.0403	0.0120	0.4618	0.0741	0.1386	0.0320	0.0035	0.6237
Group III	0.0426	0.0288	0.0341	0.0118	0.1937	0.0523	0.0901	0.0297	0.0024	0.5799
TOTAL	**0.0724**	**0.0648**	**0.0538**	**0.0014**	**0.4890**	**0.0740**	**0.1144**	**0.0436**	**0.0003**	**0.7194**

ADM: Administrative costs ratio

| | 1998-2006 | | | | | 2007-2012 | | | | |
	Mean	St. dev.	Median	Min	Max	Mean	St. dev.	Median	Min	Max
Group I	0.0608	0.1028	0.0303	0.0018	0.8672	0.0488	0.0785	0.0267	0.0020	0.6136
Group II	0.0143	0.0131	0.0105	0.0010	0.0833	0.0223	0.0285	0.0127	0.0023	0.1318
Group III	0.0130	0.0172	0.0068	0.0020	0.1213	0.0238	0.0347	0.0112	0.0027	0.2114
TOTAL	**0.0441**	**0.0861**	**0.0206**	**0.0010**	**0.8672**	**0.0378**	**0.0642**	**0.0202**	**0.0020**	**0.6136**

Groups are defined as follows: Group I are insurers independent from banks, Group II are insurers totally controlled by banks, Group III are insurers jointly held by banks and other insurers. All variables are gross of reinsurance and expressed at 2012 prices. Accounting data is obtained from the public database INFOBILA, issued by ANIA (Italian National Association of Insurance Companies). TC *are the sum of incurred claims and benefits, change in technical provisions, bonuses and rebates, acquisition costs, administrative expenses, financial charges including those arising from contracts where the investment risk is borne by policyholders, other technical expenses, other operating expenses, non-operating expenses and income taxes, all gross of reinsurance;* Y *are gross written premiums,* DISTR *is the ratio between distribution costs and gross written premiums,* ADM *is the ratio between administrative expenses and gross written premiums.*

Table 4: Cost Function Estimates

Variable	1998 -2006			2007-2012		
	Beta	**Std.Err.**	**t-value**	**Beta**	**Std.Err.**	**t-value**
Const.	2.1002 *** (<0,001)	0.2566	8.1859	1.1544 * (0.0333)	0.5401	2.1374
log(y)	0.8481 *** (<0,001)	0.0518	16.3768	1.2520 *** (<0.001)	0.1144	10.9454
log(distr)	0.0966 (0,1162)	0.0614	1.5728	0.0153 (0.8585)	0.0859	0.1785
log(adm)	0.2879 *** (<0,001)	0.0608	4.7325	0.8682 *** (<0.001)	0.1476	5.8807
log(y)^2	0.0117 * (0.0281)	0.0027	2.2000	-0.0390 ** (0.0024)	0.0064	-3.0572
log(distr)^2	0.0124 * (0.0240)	0.0055	2.2617	-0.0117 (0.3799)	0.0066	-0.8793
log(adm)^2	0.0148 (0.3262)	0.0075	0.9824	0.0127 (0.7396)	0.0191	0.3327
log(y) log(distr)	0.0002 (0.9692)	0.0062	0.0386	-0.0011 (0.9103)	0.0095	-0.1128
log(y) log(adm)	-0.0085 (0.2194)	0.0069	-1.2293	-0.0447 * (0.0154)	0.0184	-2.4344
log(distr) log(adm)	-0.0033 (0.7586)	0.0107	-0.3075	0.0161 (0.3283)	0.0164	0.9790
AIC	-945.2907			-162.3320		
BIC	-841.4990			-84.7240		
Log-likelihood	494.6453			100.1663		

*Significance codes: '***' expresses significance at the 0.999 level, '**' at 0.99 and '*' at 0.95*

The table illustrates Betas and p-values for the translog cost function within the model described in Equation 2. Y are gross written premiums, DISTR is the ratio between distribution costs and gross written premiums, ADM is the ratio between administrative expenses and gross written premiums. The goodness-of-fit is measured by the AIC (Akaike information criterion), the BIC (Bayesian information criterion) and the log-likelihood of the entire model described in Equation 2.

Table 5: Time Effect Estimates

| Year | 1998 – 2006 | | |
	Gamma	Std. Err.	t-value
1999	0.0135 (0.3696)	0.0151	0.8977
2000	-0.0184 (0.2251)	0.0152	-1.2141
2001	-0.0082 (0.5929)	0.0154	-0.5349
2002	0.0053 (0.7361)	0.0156	0.3372
2003	0.0045 (0.7783)	0.0159	0.2817
2004	-0.0049 (0.7626)	0.0163	-0.3022
2005	0.0152 (0.3652)	0.0167	0.9062
2006	0.0097 (0.5650)	0.0169	0.5757

| Year | 2007 – 2012 | | |
	Gamma	Std. Err.	t-value
2008	0.0702 *** (<0.001)	0.0205	3.4181
2009	0.0809 *** (<0.001)	0.0218	3.7164
2010	0.0272 (0.2336)	0.0228	1.1931
2011	0.0302 (0.1783)	0.0224	1.3488
2012	-0.0131 (0.5726)	0.0232	-0.5647

*Significance codes: '***' expresses significance at the 0.999 level*

The table illustrates the time effect within the model described by Equation 2 (γ_t), together with standard errors, t-test and p-values. Each period is analyzed by comparison to a benchmark year, respectively 1998 and 2007.

