

Monetary Policy and Life Insurance Profitability: Bancassurance's Edge in a Low-Yield World

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Monetary Policy and Life Insurance Profitability: Bancassurance’s Edge in a Low-Yield World

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Abstract

This paper examines the effects of monetary policy on the profitability of life insurers during the prolonged low-interest-rate period, leveraging a novel dataset of 31 leading French insurers from 2009 to 2018. We classify insurers into three business models—bancassurers, traditional S.A insurers, and mutual insurers—and provide new evidence on the mechanisms driving performance differences. Bancassurers demonstrate consistently higher profitability levels and expanding market shares over the period. This advantage is driven by their ability to mitigate the “income channel” effect of low rates by rapidly reducing guaranteed yields offered to policyholders more effectively than their peers, thereby sustaining profitability and gaining market share throughout the low-yield environment. We also examine how insurers’ portfolio strategies shape profitability in this context. Specifically, we explore the “hunt-for-yield” effect by analyzing the impact of higher equity allocations compared to bonds, the shift toward greater reliance on unit-linked policies, and the role of capital adequacy structures. Our findings reveal substantial heterogeneity in how different types of insurers adapt to monetary policy, illustrating the diverse effects of prolonged monetary easing on non-bank financial intermediaries.

Keywords: Low interest rate environment, Insurance profitability, Monetary policy, Financial stability, Non-bank financial intermediaries

JEL: G22, E58

1. Introduction

In response to the 2007 financial crisis, central banks from advanced economies implemented unconventional monetary policies, including significant reductions in monetary policy rates coupled with asset purchase programs (APP) targeted mainly but not exclusively at government bonds.¹ By adjusting short-term interest rates, central banks aimed to “flatten” the yield curve, leading to a reduction in long-term interest rates by influencing market participants’ expectations. This allowed governments to issue bonds with lower interest payments, increasing their fiscal flexibility and supporting the economic recovery (DeLong and Summers, 2012).

While there is widespread agreement that central banks’ aggressive response at the early stage of the crisis was critical in preventing a financial and economic meltdown (Gray et al., 2008), concerns have mounted that the negative side effects of prolonged monetary accommodation may outweigh the net benefits after several years of implementation (e.g., Dale, 2012; Rajan, 2013). This is particularly true for banks and insurers, whose incentives and business models can be severely disrupted. The impact of monetary policy differs between life and non-life insurance due to their distinct operational dynamics. Life insurance is more sensitive to monetary policy changes because its liabilities have longer maturities, requiring insurers to match them with suitable long-term assets. In contrast, non-life insurance, such as property insurance, focuses on short-term coverage, relying on safer, short-term assets to cover potential losses. Consequently, life insurers are more vulnerable to fluctuations in interest rates than non-life insurers (Berdin et al., 2015).

Profitable insurance companies are an essential component of a stable financial system, acting as key players in financial intermediation. Life insurers, in particular, play a crucial role in funneling savings into the economy as predominant actors in fixed-income markets. Maintaining strong profitability and solvency for life insurers is therefore critical for the proper functioning of the economy. Their stability ensures that savings are effectively transformed into productive investments, supporting economic growth and financial stability. Profits serve as a buffer against which insurance can write off underwriting losses and a source of funds for rebuilding capital should an insurance company incur significant losses. They also allow life insurers to attract outside capital (Domanski et al., 2017).

Monetary policy affects life insurers through the mismatch between their long-term liabilities and shorter-term assets. In a low interest rate environment, returns on insurers’ investments decrease, negatively impacting their profitability. Simultaneously, insurers are required to hold more capital to manage the risk of policy surrenders and comply with regulatory requirements that prevent excessive risk-taking. The combination of lower returns and higher capital requirements erodes life insurers’ profitability (Trichet, 2005).

The decline in guaranteed rates of life insurance policies in France and Europe can be attributed to the low interest rate environment. Guaranteed policies, which are the cornerstone of life insurance, provide a minimum return regardless of market performance. Although this return is typically lower than insurers’ investment yields, low interest rates can reverse this spread, making it difficult for insurers to maintain profitability. Insurers are reluctant to further reduce

¹Namely the central banks of the United States, United Kingdom, Japan, and euro area.

their offered yields to avoid policyholder surrenders, which exacerbates the issue. To mitigate the potential impact of the low-yield environment, regulators and insurers have implemented various measures, such as promoting the distribution of unit-linked (non-guaranteed) policies, facilitated by new legislation like the “loi Pacte” enacted in France in 2019 (Guiguet-Schiélé, 2019), committing to reducing guaranteed rates and diversifying their portfolios (Löfvendahl and Yong, 2017).

This paper examines the impact of the low interest rate environment on French life insurers by analyzing the sources of heterogeneity in the transmission of monetary policy. The French insurance market serves as a representative case study, offering unique insights into the European market. Despite the strong fragmentation and diverse range of players across Europe, the French market stands out for its distinctive characteristics. As the second largest market in Europe after the UK (Boissin and Carbonnier, 2013), the French market is particularly interesting to examine the effects on profitability. Its net investment spread—the difference between the yield of the French 10-year government bond and the average yield on guaranteed policies—remains remarkably close to zero, unlike other European counterparts. Furthermore, the share of guaranteed policies, which are the most vulnerable in a low-yield environment (EIOPA, 2020), is quite high in France, representing 70 percent of all premiums in 2015, compared to the EU weighted average of 51 percent. These distinctive features make the French market a valuable reference point for understanding the impact of low interest rates on life insurers.

Our contribution to the literature is twofold. First, we comprehensively analyze the link between the low-yield environment and profitability, focusing on the life insurance sector. While this relationship has been extensively studied for the banking sector (Altavilla et al., 2018; Borio et al., 2017; Hack and Nicholls, 2021), research on the life insurance sector remains limited. We address this gap by drawing on a data set that covers 31 life insurance companies headquartered in France for the period 2009-2018, using the overall return on assets (ROA) as a measure of profitability.

Second, we introduce a novel categorization framework for life insurers based on their distinct legal and business models. This framework includes *bancassurers*, which are financial conglomerates offering both banking and insurance services, traditional insurers that exclusively operate in the insurance sector as limited companies, and mutual insurance companies, which are non-profit entities without share capital.² Notably, non-bancassurers represent close to 60 percent of total life insurance assets over the period. Despite its inherent appeal, this aspect has been largely overlooked in empirical research, with previous studies primarily focusing on categorization based on insurer size (Pouvellet et al., 2022).

We demonstrate that these new categories are crucial for evaluating the impact of monetary policy on life insurance. For instance, a small company offering life insurance products might benefit from its link to a larger banking conglomerate, enjoying easier access to clients, more intra-group liquidity, and a diversified range of policies and investments. Ignoring these key categories prevents a comprehensive understanding of the changes in the life insurance market due to the low-yield environment.

²Mutual insurance companies should not be confused with health mutuals, which are governed by a separate legal framework, the Mutuality Code.

This study employs panel data econometrics to investigate the impact of monetary policy on the profitability of French life insurers. The analysis reveals mixed evidence, which can be attributed to the heterogeneity within the sample. By introducing a novel categorization of life insurers, it becomes clear that monetary policy significantly influences *non-bancassurance* players, including limited insurance companies and mutual insurers.

Furthermore, the study uncovers new insights into how insurers' characteristics, such as portfolio choices, premiums, and reserve adequacy, affect their profitability. The findings indicate a pronounced divergence among insurers, leading to a transformation of the life insurance market. Notably, *bancassurance* companies leverage the low-interest environment to lower guaranteed rates while expanding their market share.

The results offer new perspectives on the influence of monetary policy transmission on market power dynamics (Duval et al., 2021) and underscore the potential risks to financial stability stemming from the increased interconnectedness of financial conglomerates.

The remainder of the paper is structured as follows. Section 2 examines the primary channels through which a low-yield environment affects life insurers' profitability and presents the accompanying empirical evidence. Section 3 provides an overview of the French life insurance market, including stylized facts and an outlook. Section 4 outlines the empirical strategy and describes the data used, followed by a discussion of the econometric results in Section 5. The conclusion emphasizes the main findings and their implications.

2. The impact of a low-yield environment on life insurers profitability

2.1. The channels at stake: insights from the literature

The 2007 financial crisis prompted central banks to significantly lower interest rates for an extended period, aiming to stimulate the economy and raise inflation expectations. However, the resulting low-yield environment did not favor all sectors equally, with the financial sector being particularly affected. The business models of both banks and insurance companies are highly sensitive to interest rate changes, as their assets and liabilities are directly influenced by monetary policy (Berends et al., 2013).

Banks, for instance, rely on the interest rate spread between their liabilities (deposits) and assets (loans). As the adjustment speed is lower for deposits than for loans, a decrease in interest rates compresses banks' net interest margins (Wang, 2018). The negative effects of a protracted period of low interest rates become more pronounced over time (Altavilla et al., 2018). Similarly, Borio et al. (2017) highlight that the low rate environment's negative impact on bank profitability outweighs the positive effects of increased provisions and valuation gains.

Despite the similarities in the impact of the low-yield environment on banks and insurers, there are several key differences between these financial intermediaries. Banks have access to central bank liquidity, while insurers do not. Additionally, banks manage long-term assets with short-term liabilities, whereas insurers handle short-term assets with long-term liabilities. Finally, banks primarily focus on lending activities, while insurers invest mainly in bonds and other capital markets assets (Argimon et al., 2019).

The "income channel" is the primary mechanism through which the low-yield environment affects the profitability of life insurers. Life insurers' assets typically have shorter maturities

than their liabilities, resulting in a duration mismatch. As a consequence, when maturing assets are reinvested at lower yields, life insurers' investment income progressively decreases (Claeys and Darvas, 2015). Across European life insurance companies, the average liability is 4.21 years longer than the average asset, with French life insurance companies slightly above the average, exhibiting a duration mismatch of 4.82 years (EIOPA, 2014).

Reinvestment risk poses a significant challenge for life insurers, as newer investments often have lower yields. To maintain profitability, companies are forced to adjust the returns they offer, which can make policies less attractive to policyholders. This, in turn, creates a risk of policy surrenders, as policyholders may seek higher returns elsewhere.³

A company's business model determines its level of vulnerability to the income channel. Insurers that have sold policies with built-in guarantees promising a minimum return throughout the duration of the policies are more severely impacted, as these guarantees reduce their profit margins. Consequently, insurers with a smaller proportion of unit-linked contracts and those with higher guaranteed rates and longer contract maturities are the most vulnerable to the effects of the low-yield environment (EIOPA, 2019, 2020). This vulnerability is evident in the case of European insurers with a higher share of liabilities with minimum return guarantees in 2016, which experienced lower stock returns during the COVID-19 crisis (Kojen and Yogo, 2022).

Due to the lack of firm-level data, studies have often relied on the stock returns of life insurance companies to measure the impact of monetary policy on profitability (Hartley et al., 2016). This "top-down" approach assumes that lower profits are reflected in lower stock prices, as stock analysts and rating agencies consider the interest rate sensitivity of an insurer's liabilities. However, this method has limitations. First, it only includes publicly traded companies, introducing a selection bias. Second, stock returns do not fully capture a company's financial performance, as they are also influenced by the overall performance of the national stock market where the company is listed. This introduces a large home bias, even though large life insurance companies may operate in multiple markets.

Furthermore, Domanski et al. (2017) suggest that life insurers pursued a "hunt for duration" strategy in response to the low-yield environment. This strategy involved increasing their acquisition of bonds with longer maturities, mainly sovereign bonds. The increased demand for these bonds led to excess demand and subsequently lowered their yields, creating a vicious cycle that perpetuated the low-yield environment.

One measure for evaluating the impact of the low interest rate environment is the net investment spread, which is the difference between the 10-year sovereign bond yield and the national average guaranteed rate, as highlighted by Löfvendahl and Yong (2017).⁴ Many life insurers in certain jurisdictions have struggled to meet the investment guarantees they promised policyholders. To ensure they can meet these guarantees, insurers can invest in government bonds with a duration similar to the underlying insurance contract.⁵

³Interestingly, empirical evidence suggests that during low-yield periods, policyholders are less likely to surrender their policies, which accelerates the negative duration gap (Berends et al., 2013).