Group	1998 – 2006			2007 – 2012		
	Psi	Std.Err.	t-value	Psi	Std.Err.	t-value
Group II	-0.0482	0.0279	-1.7285	0.1557 ***	0.0464	3.3529
	(0.0843)			(<0.001)		
Group III	-0.0125	0.0254	-0.4918	0.1686 ***	0.0402	4.1975
	(0.6230)			(<0.001)		
AIC	-945.2907			-162.3320		
BIC	-841.4990			-84.7240		
Log-likelihood	494.6453			100.1663		

Table 6: Group Effect Estimates

Significance codes: '***' expresses significance at the 0.999 level

The table illustrates the group effect within the model described by Equation 2 as $D\psi$, together with standard errors, t-test and p-values. Groups are defined as follows: Group I are insurers independent from banks, Group II are insurers totally controlled by banks, Group III are insurers jointly held by banks and other insurers. Each period is analyzed by comparison to a benchmark group (Group I). The goodness-of-fit is measured by the AIC (Akaike information criterion), the BIC (Bayesian information criterion) and the log-likelihood of the entire model described in Equation 2.

Table 7: Scale economies

Group	1998 – 2006		2007 – 2012	
	Elasticity	χ^2	**Elasticity**	χ^2
Group I	1.012 (0.071)	3.244	0.857 ** (0.001)	10.283
Group II	1.040 *** (<0.001)	25.705	0.933 *** (<0.001)	14.902
Group III	1.041 *** (<0.001)	25.756	0.942 *** (<0.001)	11.137

*Significance codes: '***' expresses significance at the 0.999 level, '**' at 0.99 and '*' at 0.95*

The table illustrates the elasticity of total costs with respect to output as described by Equation 4, together with the Wald Chi-square test and p-values. *Groups are defined as follows: Group I are insurers independent from banks, Group II are insurers totally controlled by banks, Group III are insurers jointly held by banks and other insurers.*

APPENDIX

LINEAR MIXED EFFECT MODELS

In analyzing panel data we rely on fixed effects if we assume that differences across individuals are characterized by differences of the constant term. However, multiple measurements for each individual, such as repeated observation over time, generally result in correlation of within-subjects' errors. Moreover, considerable variation among individuals in number and timing of observations might often affect data. The resulting unbalanced datasets are typically not effectively analyzed using a general multivariate model with unrestricted covariance structure [Laird and Ware (1982)]. Instead, data of this form can be analyzed using a variant of a two-stage model generally referred to as mixed-effects models. In this formulation the probability distribution for the multiple measurements has the same form for each individual but parameters of that distribution are allowed to vary across individuals. The distribution of these parameters or random effects in the population constitutes the second stage of the model [Laird and Ware (1982)].

In our analysis we use a particular type of mixed-effect models considering only random intercepts for subjects and a constant slope with respect to the covariates. In this approach fixed effects describe patterns of change in the mean response over time in the population, while the random variables represent the individual's deviation from the population mean intercept after the covariates have been accounted for. In order to consider variations among repeated observations of the same individual data are clustered in groups composed by observations for individual (s) over time. The hierarchical notation is as follows:

$$TC_s = a + \gamma_t + D_s \psi + X_s \beta + Z_s b_s + \varepsilon_s$$

With $\varepsilon \sim i.i.d.N(0,\sigma_{\varepsilon}^2 I)$ and $b \sim i.i.d.N(0,\Phi)$.

TC is the response vector which comprises the logarithm of the total costs, α is the vector for the general intercept, γ_t is the dummy for the time effect, $D\psi$ includes the dummy matrix D and the coefficients vector ψ to be estimated in order to grasp the effect of ownership models, $X\beta$ comprises the matrix X with the logarithms of the cost function variables and the vector of coefficient β to be estimated, $Zb + \varepsilon$ is the stochastic part of the model which encompasses the stochastic error term ε_s, a random variable b_s and $Z_s = 1_s$ to include only random intercept and constant slope. Finally, Φ is a positive definite symmetrical matrix independent from *s.*

The parameters have been estimated through the restricted maximum likelihood approach (REML) using the "*nlme*" package of R. For a literature review on estimates through maximum likelihood, see Harville (1977).

Life insurers' asset risk during the financial crisis: evidence from Italy

1. Introduction

The crisis fostered a global attention of regulators, supervisors, academics and the general public on financial institutions. After its triggering a number of entities, in particular banks, suffered from significant financial distress. Despite a high degree of variability, an unprecedented downturn hit all economies with an end not clearly foreseeable yet.

The impact of this shock adds to the rapid evolution of financial markets. New technologies and knowledge facilitate the management of financial institutions but may also incentive complexity through innovation in products and strategies. At the same time, regulation and supervision encompassed a season of risk-based improvements that tried to guide these evolutionary trends, although frequently followed them.

Life insurers and pension funds are major institutional investors. The increasing size of their investments, the thickening of connections with other intermediaries and the role on risk transfer mechanisms of customers raised several questions about their systemic relevance (Trichet, 2009). However, the criteria for identifying systemically relevant institutions (size, interconnectedness, substitutability; FSB, 2009) should distinguish specific features of insurers when compared to banks, in particular the timing of claims towards their liabilities (IAIS, 2009; Geneva Association, 2010). Nonetheless, insurers are exposed to market and credit risks with systemic relevance.

Not surprisingly, risk-based supervision developed rapidly for banks, prone to the disruptive effects of runs. At the same time, insurers are not new to these concepts. European insurers, despite referring to a regulatory framework dating back to 1970s (Solvency 1), comply with an implicit link between capital and risk. On the other hand, risk-

based capital is frequently a supervisory tool in other countries, f.i. in the US since early 1990s (RBC) and in Switzerland since mid 2000s (SST). The banking sector contributed significantly in this area through the Basel Accords. Insurers have also been experiencing improvements in this area, with country-based enhancements (specific restrictions on assets, UK's "twin peaks" model, Denmark's "traffic lights" system, etc.) as well as due to the long-term discussion on Solvency 2.

The issue of how regulation and supervision should address and influence risk-taking activities of undertakings is particularly relevant from a political and academic perspective, since, by constraining competition, the welfare of customers may be altered.