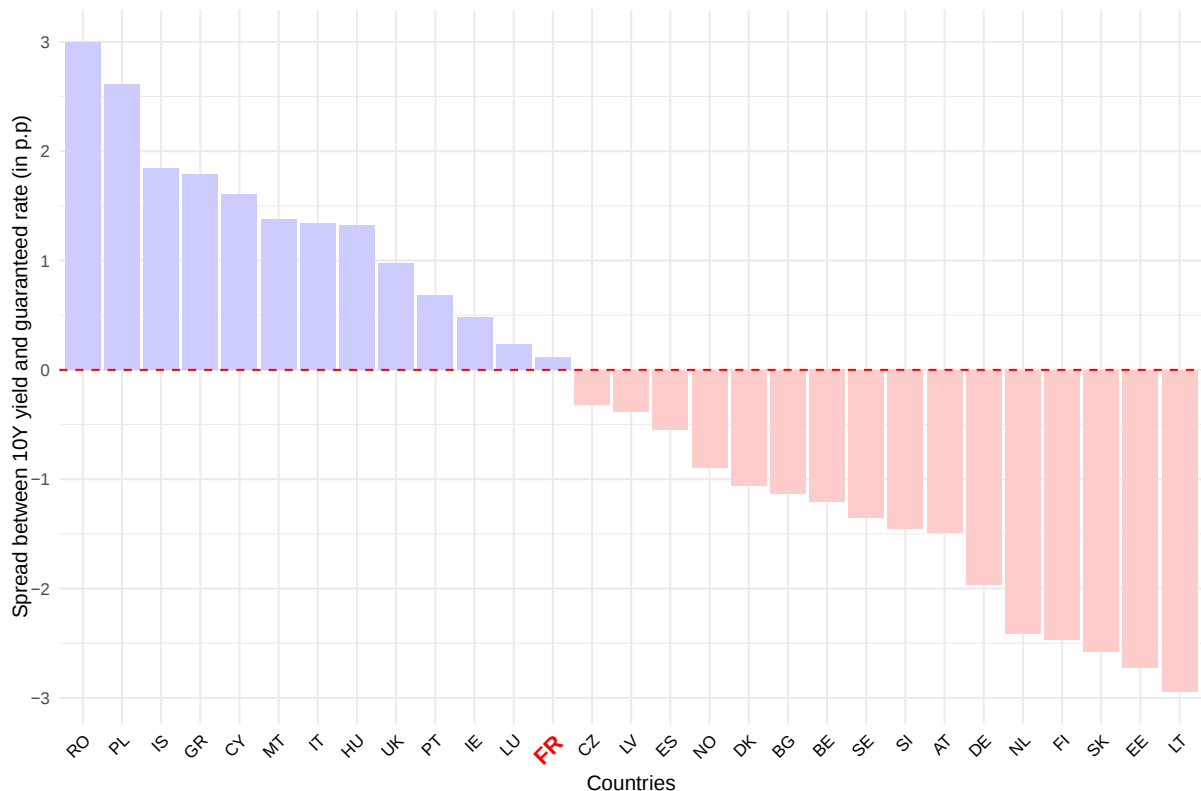
⁴The guaranteed rate offered by life insurance companies is the minimum yield that the insurer commits to pay on the policyholder's investment or savings component, regardless of market conditions.

⁵For France, the average duration of life insurance policies is 12 years, but it ranges from 5 to 15 years for the

By adopting this investment approach, insurers can assess their ability to honor investment guarantees by comparing the yields they can earn from the reference government bond (10-year sovereign bond) with the guaranteed yield offered to policyholders. Figure 1 shows that in the 2017-2018 period, 15 out of 29 European countries reported a negative net investment spread, with France slightly above zero percent.

The income channel and its effects on insurers' profitability in the low-yield environment have been investigated in the literature. Berdin et al. (2015) demonstrate that lower long-term rates reduce insurance profitability across EU life insurance companies, while non-life insurance companies remain unaffected. Although this study is the only industry-wide empirical analysis across EU member states, cross-country comparisons remain challenging due to variations in business operations and significant differences in guarantee levels.

Figure 1: *Net investment spread per EU country*



Note: Sample of 29 European countries overseen by EIOPA, including Iceland, Norway, and the UK. Each country's spread averaged for 2017-2018. Data from <https://www.eiopa.europa.eu/tools-and-data/statistics-and-risk-dashboards/insurance-statistics> (EIOPA) and ECB Statistical Data Warehouse.

The literature also emphasizes the “balance-sheet channel”, which examines how interest rates affect insurers' solvency through valuation effects, potentially impacting profitability.⁶ Lower interest rates typically increase the values of both assets and liabilities. However, as Berdin et al. (2015) explain:

rest of the European countries.

⁶Solvency and profitability are closely interlinked. Financial insolvency hampers an insurer's ability to attract new clients and maintain core strategies, ultimately slowing expected returns (Burca et al., 2014; Siddik et al., 2022).

A market-consistent valuation of assets and liabilities, such as prescribed in Solvency II, typically results in higher increases in the value of the latter when long-term yields decline because the magnitude of the assets invested in fixed-term instruments is a fraction of the total liabilities.

This dynamic would, *ceteris paribus*, translate into an increase in capital ratios as defined in Solvency II.⁷ Life insurers face a particular challenge in this scenario, as they accrue unrealized gains on the nominal value of bonds without a corresponding yield increase.

Regulators have raised ongoing concerns about life insurers potentially engaging in “hunt for yield” behavior—allocating assets to riskier investments with lower credit ratings, reduced liquidity, or higher yields—in response to low interest rate environments (EIOPA, 2020; Boubaker et al., 2018). To mitigate this risk, regulatory frameworks like Solvency II have implemented risk-weighted capital requirements. These requirements aim to encourage diversification while discouraging investments in riskier, higher-yielding assets. Capital requirements serve a dual purpose: reducing the risk of insurer insolvency and maintaining market stability by promoting diversified, balanced asset portfolios (Bijapur et al., 2007).

These regulations significantly influence insurers’ investment decisions by (1) determining profit distribution to policyholders, and (2) establishing risk weightings for various asset categories. As a result, insurers may be incentivized to invest in lower-yield assets with favorable risk weightings, which frees up more reserve capital. Conversely, investments in higher-yielding corporate bonds or stocks are heavily penalized under solvency regulations. This regulatory landscape directly impacts profitability by limiting the diversification strategies available to life insurers.

A third indirect channel, known as the “economic activity channel,” emerges from the broader economic effects of lower interest rates. Central banks typically lower rates to stimulate economic activity by encouraging borrowing and spending. This economic stimulus can indirectly benefit life insurers through a knock-on effect. As economic conditions improve, households generally experience higher disposable income and savings. This increase in savings often translates into greater demand for life insurance products. Consequently, life insurers may see an uptick in new premiums, potentially offsetting the low returns on their investment portfolios (Berends et al., 2013).

Furthermore, Chebbi (2018) suggests that lower rates, combined with unconventional monetary policy tools, can boost the performance of financial assets such as stocks. This improved performance of financial assets may lead policyholders to favor unit-linked policies, which offer greater potential for profitability. The shift towards unit-linked policies is further facilitated by regulations that provide incentives and flexibility for customers to transition to non-guaranteed policies.

⁷Implemented in 2016, Solvency II is a European Union regulatory framework that establishes risk-based capital requirements and governance standards for insurance companies, ensuring their solvency and financial stability.

2.2. Evidence on firm size as a determinant of profitability

Having examined the primary channels through which monetary policy influences insurers' profitability, it is important to consider additional factors that modulate this impact on financial intermediaries, notably company size. Size has long been recognized as a significant determinant of profitability across various sectors, primarily due to the ability of larger entities to diversify and balance asymmetric shocks (Ehrmann, 2005; Thürwächter, 2022). In the financial sector, which is particularly susceptible to interest rate fluctuations, a company's size can substantially alter the impact of monetary policy.

To date, existing research has predominantly focused on the banking sector, revealing that institutional size can predict access to capital markets, diversification strategies, and risk-taking behaviors. These factors, in turn, either amplify or mitigate the effects of interest rate changes (Saona, 2011; Pham et al., 2021; Hack and Nicholls, 2021). Further evidence suggests a nuanced relationship between bank size and monetary policy sensitivity. Larger banks appear more affected by interest rate changes during periods of loose monetary policy, while smaller banks exhibit greater sensitivity under tight monetary policy regimes (Naqvi and Pungaliya, 2023).

Research on the effect of size on monetary policy transmission in the insurance sector has yielded mixed results. Studies focusing on the EU insurance sector suggest a nuanced relationship between company size and sensitivity to interest rate changes. Berdin et al. (2015) find that large life insurance companies' profitability remains largely unaffected by interest rate fluctuations. In contrast, smaller companies appear more vulnerable in a low-yield environment, primarily due to their less diversified portfolios and limited geographical scope. This vulnerability of smaller insurers can be attributed to their limited resources and reduced flexibility in managing interest rate fluctuations, which increases their susceptibility to financial stress.

However, the picture is not straightforward. Berends et al. (2013) present a contrasting view, noting that large life insurance firms face their own set of challenges. These larger entities often have more interest-rate-sensitive liabilities, a greater proportion of non-insurance assets, and face increased pressure from the stock market. These factors can potentially amplify the negative effects of a low-interest environment on larger insurers.

The analysis of monetary policy's impact on life insurance profitability is complicated by the growing interconnectedness between bank and non-bank intermediaries and the rise of financial conglomerates. Size alone is insufficient to capture the factors that amplify or mitigate this impact; other aspects, such as business models and legal structures, may provide more relevant insights.

The significant wave of consolidations in the financial sector over recent decades has prompted researchers and regulators to examine the risks associated with financial conglomerates (Yoo, 2010). Van Lelyveld and Knot (2009) find that firms engaging in multiple activities are valued lower, while Amel et al. (2004); Montgomery et al. (2014) reveal evidence of diminishing scale returns over a certain size for financial intermediaries, compensated by increased market power. Despite regulatory advances at the European level concerning financial conglomerates (Gruson, 2004), studies have mainly highlighted the positive aspects of consolidation based on resilience to common shocks, especially during the European sovereign debt crisis (Hauton and Héam, 2015).

The French market serves as an excellent case study due to the strong growth of financial conglomerates in its life insurance sector, known as “bancassurers”—banks operating in the life insurance industry—, and a significant share of guaranteed products. This environment underscores the need to consider factors beyond size to effectively understand the transmission of monetary policy on life insurers.

3. Segmentation-based transmission mechanisms

3.1. The French case study

France boasts one of the world’s most developed insurance markets, ranking fifth globally and second in Europe—surpassed only by the UK—in terms of gross written premiums (GWP). The significance of life insurance in the French financial landscape is evident: in 2018, the outstanding value of life insurance policies represented a substantial 70 percent of French GDP, amounting to 1.7 trillion EUR. Within the broader financial system, the entire French insurance sector’s assets accounted for 118 percent of GDP in 2018. While impressive, this figure is dwarfed by the banking sector, which was three times larger at 344 percent of GDP. However, life insurance has been gaining ground as the preferred savings vehicle for French households. The proportion of households holding life insurance policies has steadily increased from 35 percent in 2010 to 39.2 percent in 2018, establishing it as the primary savings choice (Frayssé et al., 2020).

These trends underscore the crucial role of the French life insurance industry as a key financial intermediary, effectively channeling household savings into investments. The industry’s growing prominence and its substantial share of GDP highlight its importance not only to individual savers but also to the broader French economy. The yearly report from the French Insurance Federation (*France Assureurs*) provides a comprehensive overview of the sector, revealing significant trends.

Since 2014, the number of life insurance providers—including those offering both life and non-life insurance—has steadily decreased from 93 to 83 companies in 2018. This decline reflects a broader consolidation process in the market, mirroring similar trends in the non-life sector. The consolidation’s impact is evident in the concentration of market share: the twenty largest premium collectors now represent 89 percent of total premiums, up from 85 percent in 2011.⁸

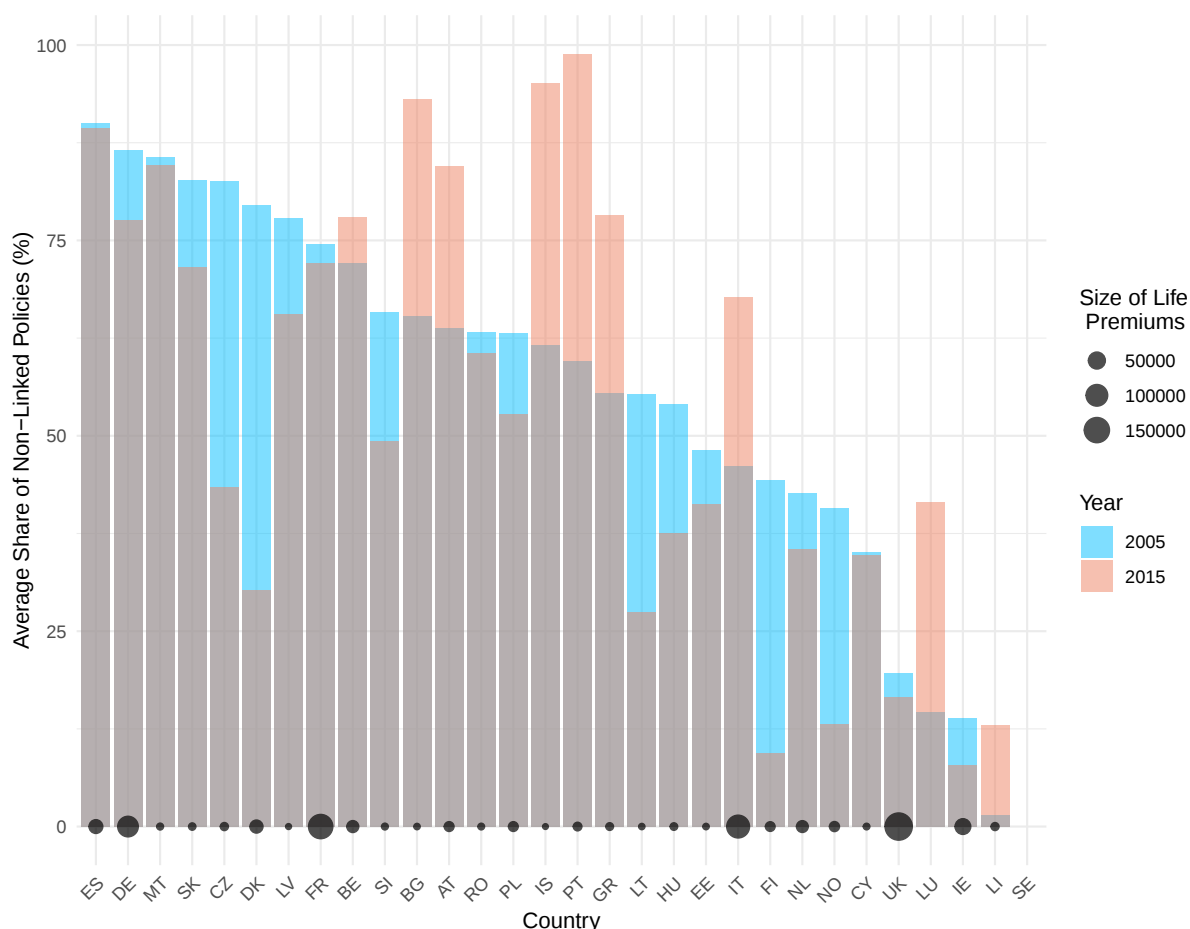
Euro-guaranteed contracts have emerged as a cornerstone of French household financial wealth, accounting for 40 percent of aggregate holdings in 2015 (Perdu and Marionnet, 2019). These contracts appeal to risk-averse policyholders, offering a saving plan with guaranteed capital and a minimum guaranteed return. The popularity of life insurance policies among French savers is further bolstered by attractive tax incentives. Investors enjoy tax relief on gains if they maintain their investment for at least four years, with even more substantial tax breaks after eight years.⁹

Figure 2 illustrates a prevailing downtrend in the share of guaranteed policies across Europe, signaling a significant shift in consumer preference towards unit-linked policies. An analysis of the European sample, comprising 29 countries, reveals that 20 nations experienced a decline in

⁸In our 2009-2018 sample the average HHI over the period stands at 892.

⁹The tax relief reduces the tax rate from 35 percent after five years to 7.5 percent after eight years.

Figure 2: *Share of guaranteed policies over total policies in the EU from 2005 to 2015*



Note: Data from 29 European countries (EIOPA oversight), including Iceland, Norway and UK. Share = guaranteed policies premiums / total gross written premiums. Sources: <https://www.eiopa.europa.eu/tools-and-data/statistics-and-risk-dashboards/insurance-statistics>, EIOPA and ECB statistical data warehouse.

the share of guaranteed policies between 2005 and 2015. Interestingly, France, where guaranteed policies remain the primary saving instrument for households, witnessed only a marginal decrease in the share from 74 percent to 72 percent. This trend highlights a widespread effort by life insurers throughout Europe to guide consumers away from guaranteed policies and towards unit-linked alternatives, reflecting a strategic realignment within the industry to adapt to changing market conditions and consumer demands.

In France, life insurers are mandated by the Insurance Code to distribute 85 percent of the financial surplus and 90 percent of the technical surplus to policyholders (Borel-Mathurin et al., 2018). The remaining portion can be allocated to the provision for deferred profit-sharing, which must be distributed within the next eight years. This mechanism allows life insurers to smooth the distribution to policyholders, mitigating the impact of poor financial performance. The ten-year sample covered in the article, spanning from 2009 to 2018, captures the full cycle of profit-sharing dynamics, as the average length of these contracts ranges from 8 to 12 years. This overview emphasizes the importance of life insurance as a savings and investment tool for individuals in France, while also highlighting the significant role the life insurance industry plays

in the broader financial system of the country, serving as a crucial source of investment capital for businesses and the economy as a whole.

3.2. The role of business model segmentation

Over the last few decades, *bancassurance* players have emerged as dominant forces in the European insurance industry. Bancassurance refers to the practice of distributing insurance products through banks or other financial institutions, capitalizing on the integration of banking and insurance services. This convergence has reshaped the European insurance landscape (Benoist, 2002), raising various questions regarding profitability, resilience, risk diversification, competition, and systemic risks. Bancassurers leverage their extensive customer base and distribution network by bundling insurance products with banking services such as loans, mortgages, or investment products. These advantages have propelled bancassurers to the forefront of the insurance industry, enabling them to capture a significant market share throughout Europe, as illustrated in Figure A.3 in the Appendix. According to (Pouvellet et al., 2022), the bancassurance model originated in France during the 1980s as a strategic response to the growing life insurance market, generating synergies for the distribution of life insurance products.

As the model gained prominence in Europe, the need for specific regulatory oversight became apparent. In response, the European Union introduced the Financial Conglomerates (FICO) directive in 2002. This directive outlines the identification criteria and rules governing the oversight of bancassurance-type players, ensuring that these entities are subject to appropriate regulatory requirements. To qualify for FICO status, three cumulative conditions must be met: (i) the head of the group must be a “regulated entity”; (ii) at least one entity within the group must belong to the insurance sector, and at least one other must belong to the banking sector; (iii) the consolidated or aggregated activities of the group in the insurance, banking, and investment services sectors must be significant, with the ratio of the total balance sheet in the financial sector to the total balance sheet of the group surpassing 40 percent (Meyers and Ballegeer, 2003).

The FICO categorization, which recognizes the unique position of bancassurance players in the French life insurance market, is crucial for the next step of our empirical analysis. This analysis distinguishes bancassurance players from traditional S.A. insurance companies and mutual insurance companies, taking into account the distinct features and market dynamics associated with each category. By differentiating between these types of life insurance actors, the study can provide a more nuanced understanding of the French life insurance landscape and the role of financial conglomerates within it. This approach allows for a comprehensive examination of the performance, risk profiles, and competitive dynamics of each category, shedding light on the implications of the bancassurance model for the broader insurance industry.

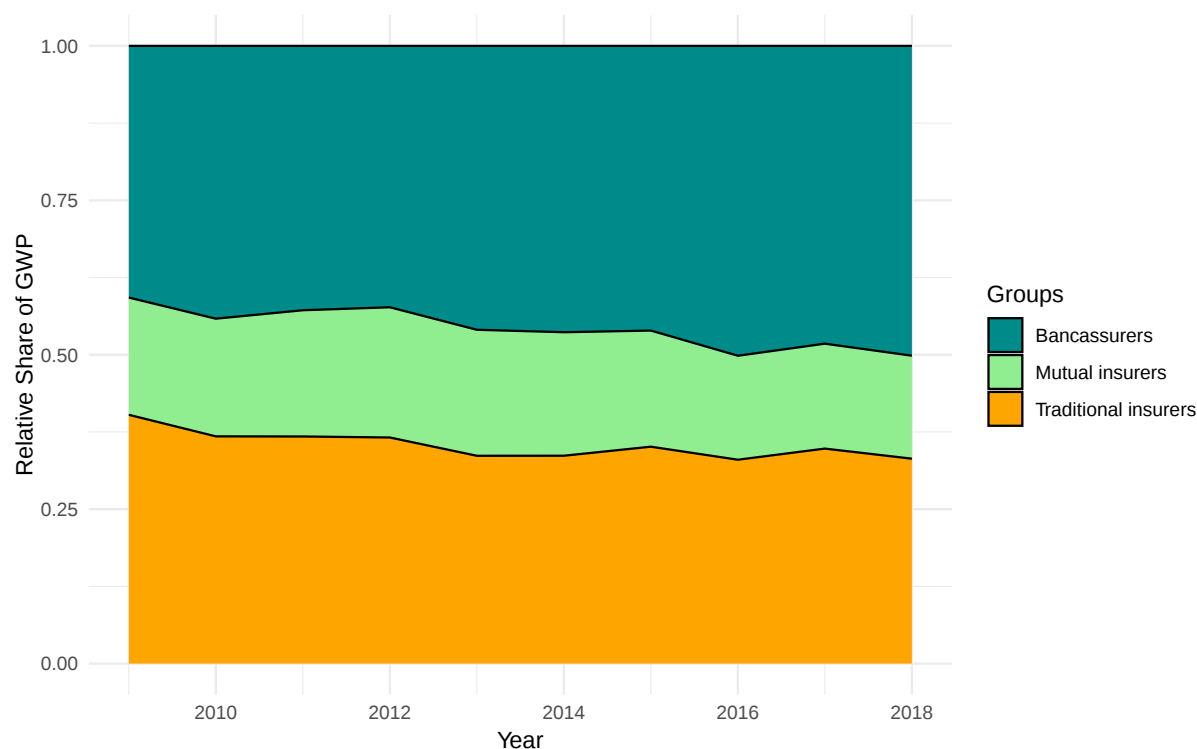
In France, *bancassurance* players, consisting of insurance companies tied to large banking groups such as BNP Paribas Cardif, Crédit Agricole Assurances, Société Générale Assurances, or BPCE Vie, dominate the life insurance market. In 2018, these entities collectively held a 65 percent share of life insurance premiums, solidifying their position as the predominant type of life insurers in the French market. However, as Capitaine et al. (2019) points out, the net average

revaluation rate served for *bancassurers*' policies is lower than the market average.¹⁰ In 2018, *bancassurers* offered a net average rate of 1.93 percent, compared to the average market rate of 2.43 percent. This disparity has been growing steadily since 2011 when the average served rate was equal to the average market rate. *Bancassurers* leverage their integrated banking networks for policy distribution, enabling them to charge higher fees and offer lower revaluation rates while still being regulated under the French Insurance Code.

The second group comprises traditional life insurers, predominantly structured as limited companies (S.A.) and often publicly traded. These insurers, including notable firms like Axa, Allianz, Aviva, and Generali, provided a net average revaluation rate of 2.70 percent in 2018, consistently outperforming the market average over the past decade. Similar to *bancassurers*, they are governed by the Insurance Code, but insurance services constitute their core activities.

The third type of life insurance company operating in France is the mutual life insurer. Mutual life insurers are non-profit organizations owned by their policyholders, setting them apart from traditional life insurers and *bancassurers*. Notable examples of French life mutuals include La Mondiale, AGPM, CARAC, and La France Mutualiste. These insurance companies typically boast stronger capitalization and maintain more prudent investment portfolios compared to their counterparts.¹¹

Figure 3: *Concentration of life insurance industry in France*



Note: Sample of 31 French life insurers (2009-2018). Data from AMBest and annual reports. Proportional stacked area chart shows the share of gross written premiums for each group.

¹⁰The net average revaluation rate is weighted by mathematical provisions.

¹¹Insurance companies governed by the Insurance Code but affiliated with property and casualty (P&C) groups often exhibit “mutualist behavior,” allocating a larger share of investment returns to policyholders while opting for safer investment choices.

Figure 3 illustrates the structural changes in the French life insurance sector over the last decade. *Bancassurers* have significantly increased their market share from 40% to nearly 45%, solidifying their dominant position in the industry. In contrast, S.A. insurance companies have experienced a decline, with their market share falling from 44% to 39%. Mutual companies have demonstrated remarkable stability, maintaining a consistent share of approximately 20% of total life insurance assets throughout the period.

Adopting a business model-centric perspective in the classification of life insurance players offers a more insightful and nuanced understanding of the industry compared to categorizing them solely by asset size. While asset size is an important factor, it fails to capture the distinct characteristics of the business models and regulatory frameworks that differentiate insurers such as *bancassurance* players, traditional S.A. insurance companies, and mutual insurance providers. By focusing on the legal framework as a proxy for business models, researchers can delve deeper into the idiosyncrasies of each category and uncover the unique challenges and opportunities faced by these different types of insurers.

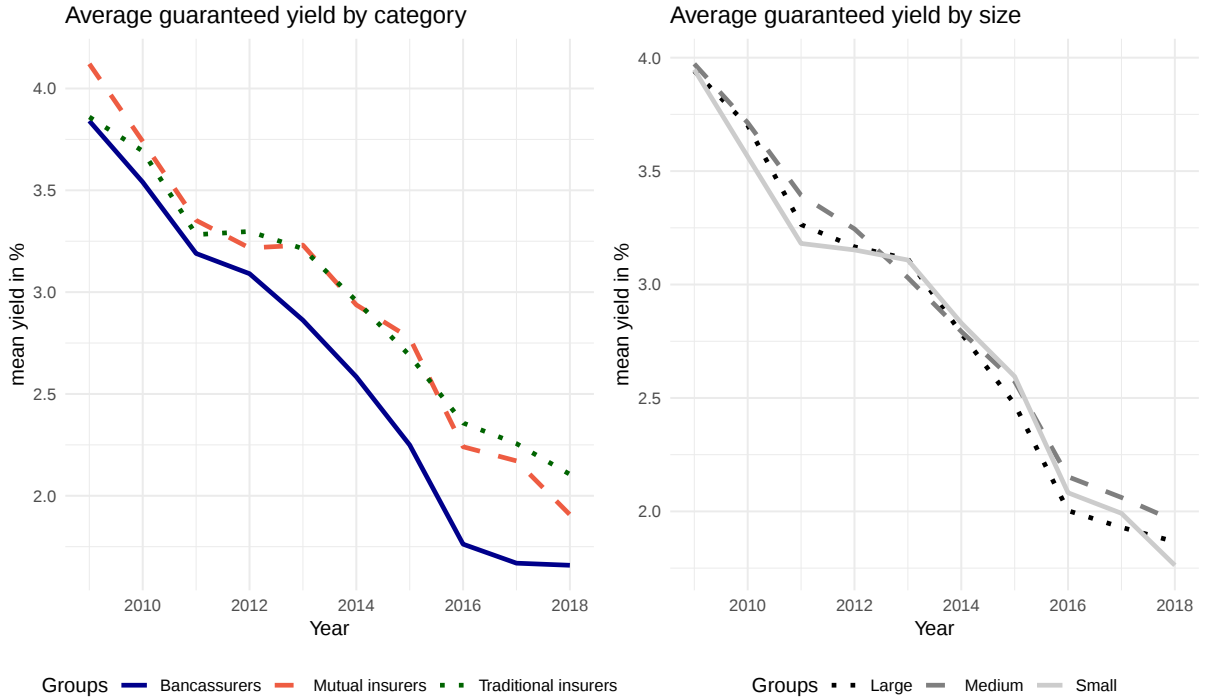
This business model-centric approach allows for a more granular analysis of the regulatory environment, competitive landscape, distribution strategies, and risk profiles associated with each type of player. By examining the industry through this lens, researchers can better understand the complex interplay between organizational structure, market dynamics, and regulatory frameworks that shape the life insurance sector. This perspective is particularly relevant when investigating topics such as market concentration, profitability drivers, product innovation, and regulatory compliance, as it enables a more targeted exploration of the factors that drive performance, innovation, and risk management within each category.