This paper contributes to this discussion by focusing on the relationship between asset risk and risk profiles of life insurers in the period 2005-2011.

We focus on the Italian market, considering it a representative ground for our purposes for a number of reasons. Firstly, this is a competitive, developed and sizeable market[5]: in 2012, around 100 life insurers collected almost 70 billion EUR of premiums, with 437 billion EUR of assets under management (ranking fourth after France, the UK and Germany), with penetration rates as high as 4.5% (higher values are present only in the UK, France and Belgium). Secondly, products offered are well diversified, with technical provisions of traditional and with-profits business accounting for 300 billion EUR, policies linked with investment funds or indices for 90 billion EUR, capital redemption contracts for 25 billion EUR and pension fund management for 9 billion EUR. Moreover, despite financial results of insurers were severely affected by recent market trends, no disruptive effects have been recorded to date. Operating results rose in 2012 to almost 7 billion EUR, between three and four times their pre-crisis level and recovering from 2008's and 2011's unprecedented losses

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[5] Statistics are obtained from ANIA (2013) and Insurance Europe (2013).

exceeding 3 billion EUR. Finally, the Italian market is subject to the European insurance regulation and supervision, but adopted some country-specific additional requirements.

We employ a panel data analysis to assess the impact on asset risk of several firm characteristics, essentially testing the finite risk hypothesis (Baranoff and Sager, 2002 and 2009). Additionally, we also make a contribution to the literature developed so far by studying the relationship between asset risk and the adoption of specific bancassurance models, given their strong presence of this phenomenon into the Italian life insurance market.

Finally, we extend our analysis to take into account the variability of insurers' risk profile over time, in order to address regulatory and macroeconomic aspects.

The paper is structured as follows. In Section 2 we review the relevant literature on this topic. In Section 3 we briefly describe the Italian life insurance industry and formulate our hypotheses accordingly. In Section 4 we illustrate the econometric methodology and our data, whereas in Section 5 we present and discuss our findings. Finally, Section 6 concludes our paper, providing also some policy recommendations and suggestions for further research.

2. Theoretical framework and literature review

This work is closely linked with two streams of literature. The first refers to of the relationship between asset risk, product risk and capital among insurers. The second stream is specific to risk exposures of insurers involved in bancassurance M&A, functional in developing our additional hypotheses on the influence of bancassurance ownership models on portfolio choices.

Academic literature on insurers' asset allocation has been mainly developed after the adoption of RBC regulation in the US, encompassing capital charges towards investment risks. Earlier studies established a reference framework within the broader analysis of enterprise and financial risk management (see f.i. Santomero and Babbel, 1997). The strong link between insurers, investments and regulation leads to a trade-off between returns and safety that seems to favour equity and similar investments for variable insurance policies to hedge inflation risks and offer an expected long-term positive real return (Davis, 2001).

Baranoff and Sager (2011) review two major sets of theories concerned with the relationship between product risk, asset risk and capital. The first one, the *finite risk hypothesis*, predicts that capital and asset risk (as well as between capital and product risk) are positively correlated and insurers balance their overall risk-taking (Cummins and Sommer, 1996; Baranoff and Sager, 2002 and 2003). A second stream, the *excessive risk hypothesis*, predicts that firms may seek to increase their overall risk exposure.

Asset risk can be defined either as a regulatory issue or an opportunity risk.

Regulatory asset risk is based on an adjusted US RBC measure calculated as the sum of several loadings on the book value of a firm's assets (Baranoff and Sager, 2002).

Opportunity asset risk is a measure of volatility on hypothetical returns that insurers could have earned by investing their assets in matching indexes (Baranoff and Sager, 2011).

Product risk may be proxied by each company's range of contracts: in earlier works, Baranoff and Sager (2002) consider product risk as endogenously determined and associate it to the level of specialization in accident and health, the most risky line of business, and find that product risk and capital are negatively correlated. Evidence is mixed when considering the relationship between organizational and distribution strategies and asset risk (Chang et al., 2010) but seems stronger in the life sector (Baranoff and Sager, 2003).

More recently the analysis has been based on the *business strategy hypothesis* which is derived from the theory of transaction costs (Williamson, 1985; Grossman and Hart, 1986; Regan and Tennyson, 1996; Regan and Tzeng, 1999). This approach assumes that product risk is predetermined to capital and investment risks. This underneath hypothesis is also consistent with claims on the insurance business being liability-driven and on the importance of asset-liability management (f.i. Obersteadt, 2013). Since every class of products may be associated to a specific level of asset risk, proxies have been obtained from the proportion of premiums attributable to health, annuities, life and reinsurance lines and clustering entities accordingly (Baranoff and Sager, 2011). Following this approach, Baranoff and Sager (2011), in analyzing U.S. life insurance during the financial crisis, find that companies remain within the finite risk boundaries but move towards the excessive risk area (Baranoff and Sager, 2011).

Other firm specific factors have been found relevant to determine the level of capital and asset risk. Baranoff and Sager (2011) find that larger size within most products segments is associated with lower capital ratio and with higher asset risk, arguing that dimension may be risk-neutralising, consistently with the notion of "too-big-to-fail". This was recently confirmed by Obersteadt (2013), finding that larger companies have lower capital-to-asset ratios and accept higher levels of systemic risk but are more diversified and less volatile. Chang et al. (2010) proxy business risk with leverage ratios and control for complexity and specialization of the product mix; however, since they focus on non-life insurers, several variables (f.i. coefficient of variation of loss ratios, level of reinsurance and advertising expenses) are not relevant for the purposes of our analysis.

Among firm specific factors that may have an impact on asset risk, we also include ownership linkages with banks. Following Baranoff and Sager (2003) by extending their

hypothesis on the importance of distribution system and organizational form in determining the level of asset risk and capital (in contrast with the evidence for U.S. non-life insurers provided by Chang et al. (2010)), we consider the relationship between bancassurance and portfolio choices as worth of further investigation.