An analysis of the data reveals that current classifications of insurers, which primarily rely on size, fail to capture important differences between the various types of insurers. This leads to ambiguous and incomplete categorization. To address this issue, we propose to retain a division based on the legal framework and business model that better reflects the unique characteristics of each type of insurance, as highlighted by Figure 4.

The figure illustrates a clear downward trend in guaranteed rates across all life insurance players, a natural consequence of the persistent low-yield environment. Initially, both traditional insurers and *bancassurers* offered similar guaranteed rates on average, with mutual insurers providing slightly higher rates. However, over the observed period, *bancassurers* managed to reduce their guaranteed rates more swiftly while maintaining their market share. In contrast, traditional insurers demonstrated a more gradual reduction in their guaranteed rates. By the end of the period, traditional insurers' guaranteed rates were higher than those of mutual insurers. The right figure shows that the gap is not representative when considering the size of the life insurers, as it demonstrates homogeneous decreases across the sample. Despite variations in business models, the consistent downward trend in guaranteed rates is evident for all life insurers, irrespective of their size.

A business-model classification has the potential to improve the efficiency and accuracy of insurance industry analysis and enhance regulatory oversight. By taking into account the unique characteristics and challenges faced by each type of insurer, analysts and regulators can gain a more comprehensive understanding of the industry's structure and dynamics beyond just

Figure 4: *Guaranteed yield heterogeneity: Legal vs. Size classifications*



Note: Individual insurers' financial statements and AM Best ratings data.

asset size. This enables more targeted and effective decision-making, as it considers the distinct opportunities and risks associated with each category of insurance player.

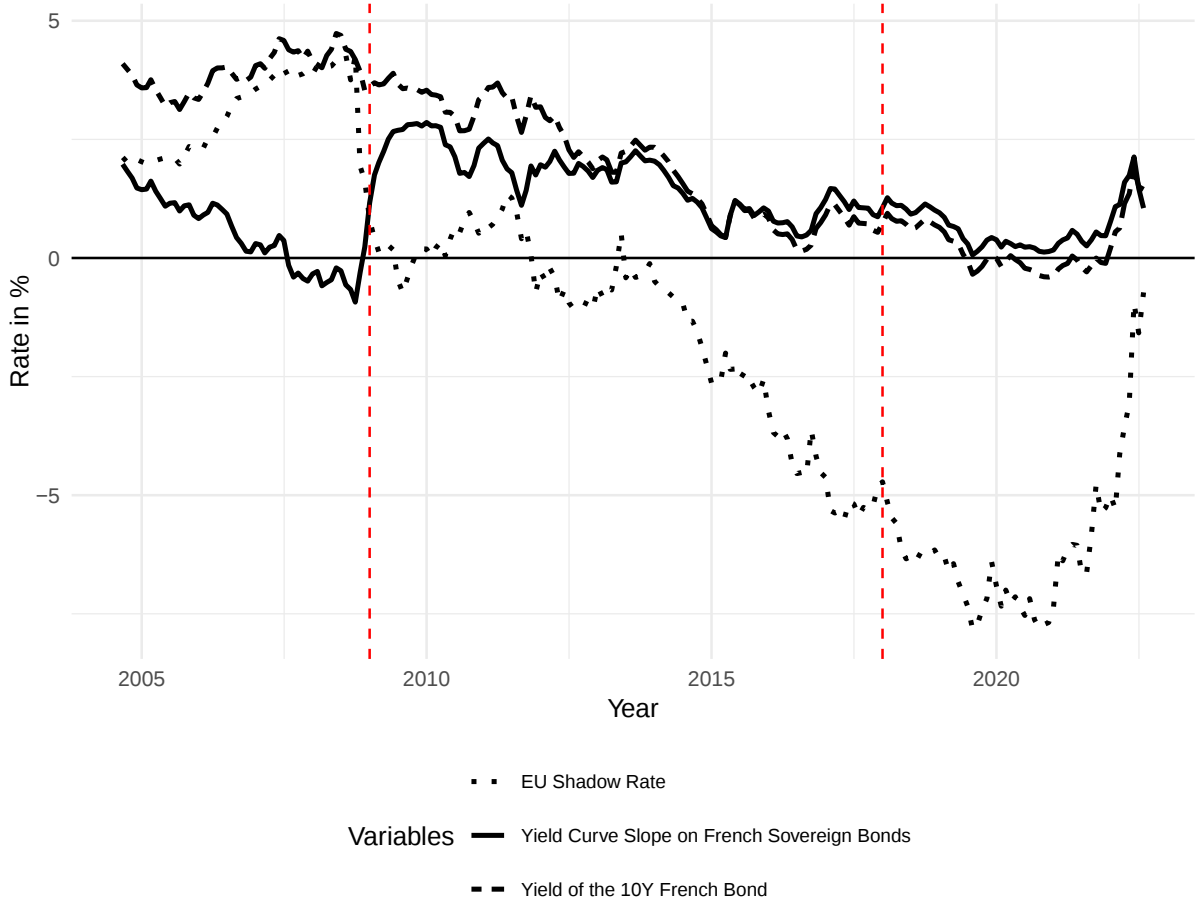
4. Stylized facts and data

The current section presents stylized facts about the French life insurance market and describes the data used in this analysis. The dataset consists of insurance-level information from AMBest, a credit rating agency. It includes balance sheet statements, annual reports, and Solvency and Financial Condition Reports (SFCR), focusing specifically on the life insurance branches of major companies operating in France. The sample spans a decade from 2009 to 2018, a period that covers the years following the Great Financial Crisis. During this time, interest rates decreased persistently, and the European Central Bank implemented unconventional monetary policy measures, as illustrated in Figure 5.

The final dataset comprises yearly information on 31 French life insurers, resulting in a total of 300 observations. These insurers collectively account for life written premiums totaling 144 billion EUR, which represents nearly 90 percent of total life gross written premiums in France. Each insurer in the sample has data for at least 8 years. As shown in Annex A.1, the business model categories for the life insurance companies in the sample include 12 *bancassurers*, 7 limited (S.A.) companies, and 12 mutual insurance companies.¹²

¹²Missing data concerns the following insurers: BPCE Vie (2012 and 2016-2018), Assurance du Cr dit Mutuel Nord Vie (2017-2018), Oradea Vie (2017-2018), AGPM (2017), and Associations Mutuelles Conservateur (2011-2012).

Figure 5: *Low-yield environment, 2004-2022*



Note: Slope of the yield curve refers to the difference between 10-year and 3-month French sovereign bond yields. The EU shadow rate is derived from [Wu and Xia \(2016\)](#). The dashed vertical lines delimitate the 2009-2018 study period.

Table 1 presents the descriptive statistics of the variables used in this study, revealing significant disparities among life insurers' individual characteristics. For example, the inter-quartile range (25th to 75th percentile) for bond holdings as a percentage of the non-linked investment portfolio spans from 73 to 88 percent. This finding is consistent with existing literature, which typically identifies bonds as the predominant asset in life insurers' portfolios.¹³ The data also demonstrate considerable variability in portfolio composition. Equity holdings in the portfolios range from 8% to nearly 20% (inter-quartile), while unit-linked policies constitute between 5% and 22.5% of total assets. These statistics emphasize the diverse investment strategies and risk profiles that characterize different life insurers.

Figure 6 illustrates key trends in the life insurance industry's variables of interest. Profitability, measured by the Return on Assets (ROA), shows an overall decline over the sample period from 2009 to 2018. There is a sharp initial drop between 2009 and 2011, followed by a stabilization through 2018, although significant heterogeneity is evident from the percentiles shown by the dashed lines. The Guaranteed Yield Spread, calculated as the Return on Investments (ROI)

¹³Data derived from aggregated individual balance sheets.

Table 1: *Summary statistics*

Statistics	N	Mean	St. Dev.	25th Pctl	75th Pctl
Variables of interest					
Return on assets	300	3.72	3.74	1.80	4.70
Return on investments	302	3.55	1.72	2.90	4.34
Return on equity	300	7.64	6.95	4.80	10.11
Solvency I ratio	292	259.72	134.03	152.76	343.47
Monetary policy variables					
Yield on guaranteed funds	305	2.83	0.76	2.22	3.40
EU shadow rate	302	−1.80	2.25	−4.03	0.05
Yield curve slope	302	1.59	0.58	1.07	1.96
Individual features					
Share of bonds	302	79.69	12.64	72.91	88.06
Share of equities	302	15.34	11.18	7.98	19.35
Share of unit-linked investments	301	16.73	16.63	5.00	22.49
Net reserves ratio	291	11.48	4.33	8.77	13.52
Yearly growth in premiums	266	2.35	15.07	−5.94	10.72
Total assets	305	59,460.53	80,495.28	6,452	85,178

N: number of observations; *ROA*, *ROI*, *ROE*, *Solvency I ratio*, *Yield on guaranteed funds*, *EU shadow rate*, *Slope of the yield curve*: in %; *Share of bonds*, *equities*, *unit-linked investments*: % of investment portfolio; *Net reserves ratio*: net reserves/net written premiums; *Yearly growth in premiums*: % change in written premiums.

minus the average guaranteed yield per insurer, measures the overall margin spread. This spread exhibits volatility, with a notable dip in 2012, followed by a recovery and then another decline from 2017 to 2018. The overall trend of the spread is relatively flat (or slightly decreasing) with these fluctuations, potentially reflecting the complex impact of monetary policy through the income channel.

The figure also depicts the portfolio mix variables, revealing two significant trends. First, the steady share of unit-linked assets over the sample period suggests a consistent allocation of funds to these investment vehicles. However, the heterogeneity implies that different insurance companies may have varying levels of exposure to unit-linked assets, depending on their portfolio strategy. Second, the increasing trend in equity holdings indicates a rising preference for equity investments by insurance companies. This trend may be driven by the search for higher returns in a low-interest-rate environment or the desire to diversify investment portfolios.

4.1. Econometric framework

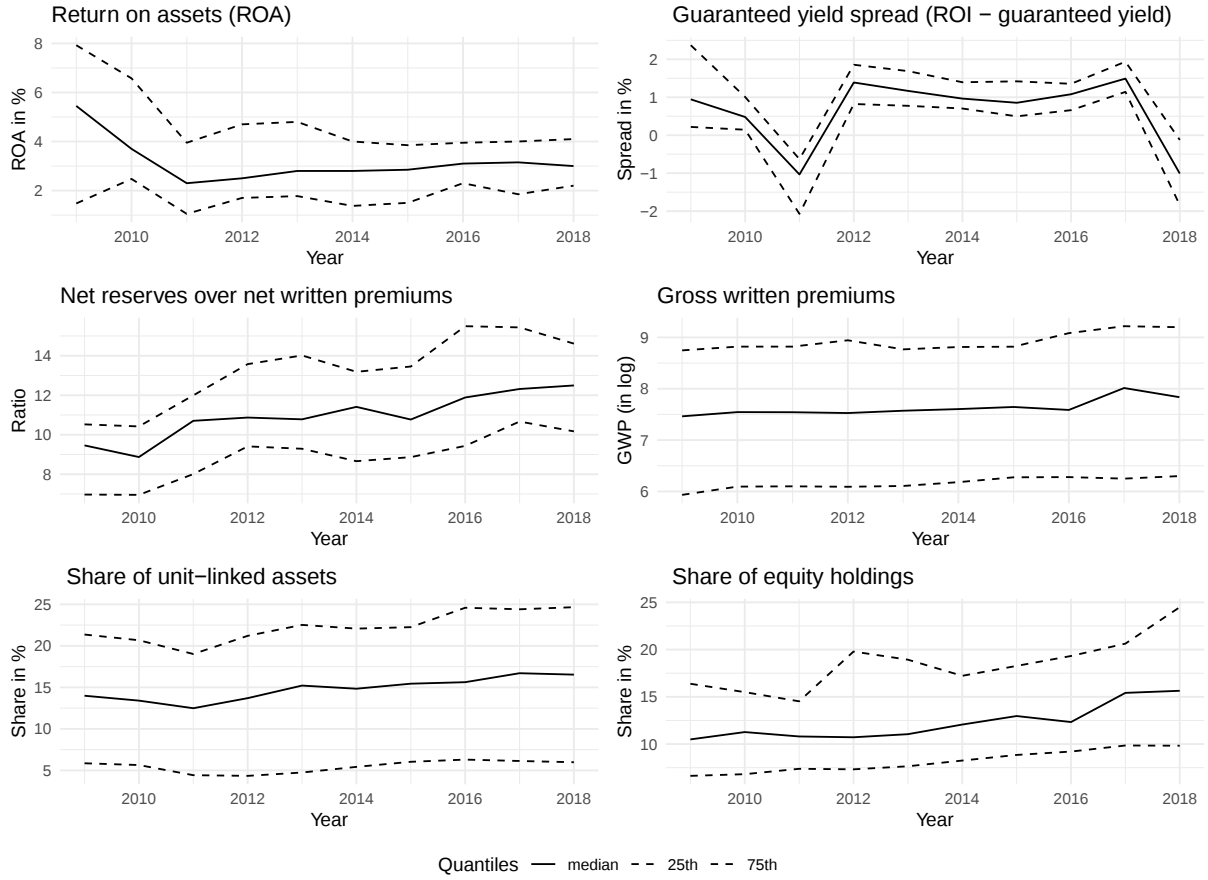
The baseline empirical model is estimated with the following regression:

$$Y_{it} = \alpha + \beta_1 MP_t + \beta_2 GYS_{it} + \beta_3 X_{it} + \omega_i + \gamma_t + \epsilon_{it} \quad (1)$$

where the i and t subscripts denote the spatial and temporal parameters of the panel, respectively and ϵ_{it} is the residual term. The dependent variable Y_{it} measures the profitability of entities using the *return on assets* (ROA).¹⁴ MP_t denotes the *slope of the yield curve*, the

¹⁴ROA, calculated as the ratio of net profit to average assets over three years, is widely used by prudential

Figure 6: *Variables of interest*



Source: Individual insurers' balance sheet data, AMBest data for the 31 life insurance companies operating in France in the sample over the period 2009-2018.

difference between 10-year and 3-month French sovereign bond yields, controlling for unconventional monetary policy effects (Altavilla et al., 2018; Borio et al., 2017). For robustness, we also consider the *EU shadow rate* (Wu and Xia, 2016) as an alternative indicator for euro area unconventional monetary policy.

The *average yield on guaranteed policies*, used to compute the *guaranteed yield spread* GYS_{it} , is derived from web-scraping the yield of 127 guaranteed policies for the 31 life insurance companies in the sample over the period from 2009 to 2018, resulting in a total of 1,042 observations.¹⁵ Consequently, GYS_{it} represents the average gap between the actual return of insurance companies on their investments, which includes unrealized gains and losses, and the yield allocated to policyholders.

The model accounts for life insurance characteristics by including a set of individual fixed effects ω_i , and a vector of time-varying, insurance-specific indicators X_{it} . These indicators are crucial for identifying factors that influence the profitability of life insurers (Kozak et al., 2011).

authorities and in literature to monitor insurer and bank profitability (Altavilla et al., 2018; Borio et al., 2017; Berdin et al., 2015; Kwon and Wolfram, 2017).

¹⁵The websites used for web-scraping were *L'Argus de l'assurance* and *Money Vox*, specialized insurance news providers listing the major policies and their yearly yields. We compute the average over the policies without missing observations for each year and insurer. The number of policies per insurer ranges from 1 to 14, with an average of 4.

The vector X_{it} comprises four key components:

- (i) Insurer size: This is measured as the natural logarithm of total gross written premiums in millions of euros (Malik, 2011).
- (ii) Share of equities: This is calculated as the share of equity investments relative to bonds in guaranteed policy investments. It is a measure of the “hunt for yield” of life insurance companies throughout the period.¹⁶
- (iii) Share of unit-linked assets: This is defined as unit-linked assets as a share of total assets. This variable takes into account the switch suggested by regulatory agencies to enhance the profitability of life insurers, as policyholders bear all the risk resulting from these investments.¹⁷
- (iv) Net reserves over net written premiums ratio (NRNWP): This ratio serves as a proxy indicator of the solvency position and measures the risk aversion of each life insurer considering its reserves’ policy. This variable accounts for the mathematical provisions kept by insurers to cover net written premiums.¹⁸

The decision to include time-fixed effects in the regression instead of macroeconomic control variables, such as inflation, real GDP growth, and the yearly return of the CAC 40 French stock index, was based on two considerations. First, including macroeconomic variables could lead to multicollinearity with the monetary policy variable. Second, given the limited number of observations available for the analysis, including additional variables would decrease the degrees of freedom, potentially reducing the statistical power of the regression. However, the robustness section provides an alternative specification that incorporates these macroeconomic control variables to validate the consistency of the results under different model assumptions. This approach ensures that the findings are not driven by the exclusion of relevant macroeconomic factors.

4.2. Testable hypotheses

The empirical analysis on the impact of the low-yield environment on life insurance companies in France explores several testable hypotheses derived from insights provided by Löfvendahl and Yong (2017), who surveyed life insurance companies and regulators. The study examines the potential measures that insurers and regulators may adopt in response to the low interest rate environment.

Regulators’ feedback suggests that they are likely to impose higher capital requirements and demand higher technical provisions from life insurance companies. Life insurance companies usually focus on three key strategies to navigate the challenges posed by the low-yield environment. First, they consider lowering guaranteed interest rates on their policies to align with the

¹⁶It has shown an increasing trend as life insurers diversify their portfolios. A positive coefficient is expected, as a higher share of equity holdings implies more remunerating higher-risk investments, which could boost profitability.

¹⁷A positive coefficient is expected for this variable, as insurers display net gains from these products with fees slightly higher than for guaranteed policies (nationale de défense des consommateurs et usagers, 2019).

¹⁸A negative coefficient is expected for this variable, as an increase in the ratio could imply a trade-off between risk aversion and profitability.

current market conditions. Second, insurers aim to increase the diversification of their investment assets to mitigate the risks associated with low yields. Finally, life insurance companies encourage policyholders to surrender their guaranteed policies in favor of unit-linked policies, which transfer the investment risk to the policyholders.

The results from [Löfvendahl and Yong \(2017\)](#) provide a comprehensive framework for investigating the strategies and actions that insurers and regulators may implement in response to the low-yield environment. By controlling for macroeconomic conditions through time-fixed effects, several testable hypotheses emerge regarding the impact on life insurance companies' profitability:

- (i) The guaranteed yield spread is expected to have a negative coefficient on the return on assets. This would indicate that reducing guaranteed yields enhances profitability.
- (ii) Increasing asset diversification by raising the portfolio share of equities is anticipated to have a positive effect on the return on assets. Diversifying investments may help improve overall returns.
- (iii) A negative relationship is expected between the increase in the net reserves ratio, which serves as a proxy measure of capital requirements, and the return on assets. Higher capital requirements may constrain insurers' ability to generate profits.
- (iv) The share of unit-linked assets is hypothesized to have a positive relationship with profitability. The risk transfer to policyholders eliminates the obligation for insurers to provide guaranteed yields on these policies, allowing them to benefit from reduced risk exposure.

Testing these hypotheses empirically will provide valuable insights into the effectiveness of the strategies adopted by life insurance companies and the impact of regulatory measures on their profitability in the low-yield environment.

5. Estimation results

5.1. Econometric considerations

The common econometric issues of heteroskedasticity, and autocorrelation associated with panel data are addressed by using robust standard errors ([MacKinnon and White, 1985](#)).¹⁹ To determine the most appropriate specification for the models, the Hausman test ([Hausman, 1978](#)) and the Breusch-Pagan Lagrangian Multiplier test ([Breusch and Pagan, 1980](#)) are conducted. These tests favor the use of a fixed effects (FE) model for determining the profitability of life insurers, which is in line with the previous literature on the subject.

One possible identification problem in the analysis of life insurance profitability is endogeneity, as the profitability of insurers could impact the balance sheet items listed above and influence monetary policy. To minimize potential endogeneity issues, Pearson correlation coefficients between the variables are calculated (see Annex [A.2](#)), with all coefficients remaining

¹⁹As the time dimension is low ($T = 10$), the possible unit root in the series is ignored. In short periods, trends are usually confirmed, although it is not necessarily the case for the longer term. Collinearity is also examined through Table [A.2](#) in the Appendix.

below 0.3. Furthermore, the Variance Inflation Factor (VIF) values of the regression coefficients are checked, and none exceeds 1.3, indicating a satisfactory level.²⁰

The banking sector literature has eagerly relied on dynamic System Generalized Method of Moments (S-GMM) panel methodologies (Blundell and Bond, 1998) to address endogeneity issues. However, this specification has been shown to produce biased estimation results when examining reduced samples. Moreover, the endogeneity problem may be less severe due to the sample's characteristics. Although aggregate life insurance industry conditions could influence monetary policy decisions by affecting long-term yields through portfolio switches to sovereign bonds, focusing on a benchmark market, such as the French life insurance market, diminishes the likelihood of observing a significant impact on monetary policy decisions. Furthermore, insurers' investments in both domestic and foreign assets further mitigate this risk.

5.2. Benchmark results

The results presented in Table 2 for the simple specification (1) discussed earlier do not reveal a discernible impact of monetary policy on the profitability (ROA) of life insurers, considering both the slope of the yield curve and EU shadow rate variables and accounting for the full set of variables. This suggests that the relationship between monetary policy and profitability is not apparent when considering only these variables, indicating potential heterogeneity across insurers. However, one noteworthy finding is the negative relationship observed between the share of equities holdings variable and the ROA. The coefficient estimates suggest that an increase in equity holdings has a detrimental effect on the performance of life insurers, contrary to the existing literature. This finding aligns with the risk-based Solvency II regulation, which imposes a 39 percent risk charge on capital requirements for equities investments in the European Economic Area (EEA) and 49 percent for non-EEA equities (Laboul and Deputy-Director, 2015).²¹ These additional capital requirements can reduce the available capital for further investments in other products such as bonds and weigh on overall profitability. The ambiguous effects and non-significant coefficients in the initial regressions may be explained by heterogeneity among the life insurers in the sample (Berdin et al., 2015).

²⁰More specifically, the VIF values are as follows: Slope of the yield curve 1.11, Share of equities 1.18, Net reserves ratio 1.22, Total gross written premiums 1.13, Share of unit-linked assets 1.1.

²¹According to the 2017 annual report of the French Insurance Association, sovereign bonds have no additional capital requirements (0 percent), while corporate bonds, with an A rating and a 5-year maturity, generally require an additional 7 percent in capital.

Table 2: *Benchmark regressions results - Return on Assets*

	ROA and Yield curve slope			ROA and EU shadow rate		
	(1)	(2)	(3)	(4)	(5)	(6)
Yield curve slope	2.59*** (0.86)	0.56 (0.70)	0.69 (0.77)			
EU shadow rate				0.58*** (0.19)	0.13 (0.16)	0.15 (0.17)
Share of equities		-0.21*** (0.07)	-0.17** (0.06)		-0.21*** (0.07)	-0.17** (0.06)
Net reserves ratio		-0.10 (0.06)	-0.10 (0.06)		-0.10 (0.06)	-0.10 (0.06)
Log gross written premiums		-3.10*** (0.76)	-2.79*** (0.94)		-3.10*** (0.76)	-2.79*** (0.94)
Share of unit linked policies		0.02 (0.09)	0.02 (0.09)		0.02 (0.09)	0.02 (0.09)
Guaranteed yield spread			-0.13 (0.16)			-0.13 (0.16)
Constant	0.47 (1.29)	38.77*** (8.91)	34.52*** (10.55)	6.70*** (0.96)	40.11*** (8.47)	36.17*** (9.65)
FE	YES	YES	YES	YES	YES	YES
TE	YES	YES	YES	YES	YES	YES
Num. obs.	300	291	287	300	291	287
R ² (full model)	0.48	0.54	0.51	0.48	0.54	0.51
Adj. R ² (full model)	0.41	0.46	0.43	0.41	0.46	0.43

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$. Robust standard errors are reported in parentheses.

5.3. Heterogeneity results

While size has traditionally been the primary measure of heterogeneity in the literature for bank and non-bank financial intermediaries, our data reveal significant differences in monetary policy transmission within the life insurance sector when considering business model categories. Figures 4 and 7 illustrate the sample's heterogeneity using the legal classification, focusing on the guaranteed yield spread and premium growth. These figures highlight the competitive advantage of *bancassurers*, who experience the highest premium increases while simultaneously lowering their guaranteed rates more rapidly than competitors. This discrepancy, not adequately captured by insurer size alone, serves as the primary rationale for implementing an alternative classification.²²

²²Size categories are determined by ranking insurers by average asset size and dividing them into terciles, ensuring equal sample sizes. Annex A.4 illustrates the heterogeneity across the full set of variables.

Figure 7: *Premium growth heterogeneity: Legal vs. Size classifications*



Note: Sample of 31 life insurance companies operating in France for the period 2009-2018. Data extracted from AMBest and individual annual reports.

Table 3 examines the impact of insurer classification on profitability in the low-yield environment. The panel regressions incorporate dummy variables based on the business model categories, along with individual and time fixed effects. Column (1) confirms the ambiguous influence of the slope of the yield curve on overall profitability when controlling for insurer-specific variables. Subsequent regressions introduce interactions with different insurer classifications, enriching our understanding of sector-specific responses to monetary policy shifts. The dummy category coefficients are significant across all specifications, underscoring the relevance of the legal classification.

Notably, being a bancassurer increases ROA by 13 basis points, while it decreases by 14 and 12 basis points for mutual and traditional SA insurers, respectively. By interacting the monetary policy variable (slope of the yield curve) with categorical dummies, we disentangle insurer-specific characteristics:

1. The interaction with the Bancassurer dummy suggests a mitigated effect of monetary policy on profitability, implying dampened sensitivity to interest rate changes.
2. Conversely, the interaction with the Mutual insurer dummy amplifies the effect, indicating that monetary policy easing significantly enhances profitability for mutual insurers.
3. The interaction effect for the S.A. insurer dummy remains statistically non-significant. This suggests that the overall effect across S.A. insurers does not follow any specific category-wise trend.

Additionally, we verified the results using categorization by size, finding that none of the

Table 3: *Benchmark heterogeneous regressions results - Return on Assets*

	(1)	(2)	(3)	(4)
Yield curve slope	0.56 (0.70)	1.15 (0.79)	-0.06 (0.68)	0.61 (0.73)
Log gross written premiums	-3.10*** (0.76)	-3.18*** (0.78)	-3.25*** (0.77)	-3.11*** (0.76)
Share of equities	-0.21*** (0.07)	-0.21*** (0.07)	-0.21*** (0.07)	-0.21*** (0.07)
Net reserves ratio	-0.10 (0.06)	-0.09 (0.06)	-0.10 (0.06)	-0.10 (0.06)
Share of unit-linked policies	0.02 (0.09)	0.06 (0.09)	0.02 (0.09)	0.01 (0.09)
Bancassurer dummy		13.46** (5.93)		
Yield curve slope * Bancassurer dummy		-1.41** (0.59)		
Mutual dummy			-14.81** (5.85)	
Yield curve slope * Mutual dummy			1.53** (0.72)	
SA dummy				-12.33*** (3.66)
Yield curve slope * SA dummy				-0.31 (0.61)
Constant	38.77*** (8.91)	26.72*** (6.12)	41.33*** (9.09)	38.97*** (8.90)
FE	YES	YES	YES	YES
TE	YES	YES	YES	YES
Num. obs.	291	291	291	291
R ² (full model)	0.54	0.55	0.55	0.54

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$. Robust standard errors are reported in parentheses.

interaction coefficients yield significant results, further confirming the validity of the business model categories (see Table A.3 in Annex).