In order to develop our hypothesis, we follow the most recent literature exploring the effects of banks' diversification into insurance activities on the idiosyncratic and systematic risk exposure which provides mixed evidence. Large and diversified banks that are involved in noninterest – income activities have found to bear higher systematic risk (Stiroh, 2006; see Casu 2010 for a deeper discussion). This implies that the bancassurance partnerships will also exhibit higher systematic risk.

Among the extensive number of contributions on this topic, we evidence the following. Nurullah and Staikouras (2008) find that banks diversifying into life and non-life insurance activities significantly increase the volatility of their returns and the probability of bankruptcy. Baele et al. (2007) find that bank diversification is positively associated with systematic risk, but the relationship is negative with idiosyncratic and total risks. Event-study analysis of bancassurance M&A achieve a similar conclusions. The importance of systematic risk on total risk is found to increase after banks' acquisition of insurers and is influenced by size rather than diversification. Idiosyncratic risk is found to fall (Elyasiani et al., 2011) or to remain unaffected after the deal (Casu et al., 2011), thus evidencing the risk of an overreliance on non-interest income for banks entering the insurance market. These last findings are consistent with Stiro (2004) who evidence that, at the micro level, increased reliance on non-interest income may lead to higher risk and lower risk-adjusted profits.

Finally, there are other external (non firm specific) factors that influence the level of asset risk. First, a significant impact is due to regulatory changes. In Europe, Solvency 2 is expected

to increase charges on equity and alternative investments, potentially discouraging these exposures. Insurers hold low levels of these assets and impacts will be smaller where regulatory restrictions on investments are present (CGFS, 2011) and for more solvent entities (Dirk, 2013). Secondly, macroeconomic factors are also relevant. As institutional investors insurers are exposed to market shocks and volatility during financial crisis (Eling and Schmeiser, 2010).

Low interest rates raise concern (Holsboer, 2000; Siglienti, 2000; Antolin et al., 2011) for entities that typically experience a greater duration of liabilities over assets: this affects reinvestment risk and products with minimum guaranteed returns (BCG – AXA, 2013), calling for additional regulatory and supervisory care for insurers and pension funds facing competition and "gambling for redemption" issues (IMF, 2011; Belke, 2013).

Within this framework, the next Section summarizes the main features of the Italian market in order to formulate our hypothesis consistently.

3. The Italian life insurance market and the research hypothesis

The Italian life insurance market mainly encompasses traditional and with-profit policies ("Class I"), unit- and index-linked policies ("Class III") and capital-redemption products ("Class V"). In recent years, distribution strategies and the crisis concurred in reshaping the demand and supply for insurance products, shifting from those with higher levels of financial risks to more traditional products (Table 1).

[Insert Table 1]

In this context it is not feasible to employ the measure of product risk as in Baranoff and Sager (2002), due to the limited presence of health insurance. However, to investigate the relationship between asset and product risk, it is possible to draw a risk-based distinction

grounded on the output mix: we follow Baranoff and Sager (2003 and 2011) in considering that every class of products may be associated to a specific level of asset risk, treating product risk as an exogenous variable.

A first useful distinction of investments on the basis of product mix would be between investments covering technical provisions (classes I and V) and those where the risk is borne by policyholders (classes III and VI[6]); both may be subject to minimum guaranteed returns, with the latter receiving more regulatory scrutiny.

Italian insurers invest mainly in bonds and especially in long-term government debt, due to regulatory restrictions on assets and their capability of hedging nominal interest rate and inflation risks of technical provisions. Unfortunately, accounting data does not differentiate between government and corporate bonds, in particular for their credit standing. However, because of the traditional home-bias of investments, we argue that the effect on our results should be limited. Table 2 illustrates assets' composition in the period 2005–2011.

[Insert Table 2 here]

The Italian insurance industry is characterized by a strong presence of various bancassurance models, from distribution agreements to joint ventures or full banking control: the majority of life policies are distributed through bank branches. Bancassurance groups if compared to their independent peers, are mostly involved into unit and index linked policies. Accordingly, their portfolio is affected as bancassurers hold a higher proportion of investments where the risk is borne by policyholders than independent insurers. Table 3 summarizes differences in portfolio composition across bancassurance groups.

[Insert Table 3 here]

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[6] Due to specialties of pension funds and the peculiar structure of this limited market in Italy, we do not investigate this differentiation further and will refer only to unit- and index-linked policies.

Looking at interest rates, the Italian market shows higher levels compared to other EU countries ever since the inception of the financial crisis, currently remaining above minimum guaranteed returns of policies that still assure the sustainability of related liabilities (BCG – AXA, 2013). At the same time, increasing credit spreads led to material unrealized losses in recent years, affecting at the same time the return on financial business of insurers and potentially driving a higher degree of surrenders in with-profit policies where values are not adjusted to market fluctuations (Swiss Re, 2012). Therefore, we expect the "gambling for redemption" effect to be less likely to occur but not negligible. In this respect, the Italian supervisor (IVASS) began in 2013 a semi-annual stress testing to investigate these effects[7]. Anecdotally, several insurers active in the Italian market disclose to investors the intention to reduce exposures in equity due to expected future higher capital requirements. This phenomenon is not new or limited to the Italian market: European insurers have a long tradition of significant investments in equities that were already reduced after the market shocks in early 2000s (Sutton, 2004). This trend seems to have been exacerbated by the financial crisis (CGFS, 2001). Additionally, insurers may face the effects of an unintended double-standard, being compliant to current restrictions on assets and, at the same time, preparing for future requirements, rebalancing their investments in advance of new capital charges to reduce potential financial losses (Insurance Europe and Oliver Wyman, 2013).

Individual company information on Italian insurers is still subject to local accounting principles, with lower sensitivity to market prices than IAS/IFRS accounting. Therefore, when transposing proxies for asset risk to the Italian market (Baranoff and Sager, 2002, 2003 and 2011) we encounter the issue of defining individual risk loadings without a detailed

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[7] Unfortunately, individual results are currently kept confidential between insurers and the supervisor. However, the market as a whole proved resilient to a long low-rate scenario, due to product mix of insurers with most minimum guarantees significantly below returns earned on investments (Rossi S., 2013).

breakdown of portfolios. However, we can refer to asset classes as meaningful proxies, considering that most regulatory frameworks generally require higher loadings on equity investments: therefore, the weight of these investments will represent our measure of asset risk.

Combining the aforementioned considerations, we expect that Italian life insurers show an overall prudent asset risk profile, with limited effects from regulatory and macroeconomic factors and few changes on equity portfolios.

Our hypothesis are derived as follows.

According to the finite risk hypothesis we expect that higher involvement in unit- and index-linked policies, shifting financial risks to policyholders, lowers the overall risk profile of companies and allows for greater levels of asset risk within investments where the risk is retained by insurers.

HP1: Firms involved in unit- and index-linked policies hold more riskier investments.

Product diversification may also lower the overall risk, providing incentives in pursuing an aggressive investment policy. On the contrary, product specialization should be associated with a more prudent investment strategy.

HP2: Higher product diversification is associated with a more aggressive asset allocation.

Bigger U.S. insurance firms are found to be more able to diversify their operations and, therefore, to be better off in coping with systemic risk, as confirmed at least partially by recent results (Baranoff and Sager, 2011; Obersteadt, 2013).

HP3: Size positively affects the portfolio weight of equity and riskier assets.

Bank's acquisition of insurance companies may have controversial effects on the resulting overall risk exposure.

While Elyasiani et al. (2011) find a drop in overall risk exposure, Casu et al. (2011) evidence no effects in this respect. Both studies raise concerns about an increasing exposure of conglomerates to market risk and systematic risk due to the effect of an increased size of institutions. Diversification provides no benefits in terms of idiosyncratic risk accordingly to Casu et al. (2011). On the contrary, Elyasiani et al. (2011) find a negative relationship between diversification and idiosyncratic risk. Therefore, we expect that bancassurance groups facing more systematic risks would pursue a less aggressive asset allocation strategy when engaging in traditional insurance business. *HP4: Bancassurance is associated with less risky investments backing traditional and with-profits products.*

Macroeconomic and regulatory effects may alter the aforementioned relationships across time, especially when affecting the risk profile of insurers. The financial crisis increased market and credit risks, thus providing incentives to reduce exposures to riskier assets especially when "gambling for redemption" does not seem to affect Italian insurers so far. However, a reduction in equity or an increase in bonds may be attributed also to a contingent search for greater yields.

HP5: The crisis increased risks of assets and led insurers to invest more prudently.

4. Data and Methodology

We based our analysis on accounting data collected from the database INFOBILA, published by ANIA (Italian association of insurance companies, representative of about 90% of the national market). Our sample consists of an unbalanced panel of 567 individual firm-year observations for the period 2005-2011. Since all firms reported a positive level for premiums, no exclusions occurred in our sample

The use of cost-based accounting data for investments may be seen as a limitation of this study; however, for conservative purposes a closer marking-to-market of assets during recessive phases is required, due to impairments or lower market values for non-durable items. Therefore, this should not significantly bias our results. At the same time, accounting data does not disclose different portfolios based on issuer (f.i. government and corporate bonds), residual duration or effective yields. Therefore we are forced to consider only macro-classes of investments.

The inclusion into specific bancassurance models are attributed by reconstructing the history of each company in the period 2005-2011, accordingly to four sources:

- "*Le Principali Società Italiane*", edited by *Mediobanca*, which identifies insurance groups and related participating interests;

- the database *Zephir* from *Bureau Van Dijk*, for data on mergers and acquisitions;

- reports from the Italian Antitrust Authority on non-controlling participating interests;

- companies' websites and press releases.

We focus on three groups: I) insurers independent from banks; II) insurers controlled by banks; III) joint ventures. Table 4 summarizes our sample.

[Insert table 4 here]

For each firm-year we consider the weight of different asset classes on total financial investments (excluding infra-group exposures), namely land and buildings, financial assets where the risk is retained by insurers (traditional, with-profits and capital redemption policies) and those where the risk is borne by policyholders (unit- and index-linked policies). Our dependent variable is either the ratio of fixed income assets on total investments or the ratio of equities on total investments. Descriptive statistics are provided in Table 5.

[Insert table 5 here]

Independent variables consider size, business mix, product diversification, time and bancassurance models. Size and business mix variables are chosen consistently with the business strategy hypothesis (Baranoff and Sager, 2002, 2003 and 2011; Obersteadt, 2013), respectively as the value of total assets and the ratio of premiums for each class of business on total written premiums. Product diversification is measured by Rumelt's diversification index (Rumelt, 1982), considering insurers as specialists if one line of business represents at least 70% of collected premiums, or as diversified entities otherwise. Time dummies allow for the intercept of our model to vary across time. Finally, bancassurance models distinguish between the aforementioned three groups. Table 6 provides descriptive statistics on independent variables, whereas Table 7 provides a broader picture on the generalised increase in the level of specialization across all bancassurance groups in our sample.