While business model categories provide valuable insights, it is crucial to consider additional individual insurance variables that significantly shape the impact of monetary policy on profitability. Key factors include portfolio allocation choices, particularly the balance between equities and bonds, as well as the proportion of unit-linked policies. Moreover, the guaranteed yield spread and net reserves ratio stand out as important financial metrics for life insurers. These variables are instrumental in understanding the dynamics within the life insurance sector and how different types of insurers interact with monetary policy.

The importance of these factors becomes particularly evident when analyzing the rise of the bancassurance model. Bancassurers often possess distinct advantages in terms of portfolio diversity and financial integration, potentially affording them greater flexibility and resilience against monetary policy shifts. This differentiation in portfolio management and strategic finan-

cial planning among life insurer categories is pivotal for a comprehensive analysis of profitability determinants in the insurance sector.

Table 4 presents findings on the legal classification while exploring the impact of individual features. The results reveal that monetary policy, measured by the slope of the yield curve, exerts a more pronounced effect on non-bancassurers, including traditional S.A. insurers and mutual insurers, showing a stronger association with their profitability compared to bancassurers. The guaranteed yield spread emerges as a crucial factor in shaping life insurers' profitability, with divergent effects across categories. Bancassurers exhibit a negative coefficient for this spread, indicating that a narrower gap between return on investments (ROI) and average guaranteed yield to policyholders positively impacts their profitability.

Conversely, mutual insurers show a positive coefficient, suggesting that a lower spread negatively affects their profitability. These nuanced findings underscore the pivotal role of the guaranteed yield spread in determining competitive advantages among insurers. The results imply that bancassurers possess an enhanced capacity to offer lower guaranteed rates while simultaneously increasing their market share. This dynamic illuminates the complex interplay between monetary policy, business model classification, and individual features in shaping the competitive landscape of the life insurance sector.

The analysis reveals an ambiguous relationship between equity holdings and insurer profitability. Across different regressions, an increased share of equities in insurers' portfolios generally correlates with dampened profitability. This negative association suggests that life insurers expanding their equity holdings in guaranteed portfolios face higher capital requirements and elevated investment risks, which ultimately translate into reduced profitability. However, the findings uncover an intriguing exception to this trend. The interaction between the bancassurer dummy and the share of equities yields a slightly positive and significant coefficient. This distinctive pattern implies that bancassurers, unlike their counterparts, may benefit from higher exposure to equity markets. Their ability to capitalize on this exposure could stem from broader access to international equities, more diversified investment portfolios, and potentially superior risk management capabilities.

The dummy variable interaction coefficients for the share of unit-linked policies variable reveal a striking contrast between bancassurers and mutual insurers. While mutual companies see a boost in profitability as they increase their proportion of these non-guaranteed policies, bancassurers actually face a negative impact. This seemingly counterintuitive finding can be explained by a crucial insight from the stylized facts: bancassurers already hold a substantial share of unit-linked policies in their portfolios, and their competitive edge largely stems from the lower average yields they offer on guaranteed policies. As a result, when bancassurers further increase their unit-linked holdings, they simultaneously decrease their guaranteed policy offerings, eroding their key competitive advantage in the process. Mutual insurers, on the other hand, stand to gain from expanding their unit-linked business, enjoying higher profitability that aligns with theoretical predictions.

In a surprising twist, the analysis also reveals that bancassurers actually benefit from reducing their Net reserves ratio, a finding that stands in stark contrast to the strategies employed by traditional S.A. insurers and mutual insurers. This counterintuitive result sheds light on the

Table 4: Heterogeneous model results - Return on Assets

	Bancassurers			Mutual insurers			SA insurers		
	(a)	(b)	(c)	(a)	(b)	(c)	(a)	(b)	(c)
Yield curve slope	1.15 (0.79)	1.18 (0.89)	1.28* (0.76)	-0.06 (0.68)	0.06 (0.75)	0.05 (0.60)	0.61 (0.73)	0.97 (0.81)	0.21 (0.73)
Log GWP	-3.18*** (0.78)	-3.10*** (0.76)	-3.95*** (0.80)	-3.25*** (0.77)	-3.15*** (0.74)	-3.61*** (0.74)	-3.11*** (0.76)	-3.12*** (0.74)	-3.37*** (0.75)
Share of equities	-0.21*** (0.07)	-0.22*** (0.07)	-0.29*** (0.09)	-0.21*** (0.07)	-0.22*** (0.07)	-0.07 (0.04)	-0.21*** (0.07)	-0.21*** (0.07)	-0.22** (0.09)
NRNWP ratio	-0.09 (0.06)	-0.09 (0.06)	-0.10 (0.07)	-0.10 (0.06)	-0.10 (0.06)	-0.10** (0.05)	-0.10 (0.06)	-0.10 (0.06)	-0.22 (0.14)
Share of UL policies	0.06 (0.09)	0.05 (0.09)	0.17 (0.11)	0.02 (0.09)	0.00 (0.09)	-0.08 (0.11)	0.01 (0.09)	0.01 (0.10)	0.00 (0.10)
Bancassurer dummy	13.46** (5.93)	12.68** (5.82)	18.69** (7.65)						
Yield curve slope * Bancassurer	-1.41** (0.59)	-1.35** (0.56)	-1.00* (0.57)						
GYS		0.31 (0.28)			-0.18 (0.16)			-0.22 (0.16)	
GYS * Bancassurer		-0.56** (0.24)							
Share of equities * Bancassurer			0.32*** (0.10)						
NRNWP ratio * Bancassurer			-0.26** (0.12)						
Share of UL policies * Bancassurer			-0.39*** (0.15)						
Mutual dummy				-14.81** (5.85)	-14.56** (5.62)	-7.33 (8.08)			
Yield curve slope * Mutual				1.53** (0.72)	1.80** (0.70)	0.82 (0.68)			
GYS * Mutual					1.27*** (0.48)				
Share of equities * Mutual						-0.29** (0.11)			
NRNWP ratio * Mutual						-0.28 (0.23)			
Share of UL policies * Mutual						0.39* (0.20)			
SA dummy							-12.33*** (3.66)	-12.28*** (3.61)	-17.69*** (4.67)
Yield curve slope * SA							-0.31 (0.61)	-0.30 (0.62)	0.49 (0.69)
GYS * SA								0.08 (0.20)	
Share of equities * SA									0.05 (0.10)
NRNWP * SA									0.19 (0.14)
Share of UL policies * SA									0.08 (0.17)
Constant	26.72*** (6.12)	26.99*** (6.01)	32.20*** (6.52)	41.33*** (9.09)	40.63*** (8.85)	44.61*** (8.96)	38.97*** (8.90)	38.34*** (8.72)	43.67*** (9.13)
FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
TE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Num. obs.	291	291	291	291	291	291	291	291	291
R ² (full model)	0.55	0.56	0.59	0.55	0.58	0.59	0.54	0.54	0.55

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$. Robust standard errors are reported in parentheses.

unique advantages enjoyed by bancassurers. Thanks to their lower initial levels of this ratio, bancassurers can gain a competitive edge by maintaining a leaner solvency position in relation to reserve requirements. This approach allows them to allocate resources more efficiently and reduces the burden of capital requirements, leveraging their access to intra-group transfers and sophisticated risk management techniques. By optimizing their reserves, bancassurers can unlock a powerful strategic advantage that sets them apart in the market.

This unique positioning of bancassurers highlights the complex dynamics within the life insurance sector. It underscores how different business models and institutional structures can

lead to varying outcomes in response to similar investment strategies. The findings suggest that bancassurers may possess certain structural advantages or expertise that allow them to navigate equity markets more effectively, potentially reaping higher investment returns while mitigating associated risks.

5.4. Robustness

Annex A.5 delves into the impact of unconventional monetary policy and the prolonged low-yield environment on life insurer profitability, utilizing the EU shadow rate as an alternative monetary policy variable. The findings largely corroborate the previous results, with a notable negative coefficient for the interaction between the EU shadow rate and the bancassurer dummy, indicating that monetary policy has a negligible overall effect on bancassurers compared to other market participants. Moreover, the interactions between the guaranteed yield spread and the business model dummies further underscore the divergent strategies employed by different life insurance players. Bancassurers exhibit a significant negative coefficient, while mutual insurers show a significant positive coefficient, highlighting the competitive dynamics at play as these entities navigate the challenging low-yield landscape. Remarkably, the bancassurance model appears to thrive under these conditions, with enhanced profitability compared to their peers.

In an additional robustness test, we account for the unexpected component of monetary policy by using the Altavilla et al. (2019) EA-MPD database. Specifically, we focus on the unexpected change in the 10-year French bond rate during the press release window.²³ The results, presented in Annex A.6, align closely with our benchmark findings, showing a heterogeneous transmission of monetary policy. Notably, the heightened sensitivity of non-bancassurers' profitability to these shocks can be attributed to their lower flexibility in lowering their guaranteed yield, which exacerbates their exposure to interest rate fluctuations.

Although the main specification does not include macroeconomic variable controls, as these effects are captured through time fixed effects, we conduct an additional robustness check to account explicitly for these influences. We incorporate the real GDP growth rate, inflation rate, and CAC 40 index returns into the regression model. The results, presented in Annex A.7, confirm the robustness of our findings. Specifically, the CAC 40 index returns exhibit a positive and statistically significant effect on the profitability of insurers, underscoring the relevance of market conditions.

Annex A.8 provides additional confirmation of these findings using an alternative profitability measure, the Return on Equity (ROE), which is widely used by regulators to assess the financial health of life insurance companies. The results underscore the more pronounced influence of monetary policy on non-bancassurers and shed light on the income channel via the guaranteed yield spread. Furthermore, the analysis reveals a positive coefficient for the share of unit-linked assets variable among non-bancassurers, suggesting a potential lever that regulators could use to foster a more balanced and competitive market environment.

²³This approach calculates the change from the median quote in the 13:25–13:35 interval before the press release to the median quote in the 14:00–14:10 interval following the announcement, summing these effects over the year to capture the cumulative impact.

6. Conclusion

The challenges confronting life insurers in the wake of a prolonged low interest rate environment are both intricate and wide-ranging. This study delves into the French market, a choice motivated by its substantial size and representative characteristics, which include a high prevalence of traditional guaranteed policies, a net investment spread indicative of the European insurance sector, a significant bancassurance sector, and a diversified market structure. In contrast to the findings observed in the banking sector, this research reveals that the life insurance sector in France does not experience a significant overall impact from monetary policy, as evidenced by two key indicators: the spread of the sovereign yield curve and the EU shadow rate.

To fully capture the heterogeneity within the industry, this study introduces a novel classification of life insurers based on their legal framework, distinguishing between bancassurers, traditional S.A. insurers, and mutual insurers. By segmenting insurers in this manner, the analysis uncovers valuable insights into the unique dynamics, challenges, and opportunities faced by each category. Leveraging panel data econometrics of 31 life insurance companies operating in France, the findings demonstrate that monetary policy exerts a more significant influence on the profitability of non-bancassurance actors. This, in turn, enables bancassurance players to gain market share as they prove more resilient to the effects of the low-yield environment, highlighting the impact of the income channel of monetary policy on life insurance profitability.

Notably, the second major contribution of this article lies in its ability to highlight the underlying mechanisms driving changes in the life insurance market. The findings underscore the important role played by guaranteed policies. Bancassurance players gain a competitive edge when the spread between their investment yield and guaranteed yield narrows, translating into increased profitability. By offering lower guaranteed yields to policyholders and leveraging synergies through banking distribution networks and higher levels of customer trust, bancassurers are able to grow their businesses at a faster pace than their counterparts. Moreover, their greater access to intra-group capital transfers and more diversified portfolios allows them to increase their holdings in equities, further bolstering their strategic advantage. In contrast, heightened reserve requirements exert a negative impact on the profitability of other insurers.

In light of these findings, the article underscores key priorities for regulators, emphasizing the need to consider the impact of monetary policy on the evolving competitive landscape of the life insurance industry. The growing prominence of financial conglomerates that combine insurance and banking activities poses a potential systemic risk, as these institutions can more easily engage in risky behavior — as evidenced by the higher equities in bancassurer portfolios and lower reserve requirements — without compromising their profitability. Consequently, the consolidation of these institutions has the potential to amplify economic cycles and reduce market competition.

To effectively address these risks, regulators must implement careful monitoring and appropriate measures. Supervisory authorities should take proactive steps to prevent the bundling of banking and insurance products while actively promoting the use of unit-linked policies. This approach can play a vital role in rebalancing the competitive landscape, reducing the dominance of bancassurers and fostering a more diverse and resilient market. The implementation of robust

capital and liquidity requirements is essential to mitigate the adverse effects of concentration, ensuring that institutions are well-equipped to withstand shocks. Furthermore, enhancing transparency and strengthening risk management practices are crucial for detecting and managing the systemic risks associated with concentrated banking and insurance activities.

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Appendix

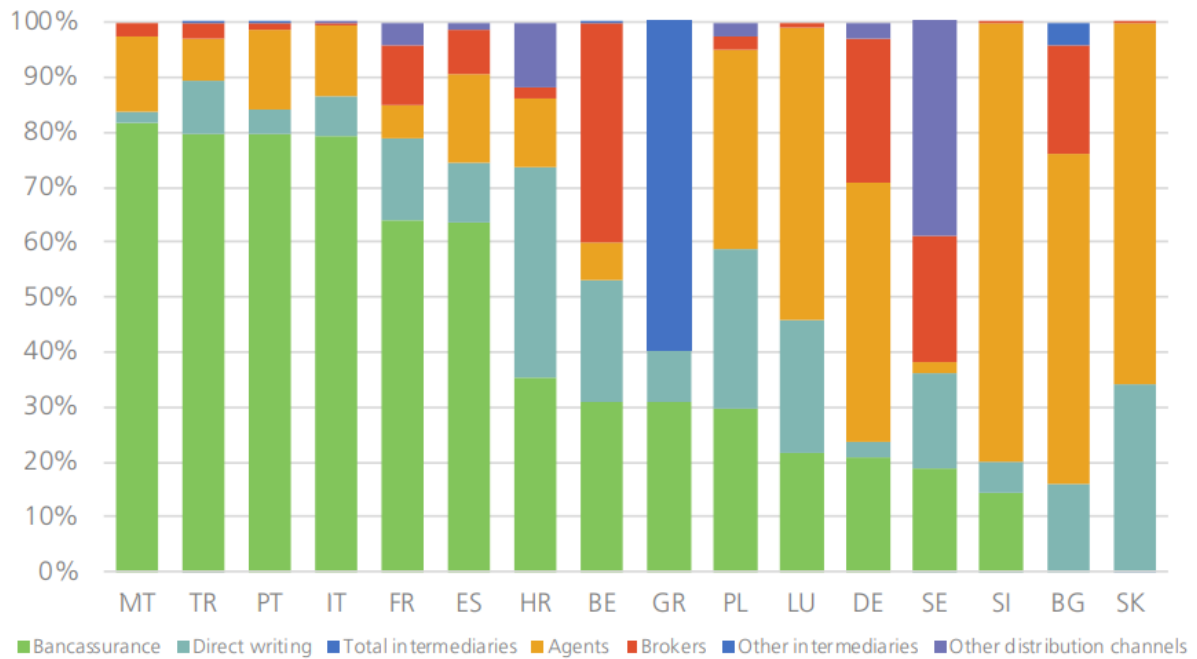
Table A.1: *Life insurance companies by category*

Company Name	Category
Credit Agricole	Bancassurer
Cardif Assurance Vie	Bancassurer
SOGECAP	Bancassurer
BPCE Vie	Bancassurer
Groupe des Assurances du Credit Mutuel	Bancassurer
Suravenir	Bancassurer
HSBC Vie France	Bancassurer
PREPAR Vie	Bancassurer
Neuflyze Vie	Bancassurer
Assurances Credit Mutuel Nord Vie	Bancassurer
Oradea Vie	Bancassurer
AGEAS France	Bancassurer
CNP Assurances	SA Limited company
AXA France Vie	SA Limited company
Generali Vie SA France	SA Limited company
Allianz Vie	SA Limited company
Swisslife France	SA Limited company
Aviva Vie	SA Limited company
Unofi Assurances SA	SA Limited company
Mondiale Societe Asr Mutuelle sur la Vie	Mutual company
Groupama GAN Vie	Mutual company
Mutavie	Mutual company
MACSF Epargne Retraite	Mutual company
Parnasse MAIF	Mutual company
AGPM	Mutual company
CARAC Mutuelle d'Epargne Retraite Prevoyance	Mutual company
APICIL Epargne	Mutual company
CAPMA CAPMI	Mutual company
SAF BTP Vie	Mutual company
Monceau Retraite Epargne	Mutual company
Covea	Mutual company

Table A.2: *Correlation table*

	ROA	Yield curve slope	EU shadow rate	GYS	Share of equities	NRNWP	Total GWP	Share of UL assets
ROA	1.00							
Slope yield curve	0.14	1.00						
EU shadow rate	0.06	0.82	1.00					
GYS	0.05	0.05	0.06	1.00				
Share of equities	-0.03	-0.16	-0.18	-0.02	1.00			
NRNWP	0.04	-0.24	-0.24	0.00	0.30	1.00		
Total GWP	0.15	-0.02	-0.03	-0.02	-0.24	-0.14	1.00	
Share of UL assets	-0.20	-0.07	-0.07	0.11	-0.11	-0.21	-0.15	1.00

Figure A.3: *Distribution of life insurance policies by country (% of GWP)*



Source: Insurance Europe, Key Fact European insurance 2016 (2015 data). The data considers the distribution of life insurance policies through banking intermediaries, which do not always correspond to *bancassurance* players, as there can be agreements between actors to cooperate in the distribution of policies.

Table A.3: *Heterogeneous regressions results - Size categories*

	(1)	(2)	(3)	(4)
Yield curve slope	0.56 (0.70)	0.52 (0.73)	0.53 (0.68)	0.68 (0.82)
Log gross written premiums	-3.10*** (0.76)	-3.10*** (0.78)	-3.07*** (0.82)	-3.07*** (0.77)
Share of equities	-0.21*** (0.07)	-0.21*** (0.07)	-0.21*** (0.07)	-0.20*** (0.08)
Net reserves ratio	-0.10 (0.06)	-0.10 (0.06)	-0.10 (0.06)	-0.10 (0.06)
Share of unit-linked policies	0.02 (0.09)	0.02 (0.09)	0.02 (0.09)	0.03 (0.09)
Large dummy		-11.64* (6.29)		
Yield curve slope * Large dummy		0.10 (0.58)		
Medium dummy			-7.95*** (2.67)	
Yield curve slope * Medium dummy			0.16 (0.72)	
Small dummy				11.69* (5.94)
Yield curve slope * Small dummy				-0.26 (0.54)
Constant	38.77*** (8.91)	38.90*** (9.17)	38.43*** (9.54)	26.86*** (6.53)
FE	YES	YES	YES	YES
TE	YES	YES	YES	YES
Num. obs.	291	291	291	291
R ² (full model)	0.54	0.54	0.54	0.54

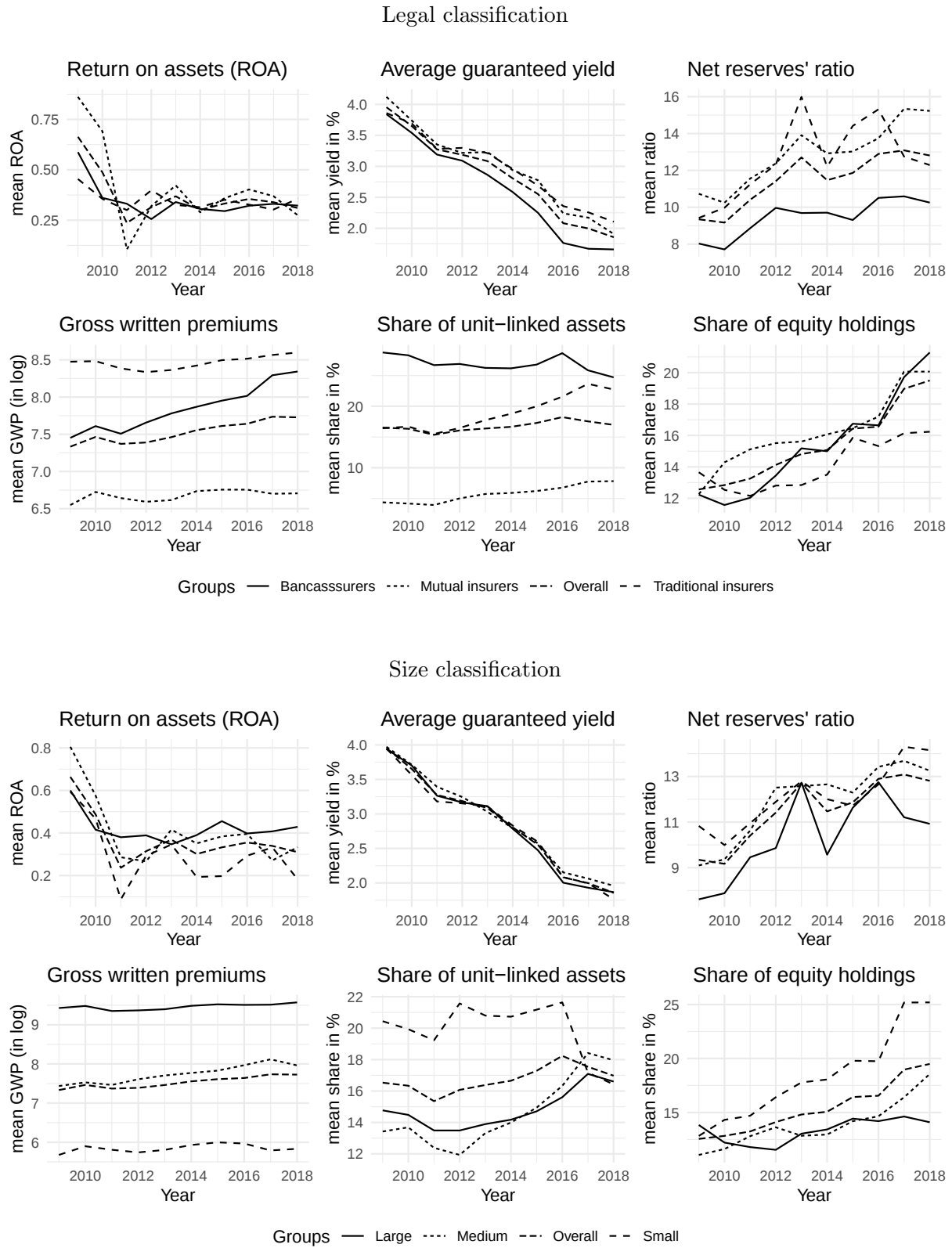
*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$. Robust standard errors are reported in parentheses.

Table A.4: *Benchmark heterogeneous regressions results - EU Shadow Rate*

	(1)	(2)	(3)	(4)
EU shadow rate	0.13 (0.16)	0.22 (0.17)	0.03 (0.16)	0.12 (0.16)
Log gross written premiums	-3.10*** (0.76)	-3.13*** (0.77)	-3.21*** (0.77)	-3.08*** (0.76)
Share of equities	-0.21*** (0.07)	-0.22*** (0.07)	-0.21*** (0.07)	-0.21*** (0.07)
Net reserves ratio	-0.10 (0.06)	-0.10 (0.06)	-0.09 (0.06)	-0.10 (0.06)
Share of unit-linked policies	0.02 (0.09)	0.04 (0.09)	0.01 (0.09)	0.03 (0.10)
Bancassurer dummy		10.54* (6.11)		
EU shadow rate * Bancassurer dummy		-0.27** (0.14)		
Mutual dummy			-11.82** (5.94)	
EU shadow rate * Mutual dummy			0.22 (0.16)	
SA dummy				-12.46*** (3.69)
EU shadow rate * SA dummy				0.04 (0.12)
Constant	40.11*** (8.47)	29.29*** (6.09)	41.19*** (8.58)	39.85*** (8.52)
FE	YES	YES	YES	YES
TE	YES	YES	YES	YES
Num. obs.	291	291	291	291
R ² (full model)	0.54	0.55	0.54	0.54

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$. Robust standard errors are reported in parentheses.

Figure A.4: *Sample's heterogeneity: Legal vs. Size classifications*



Note: Sample of 31 life insurance companies operating in France for the period 2009-2018. Data extracted from AMBest and individual annual reports.

Table A.5: *Heterogeneous model results - Return on Assets and EU shadow rate*

	Bancassurers			Mutual insurers			SA insurers		
	(a)	(b)	(c)	(a)	(b)	(c)	(a)	(b)	(c)
Eu shadow rate	0.22 (0.17)	0.24 (0.19)	0.26 (0.17)	0.03 (0.16)	0.07 (0.17)	0.13 (0.14)	0.12 (0.16)	0.20 (0.18)	-0.04 (0.17)
Log GWP	-3.13*** (0.77)	-3.06*** (0.74)	-3.94*** (0.82)	-3.21*** (0.77)	-3.12*** (0.74)	-3.50*** (0.75)	-3.08*** (0.76)	-3.08*** (0.74)	-3.47*** (0.75)
Share of equities	-0.22*** (0.07)	-0.23*** (0.07)	-0.29*** (0.09)	-0.21*** (0.07)	-0.22*** (0.07)	-0.03 (0.04)	-0.21*** (0.07)	-0.21*** (0.07)	-0.24*** (0.09)
NRNWP ratio	-0.10 (0.06)	-0.10 (0.06)	-0.11 (0.07)	-0.09 (0.06)	-0.09 (0.06)	-0.08* (0.04)	-0.10 (0.06)	-0.10 (0.06)	-0.25* (0.14)
Share UL policies	0.04 (0.09)	0.03 (0.09)	0.16 (0.12)	0.01 (0.09)	-0.01 (0.09)	-0.04 (0.11)	0.03 (0.10)	0.03 (0.10)	-0.02 (0.11)
Bancassurer	10.54* (6.11)	9.88* (5.94)	16.47** (7.80)						
Eu shadow rate * Bancassurer	-0.27** (0.14)	-0.26** (0.13)	-0.17 (0.17)						
GYS		0.29 (0.29)			-0.21 (0.16)			-0.22 (0.16)	
GYS * Bancassurer		-0.56** (0.25)							
Share of equities * Bancassurer			0.33*** (0.10)						
NRNWP ratio * Bancassurer			-0.23* (0.13)						
Share of UL policies * Bancassurer			-0.40** (0.17)						
Mutual				-11.82** (5.94)	-11.15* (5.70)	-1.49 (8.74)			
Eu shadow rate * Mutual				0.22 (0.16)	0.29* (0.16)	-0.15 (0.21)			
GYS * Mutual					1.20** (0.50)				
Share of equities * Mutual						-0.36*** (0.12)			
NRNWP ratio * Mutual						-0.37 (0.24)			
Share of UL policies * Mutual						0.31 (0.21)			
SA							-12.46*** (3.69)	-12.35*** (3.66)	-18.66*** (4.76)
Eu shadow rate * SA							0.04 (0.12)	0.05 (0.13)	0.47** (0.23)
GYS * SA dummy								0.07 (0.20)	
Share of equities * SA									0.12 (0.11)
NRNWP * SA									0.22 (0.15)
Share of UL policies * SA									0.23 (0.20)
Constant	29.29*** (6.09)	29.67*** (6.07)	35.43*** (6.62)	41.19*** (8.58)	40.99*** (8.33)	42.77*** (8.75)	39.85*** (8.52)	40.02*** (8.35)	45.85*** (8.91)
FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
TE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Num. obs.	291	291	291	291	291	291	291	291	291
R ² (full model)	0.55	0.56	0.59	0.54	0.57	0.59	0.54	0.54	0.55

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$. Robust standard errors are reported in parentheses.