[Insert table 6 here]

[Insert table 7 here]

Since we consider ratios of asset classes on total investments, we apply the following logit transformation for each class (Y_i) in order to construct our regression:

$$LOGIT(Y_i) = \log(Y_i)/[1-\log(Y_i)] \quad (1)$$

After defining our variables, we run two pooled OLS regression with time-varying intercepts, one for each dependent variable (equities and fixed income investments) and with the same covariates. The general matrix form of the model is:

$$LOGIT(Y_i) = \beta + \gamma_t + G\psi + D\phi + X\beta + \varepsilon$$
$$\varepsilon \sim i.i.d.N(0,\sigma_\varepsilon^2 I) \quad (2)$$

where γ_t is the time-effect, $G\psi$ is the dummy for the bancassurance model (expressed in comparison with Group I, independent insurers, as benchmark), $D\phi$ is the dummy for

diversification (taking value 1 in case of specialization, 0 for diversification), X is the matrix of firm-specific variables and β is the vector of coefficients to be estimated.

5. Discussion of findings

Results for our two pooled OLS regressions are provided in Table 8.

[Insert table 8 here]

The coefficient for the proportion of premiums collected from unit- and index-linked policies is significant in both models, positively correlated with investments in equities and negatively when considering fixed income. The effect is stronger for equities than for investments in bonds. This result supports our first hypothesis: a higher share of investment risk borne by policyholders is associated with a higher risk retained by insurers in their own asset portfolio. However, the level of the coefficient does not underline a strong effect in terms of composition of investments.

Diversification of products, entailing an expected lower level for the overall risk of a company, should be associated with higher levels of asset risk to confirm the finite risk hypothesis. Results show a strong, significant and negative correlation between specialization and the level of investments held in equities, as opposed by a positive but less significant coefficient for investments in fixed income. These findings support our second hypothesis.

Also our third hypothesis, associating riskier assets with a bigger size of insurers, is supported. The effect is statistically significant in both models: strong and positive for equities, weaker but negative for investments in fixed income.

Our fourth hypothesis associated the strength of bancassurance models to a lower share of investments in equities backing traditional products. Findings are supportive of this hypothesis only for firms controlled by banks, showing a strong and significant lower share

of investment in equities. Joint ventures do not provide statistically significant coefficients: the apparently less prudent investment behaviour of these entities could be explained by a lower involvement in traditional insurance products, since the latter are usually within the productive responsibility and expertise of the associated insurance group or entity. This explanation could be helpful also in considering that the higher share in equities held than insurers controlled by banks could be associated to a greater specialization in unit- and index-linked policies. Finally, if we consider investments in fixed income, both insurers controlled by banks and joint ventures hold a statistically significant lower proportion of bonds for which the investment risk is retained than independent insurers. This result could be interpreted again by considering their higher involvement in unit- and index-linked policies with the transfer of financial risk to policyholders.

Our fifth and last hypothesis dealt with time-consistency of the finite risk hypothesis, namely expecting an effect on portfolio composition due to the generalized increase in risk triggered by the financial crisis. However, all time-dummy coefficients are not significant in the first model (equities). As already mentioned this effect may be due to a bias induced by cost-based accounting data. At the same time, this apparently negligible effect of external macroeconomic factors could be a result of the current regulatory prudential restrictions placed on assets, already in force before the triggering of the financial crisis that limited the exposure to market risks of Italian insurers. However, for investments held in bonds, years 2010 and 2011 show an increase in the proportion of fixed income if compared to 2005. Being unable to distinguish across different categories of securities (corporate or government bonds) and their risk-return features, we cannot attribute this result to a more prudent investment behaviour or a contingent search for yield.

6. Conclusions

Financial intermediaries experienced several challenges in recent years, in particular the global consequences of the crisis and the resulting announcement of tighter regulation and prudential supervision. Among them, life insurers and pension funds, as institutional investors with a long-term perspective, are significantly exposed to financial risks arising from their investment activity. Since these effects may impact portfolio choices, in this paper we analyze the relationship between firm-specific characteristics that are more closely associated with their risk-taking, and the asset risk of insurers measured by their asset allocation. We were motivated by the will to understand their reaction in terms of risk exposure to recent macroeconomic and regulatory changes.

We focus on the Italian life insurance market for the period 2005-2011, due to its relevance within the European Union, the recent volatility of this industry's financial results, its compliance with European as well as country-specific regulation. Moreover, in deriving the hypothesis of this study, we consider also specialties affecting the sustainability of their policy liabilities under the current generalised low interest rates scenario. We construct our panel data model within the finite risk hypothesis and with reference to the share on total investments of two main classes: equities and fixed income assets.

We consider typical firm-specific factors suggested by relevant literature (size, product mix and business diversification). Unlike previous studies, we add bancassurance models as an explanatory variable, consistently with recent evidence on the effects of these ownership linkages on the overall risk exposure of conglomerates. Macroeconomic and regulatory factors are investigated indirectly by measuring changes in asset risk across time.

Our results strongly support the finite risk hypothesis (Baranoff and Sager, 2002 and 2003). Product diversification and engagement in policies where the investment risk is borne

by customers is associated with a riskier asset allocation. Unlike more recent evidence (Baranoff and Sager, 2011), we find that the hypothesis holds also during the financial crisis in the Italian market, i.e. we do not measure a move towards excessive risk-taking.

Extending the hypotheses developed by Baranoff and Sager (2003), bancassurance could be seen as a particular combination of organizational form and distribution strategy that influences the asset risk level. The choice of a specific bancassurance models as an explanatory variable for asset risk is found to affect the level of asset risk consistently with the finite risk hypothesis: insurers controlled by banks hold a less risky investment portfolio when compared to independent insurers. Joint ventures, on the other side, show statistically significant results only for fixed income assets. in the life sector: contrast those evidenced for non-life insurers by Chang et al. (2010).

Finally, we find that macroeconomic factors led to a higher retention of fixed income assets that is moderately statistically significant only for more recent years, whereas the volatility of stock markets did not significantly affect positions in equities. These results may be biased by the use of cost-based accounting data. However, they can also be read in the light of a contingent search for returns from domestic bonds, within a current and expected regulatory framework penalizing investment in equities, driven by increased credit spreads experienced by the Italian market in a business traditionally subject to a home bias in asset composition.