Note: Log GWP: Logarithm of Gross Written Premiums, Share of equities: Proportion of equity investments in the insurer's portfolio, NRNWP ratio: Net Reserves to Net Written Premiums ratio, Share UL policies: Share of unit-linked policies, GYS: Guaranteed Yield Spread.

Table A.6: *Heterogeneous model results - Return on Assets and Altavilla et al. (2019) Yield Curve ECB shock*

	Bancassurers			Mutual insurers			SA insurers		
	(a)	(b)	(c)	(a)	(b)	(c)	(a)	(b)	(c)
FR 10Y MP shock	0.17 (0.14)	0.20 (0.17)	0.22* (0.13)	0.06 (0.14)	0.11 (0.16)	0.06 (0.12)	0.10 (0.14)	0.17 (0.16)	0.02 (0.14)
Log GWP	-3.19*** (0.74)	-3.12*** (0.70)	-3.94*** (0.77)	-3.20*** (0.75)	-3.11*** (0.71)	-3.56*** (0.74)	-3.09*** (0.76)	-3.10*** (0.74)	-3.39*** (0.73)
Share of equities	-0.22*** (0.07)	-0.23*** (0.07)	-0.30*** (0.09)	-0.21*** (0.07)	-0.22*** (0.07)	-0.05 (0.04)	-0.21*** (0.07)	-0.21*** (0.07)	-0.22** (0.09)
NRNWP ratio	-0.09 (0.06)	-0.09 (0.06)	-0.10 (0.07)	-0.09 (0.06)	-0.08 (0.06)	-0.09** (0.04)	-0.10 (0.06)	-0.10 (0.06)	-0.24 (0.15)
Share UL policies	0.04 (0.09)	0.04 (0.09)	0.15 (0.11)	0.02 (0.09)	0.01 (0.09)	-0.06 (0.10)	0.02 (0.09)	0.03 (0.09)	-0.00 (0.10)
Bancassurer	11.18* (5.81)	10.41* (5.62)	16.31** (7.16)						
FR 10Y MP shock * Bancassurer	-0.17*** (0.07)	-0.19*** (0.06)	-0.13** (0.06)						
GYS		0.32 (0.29)			-0.23 (0.17)			-0.22 (0.16)	
GYS * Bancassurer		-0.61** (0.25)							
Share of equities * Bancassurer			0.34*** (0.10)						
NRNWP ratio * Bancassurer			-0.26** (0.13)						
Share of UL policies * Bancassurer			-0.37*** (0.14)						
Mutual				-11.92** (5.89)	-11.27** (5.57)	-3.80 (8.28)			
FR 10Y MP shock * Mutual				0.14* (0.08)	0.19** (0.07)	0.02 (0.10)			
GYS * Mutual					1.25** (0.51)				
Share of equities * Mutual						-0.32*** (0.12)			
NRNWP ratio * Mutual						-0.32 (0.26)			
Share of UL policies * Mutual						0.35* (0.19)			
SA							-12.54*** (3.62)	-12.46*** (3.57)	-16.97*** (4.33)
FR 10Y MP shock * SA							0.04 (0.06)	0.04 (0.06)	0.12* (0.06)
GYS * SA dummy								0.08 (0.20)	
Share of equities * SA									0.05 (0.11)
NRNWP * SA									0.21 (0.15)
Share of UL policies * SA									0.08 (0.15)
Constant	29.28*** (6.00)	29.77*** (5.95)	35.31*** (6.58)	40.85*** (8.38)	40.56*** (8.04)	43.89*** (8.51)	39.90*** (8.47)	40.05*** (8.30)	44.62*** (8.58)
FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
TE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Num. obs.	291	291	291	291	291	291	291	291	291
R ² (full model)	0.55	0.56	0.59	0.55	0.57	0.59	0.54	0.54	0.55

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$. Robust standard errors are reported in parentheses.

Note: Log GWP: Logarithm of Gross Written Premiums, Share of equities: Proportion of equity investments in the insurer's portfolio, NRNWP ratio: Net Reserves to Net Written Premiums ratio, Share UL policies: Share of unit-linked policies, GYS: Guaranteed Yield Spread.

Table A.7: *Heterogeneous model robustness - ROA with macroeconomic control variables model*

	Bancassurers			Mutual insurers			SA insurers		
	(a)	(b)	(c)	(a)	(b)	(c)	(a)	(b)	(c)
Yield curve slope	0.34 (0.54)	0.33 (0.54)	0.34 (0.55)	-0.87 (0.54)	-0.86 (0.53)	-0.48 (0.45)	-0.27 (0.52)	-0.25 (0.51)	-0.63 (0.55)
Log GWP	-2.93*** (0.72)	-2.85*** (0.71)	-3.44*** (0.78)	-2.98*** (0.71)	-2.89*** (0.70)	-3.21*** (0.69)	-2.85*** (0.70)	-2.85*** (0.69)	-3.10*** (0.66)
Share of equities	-0.19*** (0.07)	-0.20*** (0.07)	-0.28*** (0.09)	-0.19*** (0.07)	-0.20*** (0.07)	-0.04 (0.04)	-0.19** (0.07)	-0.19*** (0.07)	-0.20** (0.08)
NRNWP	-0.13* (0.07)	-0.13** (0.07)	-0.14* (0.08)	-0.13** (0.06)	-0.13** (0.06)	-0.12** (0.05)	-0.14** (0.07)	-0.13** (0.06)	-0.26* (0.14)
Share of UL policies	0.16** (0.07)	0.16** (0.08)	0.24** (0.11)	0.12* (0.07)	0.11 (0.07)	0.05 (0.07)	0.11 (0.08)	0.12 (0.08)	0.11 (0.09)
Stock market YoY	0.05** (0.02)	0.05** (0.02)	0.03 (0.02)	0.05** (0.02)	0.04** (0.02)	0.04** (0.02)	0.05** (0.02)	0.05** (0.02)	0.06** (0.02)
Inflation rate	-0.30 (0.25)	-0.30 (0.28)	-0.28 (0.26)	-0.29 (0.25)	-0.31 (0.29)	-0.17 (0.29)	-0.30 (0.25)	-0.39 (0.27)	-0.29 (0.28)
Real GDP growth	-0.77** (0.33)	-0.81** (0.35)	-0.64** (0.32)	-0.80** (0.33)	-0.78** (0.34)	-0.73** (0.32)	-0.80** (0.33)	-0.86** (0.36)	-0.93** (0.37)
Bancassurer	11.44** (5.60)	10.66* (5.55)	12.91* (7.77)						
Yield curve slope * Bancassurer	-1.50** (0.61)	-1.44** (0.59)	-0.94* (0.56)						
GYS		0.27 (0.23)	0.33 (0.23)		-0.19 (0.12)	-0.13 (0.11)		-0.14 (0.14)	-0.11 (0.14)
GYS * Bancassurer		-0.50** (0.24)	-0.45* (0.23)						
Share of equities * Bancassurer			0.32*** (0.10)						
NRNWP * Bancassurer			-0.25** (0.12)						
Share of UL policies * Bancassurer			-0.28* (0.15)						
Mutual				-12.47** (5.51)	-12.25** (5.37)	-1.06 (8.03)			
Yield curve slope * Mutual				1.47** (0.73)	1.71** (0.72)	0.63 (0.65)			
GYS * Mutual					1.20** (0.51)	1.31** (0.54)			
Share of equities * Mutual						-0.33*** (0.12)			
NRNWP * Mutual						-0.31 (0.22)			
Share of UL policies * Mutual						0.27 (0.21)			
SA							-10.40*** (3.28)	-10.36*** (3.24)	-15.87*** (4.21)
Yield curve slope * SA							-0.12 (0.60)	-0.11 (0.61)	0.70 (0.66)
GYS * SA								0.06 (0.19)	0.02 (0.19)
Share of equities * SA									0.08 (0.10)
NRNWP * SA									0.21 (0.14)
Share of UL policies * SA									0.06 (0.16)
Constant	25.86*** (5.92)	26.02*** (5.90)	31.37*** (6.61)	38.04*** (8.08)	37.42*** (8.01)	38.70*** (7.96)	35.77*** (7.90)	35.81*** (7.79)	40.26*** (7.87)
FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
TE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Num. obs.	291	291	291	291	291	291	291	291	291
R ²	0.52	0.53	0.56	0.52	0.55	0.58	0.51	0.51	0.52

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$. Robust standard errors are reported in parentheses.**Note:** Log GWP: Logarithm of Gross Written Premiums, Share of equities: Proportion of equity investments in the insurer's portfolio, NRNWP ratio: Net Reserves to Net Written Premiums ratio, Share UL policies: Share of unit-linked policies, GYS: Guaranteed Yield Spread.

Table A.8: *Heterogeneous model robustness - Return on Equity (ROE) model*

	Bancassurers			Mutual insurers			SA insurers		
	(a)	(b)	(c)	(a)	(b)	(c)	(a)	(b)	(c)
Yield curve slope	25.80*** (7.78)	29.49*** (8.85)	27.02*** (5.96)	7.13 (14.81)	14.36 (13.31)	12.19 (13.03)	14.96 (9.26)	23.88** (7.38)	11.84 (13.41)
Log GWP	-23.44 (13.16)	-22.28 (13.12)	-36.19** (12.09)	-24.10* (12.89)	-22.76 (12.89)	-26.73* (12.44)	-21.93 (12.95)	-22.14 (13.10)	-27.23 (16.24)
Share of equities	-4.31*** (1.26)	-4.49*** (1.30)	-5.88*** (1.53)	-4.23*** (1.20)	-4.42*** (1.26)	-1.52 (0.95)	-4.22*** (1.25)	-4.27*** (1.21)	-4.16** (1.36)
NRNWP ratio	-0.28 (1.50)	-0.24 (1.30)	-0.50 (1.60)	-0.35 (1.56)	-0.26 (1.35)	-0.77 (1.38)	-0.38 (1.63)	-0.26 (1.46)	-1.08 (2.69)
Share UL policies	1.37 (0.88)	1.19 (0.91)	3.12** (1.17)	0.60 (0.96)	0.38 (0.94)	-0.43 (1.44)	0.72 (1.47)	0.73 (1.36)	-0.17 (2.94)
Bancassurer	61.04 (97.38)	46.57 (98.00)	116.00 (105.18)						
Yield curve slope * Bancassurer	-24.62* (11.63)	-22.45* (10.66)	-13.77 (8.46)						
GYS		3.25 (6.86)			-5.13 (4.38)			-5.76 (5.41)	
GYS * Bancassurer		-9.26* (4.90)							
Share of equities * Bancassurer			6.41** (2.35)						
NRNWP ratio * Bancassurer			-4.31* (2.19)						
Share UL policies * Bancassurer			-6.37* (2.89)						
Mutual				-70.98 (98.58)	-64.39 (99.20)	67.88 (163.44)			
Yield curve slope * Mutual				20.64 (15.70)	22.74 (15.41)	8.51 (7.93)			
GYS * Mutual					17.31 (13.33)				
Share of equities * Mutual						-5.15** (1.90)			
NRNWP ratio * Mutual						-1.49 (2.23)			
Share UL policies * Mutual						3.90 (3.97)			
SA							-81.94 (54.90)	-81.03 (56.60)	-163.38 (170.10)
Yield curve slope * SA							2.99 (13.46)	3.09 (13.67)	15.59 (14.09)
GYS * SA								2.90 (6.50)	
Share of equities * SA									-0.22 (1.29)
NRNWP * SA									1.35 (2.55)
Share UL policies * SA									3.21 (6.02)
Constant	313.00** (101.20)	311.40** (100.70)	421.47*** (106.74)	383.91** (154.19)	363.15** (151.22)	388.04** (153.13)	347.32* (156.45)	331.41* (155.80)	426.29 (242.94)
FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
TE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Num. obs.	291	291	291	291	291	291	291	291	291
R ² (full model)	0.45	0.46	0.49	0.45	0.47	0.47	0.44	0.45	0.45

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$. Robust standard errors are reported in parentheses.

Note: Log GWP: Logarithm of Gross Written Premiums, Share of equities: Proportion of equity investments in the insurer's portfolio, NRNWP ratio: Net Reserves to Net Written Premiums ratio, Share UL policies: Share of unit-linked policies, GYS: Guaranteed Yield Spread.