The main limitation of this study is the lack of harmonized details on investment portfolios of insurers that are publicly available, that could have allowed to discriminate the effective exposure of individual assets. More granular data and sources of systemic risk therefore call for further research.

As a concluding remark, our results confirm the relatively prudent investment behaviour often attributed to insurers and, in particular, to the Italian market. This could be also read as a positive consequence of regulatory restrictions placed on investments, while more sophisticated risk-based supervisory tools are expected to be enforced, with potential issues stemming from their final calibration.

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Table 1 – Output composition of life insurers (2005-2011)

	2005	2006	2007	2008	2009	2010	2011
Class I	46,10%	41,97%	44,22%	57,60%	79,81%	75,29%	76,76%
Class III	35,92%	35,10%	47,29%	34,01%	12,00%	17,10%	16,92%
Class IV	0,03%	0,03%	0,05%	0,05%	0,03%	0,03%	0,04%
Class V	17,28%	11,46%	7,27%	5,86%	6,26%	5,72%	4,24%
Class VI	0,67%	11,46%	1,17%	2,49%	1,90%	1,86%	2,05%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

The table illustrates the proportion of product output of life insurers in the period 2005-2011. Classes are described as follows: I) Traditional and with-profits policies; III) Unit- and index-linked policies; IV) Health insurance; V) Capital redemption policies; VI) Collective pension funds.

Table 2 – Investment composition of life insurers (2005-2011)

	2005	2006	2007	2008	2009	2010	2011
Land and buildings	0.49%	0.43%	0.44%	0.48%	0.41%	0.31%	0.36%
Equity investments	2.25%	2.00%	2.08%	1.60%	1.63%	1.52%	1.28%
Mutual funds	2.45%	2.68%	2.54%	2.31%	2.48%	2.76%	3.20%
Fixed income assets	60.41%	60.89%	59.77%	64.05%	67.56%	70.45%	72.15%
Other financial assets	0.72%	0.66%	0.65%	1.42%	0.76%	1.09%	1.41%
Unit-/index-linked	33.68%	33.33%	34.53%	30.14%	27.15%	23.86%	21.59%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

The table illustrates the composition of investment portfolios of life insurers in the period 2005-2011.

Table 3 – Portfolio composition and bancassurance groups (2005-2011)

Year	Group	Land and buildings	Equity investments	Mutual funds	Fixed income	Other assets	Unit-/index-linked
				Investment classes			
2005	I	0.67%	2.72%	2.93%	69.98%	0.99%	22.71%
	II	0.43%	1.36%	1.52%	48.85%	0.56%	47.29%
	III	0.04%	1.55%	1.76%	42.20%	0.12%	54.33%
2006	I	0.54%	2.55%	3.20%	70.20%	0.94%	22.58%
	II	0.58%	1.28%	1.90%	52.52%	0.40%	43.32%
	III	0.03%	1.03%	1.85%	41.63%	0.08%	55.37%
2007	I	0.57%	2.69%	2.82%	68.26%	0.60%	25.06%
	II	0.56%	0.88%	2.63%	54.82%	1.63%	39.48%
	III	0.00%	1.38%	1.74%	41.57%	0.12%	55.19%
2008	I	0.52%	2.15%	2.83%	74.13%	0.92%	19.45%
	II	1.06%	0.75%	1.78%	57.30%	4.85%	34.26%
	III	0.00%	0.91%	1.52%	46.00%	0.24%	51.33%
2009	I	0.46%	2.14%	2.91%	74.22%	0.85%	19.42%
	II	0.89%	0.94%	2.19%	65.66%	1.64%	28.67%
	III	0.00%	1.03%	1.76%	55.12%	0.05%	42.05%
2010	I	0.45%	1.95%	3.24%	75.84%	1.20%	17.33%
	II	0.34%	0.99%	2.65%	67.13%	2.22%	26.67%
	III	0.02%	1.08%	1.92%	62.42%	0.14%	34.42%
2011	I	0.43%	1.64%	3.36%	75.83%	1.11%	17.63%
	II	0.60%	0.32%	4.47%	65.41%	3.90%	25.29%
	III	0.08%	1.07%	2.13%	68.13%	0.60%	28.00%
Full period	I	0.52%	2.26%	3.04%	72.64%	0.94%	20.60%
	II	0.64%	0.93%	2.45%	58.81%	2.17%	35.00%
	III	0.03%	1.15%	1.81%	51.01%	0.19%	45.81%

The table illustrates the composition of investments for each bancassurance group for the period 2005-2011. Groups are defined as follows: I) insurers independent from banks; II) insurers controlled by banks; III) joint ventures.

Table 4 – Sample size

	Group I	Group II	Group III	Total
2005	55	14	20	**89**
2006	54	14	20	**88**
2007	51	14	20	**85**
2008	47	14	21	**82**
2009	43	13	21	**77**
2010	40	14	21	**75**
2011	41	11	19	**71**
Firm-year observations	**331**	**94**	**142**	**567**

The table illustrates the size of our sample for the period 2005-2011. Bancassurance groups are defined as follows: I) insurers independent from banks; II) insurers controlled by banks; III) joint ventures.

Table 5 – Descriptive statistics of dependent variables

	Mean	St.Dev.	Q1	Median	Q3	Min	Max
Weight of equity inv.	0.0179	0.0220	0.0002	0.0098	0.0271	0.0000	0.1305
Weight of fixed income	0.6469	0.2449	0.4925	0.6955	0.8389	0.0029	0.9997
Equity inv. (logit transf.)	-0.8411	0.0787	-0.8952	-0.8220	-0.7831	-0.9677	-0.6707
Fixed income (logit transf.)	-0.2900	0.1882	-0.4146	-0.2664	-0.1495	-0.8535	-0.0003

The table illustrates descriptive statistics for the following dependent variables:
  -the ratio of equities on total investments,
  - the ratio of fixed income instruments on total investments
For both we provide the linear measure and its logit transformation used in our regression model.
Total investments comprise land and buildings, investments where the risk is retained by insurers and excluding intra-group exposures, investments where the risk is borne by policyholders.

Table 6 – Descriptive statistics of independent variables

	Mean	St.Dev.	Q1	Median	Q3	Min	Max
PropClass I	0.6325	0.2926	0.4072	0.6961	0.8869	0.0000	1.0000
PropClass III	0.2377	0.2880	0.0132	0.1178	0.3690	0.0000	1.0000
PropClass IV	0.0008	0.0112	0.0000	0.0000	0.0000	0.0000	0.2624
PropClass V	0.1122	0.1584	0.0022	0.0374	0.9820	0.0000	0.9820
PropClass VI	0.0169	0.0487	0.0000	0.0000	0.4089	0.0000	0.4089
Assets (mln)	5,431	8,997	568	1,953	5,974	12	59,743

*The table illustrates descriptive statistics for independent variables. Business mix is proxied by the ratio premiums collected in each class of business on total written premiums (*PropClass*). Classes are described as follows: I) Traditional and with-profits policies; III) Unit- and index-linked policies; IV) Health insurance; V) Capital redemption policies; VI) Collective pension funds. Assets are total assets of each insurer, in million Euro, and represent the proxy for size.*

Table 7 – Sample size by specialization and bancassurance model (2005-2011)

Year	Group	Specialized	Diversified	Total
2005	I	22	33	55
	II	4	10	14
	III	4	16	20
	All groups	30	59	89
2006	I	27	27	54
	II	5	9	14
	III	5	15	20
	All groups	37	51	88
2007	I	28	23	51
	II	9	5	14
	III	10	10	20
	All groups	47	38	85
2008	I	31	16	47
	II	7	7	14
	III	12	9	21
	All groups	50	32	82
2009	I	36	7	43
	II	11	2	13
	III	17	4	21
	All groups	64	13	77
2010	I	34	6	40
	II	9	5	14
	III	14	7	21
	All groups	57	18	75
2011	I	34	7	41
	II	10	1	11
	III	12	7	19
	All groups	56	15	71

The table illustrates the size of our sample with reference to the level of specialization and for each bancassurance model. Specialization is measured as the Rumelt's index for diversification, with specialization occurring for more than 70% of premiums written in a single product. Bancassurance groups are defined as follows: I) insurers independent from banks; II) insurers controlled by banks; III) joint ventures.

Table 8 – Results of pooled OLS regression

	POLS1 – Equities			POLS2 – Fixed income		
	Coeff.	Std.Err.	t-value	Coeff.	Std.Err.	t-value
Intercept	-39.07936 *** *(<0.001)*	3.987	-9.802	3.99467 *** *(<0.001)*	0.486	8.213
Log(PropClassI)	0.36579 *** *(<0.001)*	0.105	3.497	0.17877 *** *(<0.001)*	0.013	14.007
Log(PropClassIII)	0.16790 *** *(<0.001)*	0.049	3.436	-0.06885 *** *(<0.001)*	0.006	-11.548
Log(PropClassV)	0.11361 ** *(0.009)*	0.044	2.592	0.04491 *** *(<0.001)*	0.005	8.399
Log(PropClassVI)	-0.10390 *** *(<0.001)*	0.031	-3.338	-0.00929 * *(0.015)*	0.004	-2.445
Specialization	-2.88169 *** *(<0.001)*	0.850	-3.389	0.25379 * *(0.015)*	0.104	2.446
Log(Assets)	2.22268 *** *(<0.001)*	0.254	8.752	-0.22481 *** *(<0.001)*	0.031	-7.255
Group II	-3.95152 *** *(<0.001)*	1.031	-3.834	-0.62373 *** *(<0.001)*	0.126	-4.960
Group III	1.34680 *(0.137)*	0.904	1.490	-0.93853 *** *(<0.001)*	0.110	-8.509
Year_2006	-0.62709 *(0.626)*	1.285	-0.488	0.11899 *(0.448)*	0.157	0.759
Year_2007	0.14391 *(0.913)*	1.314	0.110	0.07670 *(0.632)*	0.160	0.479
Year_2008	-0.01158 *(0.993)*	1.341	-0.009	0.29084 *(0.076)*	0.164	1.778
Year_2009	0.02431 *(0.986)*	1.403	0.017	0.18147 *(0.289)*	0.171	1.060
Year_2010	-0.10935 *(0.938)*	1.404	-0.078	0.40148 * *(0.019)*	0.171	2.343
Year_2011	0.22760 *(0.874)*	1.430	0.159	0.47956 ** *(0.006)*	0.174	2.749
Observations	567			567		
R-squared	0.3449			0.6612		
Adj. R-squared	0.3283			0.6526		

F-test	20.76 ***	76.96 ***
	(<0.001)	*(<0.001)*

*Significance codes: '***' expresses significance at the 0.999 level, '**' at 0.99 and '*' at 0.95*

The table illustrates results for our pooled OLS regressions, where the dependent variable is either the ratio of own investments held in equities or in fixed income. P-values are provided in brackets.

Log(PropClass III) is the logarithm of premiums collected on unit- and index-linked policies on total written premiums. Specialization is the dummy measured as the Rumelt's index for diversification, with specialization occurring for more than 70% of premiums written in a single product. Log(Assets) is the proxy for size as the logarithm of total assets. Bancassurance groups are defined as follows: I) insurers independent from banks; II) insurers controlled by banks; III) joint ventures.