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## **An Analysis of Financial Conglomerate Resilience: A Perspective on bancassurance in France**

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SECRÉTARIAT GENERAL DE L'AUTORITÉ DE CONTRÔLE PRUDENTIEL  
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DIRECTION DE L'ÉTUDE ET DE L'ANALYSE DES RISQUES

AN ANALYSIS OF FINANCIAL CONGLOMERATE RESILIENCE: A  
PERSPECTIVE ON BANCASSURANCE IN FRANCE<sup>2</sup>

Cyril Pouvelle

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## **An Analysis of Financial Conglomerate Resilience: A Perspective on bancassurance in France**

**Abstract:** The objective of the paper is to shed light on the effects of financial conglomerate membership on banks' profitability, risk-taking, default risk and intragroup funding resilience. To that end, we estimate models of the entities' Return on Assets (ROA), the standard deviation of the ROA, the Z-score, a measure of banks' default risk, and intragroup funding standard deviation, using quarterly supervisory data available at the ACPR on a solo basis for French banks. We find that the financial conglomerate membership has a dampening effect on the volatility of the ROA and of intragroup funding growth, an effect that is even stronger in periods of financial stress. Moreover, financial conglomerate membership is found to reduce banks' default risk as it has a positive effect on a bank's Z-score overall. By contrast, no significant effect is shown on the ROA. By and large, these results invalidate the moral hazard assumption associated with financial conglomerates but rather highlight financial solidarity mechanisms within conglomerates.

**Keywords:** Banks, Financial Policy and Risk Management, Financial Stability

**JEL Classification:** G21, G32

### **Une analyse de la résilience des conglomérats financiers : Une perspective sur la bancassurance en France**

**Résumé :** L'objectif de ce papier est de mettre en lumière les effets pour une entité de l'appartenance à un conglomérat financier en matière de rentabilité, de prise de risque, de risque de défaut et résilience du financement intragroupe. À cette fin, nous estimons plusieurs modèles du rendement des actifs (ROA), de l'écart-type du ROA, du Z-score, une mesure du risque de défaut d'une entreprise, et de l'écart-type de la croissance du financement intragroupe, en utilisant les données de supervision disponibles à l'ACPR sur base sociale pour les banques françaises, afin de comparer les entités appartenant à un conglomérat financier par rapport à celles des autres banques.

Nos résultats indiquent que la participation à un conglomérat financier a un effet stabilisateur sur la volatilité du ROA et la croissance du financement intragroupe et que cet effet est même plus fort en période de stress financier. Par ailleurs, la participation à un conglomérat financier réduit le risque de défaut des banques car elle a un effet positif sur leur Z-score. En revanche, aucun effet significatif n'est trouvé sur le niveau du ROA. Au total, ces résultats invalident l'hypothèse d'aléa moral associée à l'appartenance à un conglomérat financier mais illustrent au contraire les bénéfices de l'appartenance à un conglomérat du fait des mécanismes de solidarité financière intra-groupe.

**Mots-clés :** Banques, politique financière et gestion des risques, stabilité financière

**JEL Classification :** G21, G32

# 1 Non-technical summary

The French financial landscape presents a specific feature linked to the presence of financial conglomerates or large groups of "bancassurance", combining banking and insurance activities. Historically, the development of such groups was linked to the growth of the life insurance market. There is no consensus in the economic literature regarding the cost-benefit analysis of the membership of such financial conglomerates nor as to whether the "conglomerate discount" concept developed in corporate finance theory can be applied to financial conglomerates.

The objective of the paper is to shed light on the effects of financial conglomerate membership on banks' profitability, risk-taking, default risk and intragroup funding resilience. To that end, we estimate models of the entities' Return on Assets (ROA), the standard deviation of the ROA, the Z-score, a measure of banks' default risk, and intragroup funding standard deviation, using quarterly supervisory data available at the ACPR on a solo basis for French banks. We compare entities belonging to a financial conglomerate to other banking institutions.

We find that the financial conglomerate membership has a dampening effect on the volatility of the ROA and of intragroup funding growth, an effect that is even stronger in periods of financial stress. Moreover, financial conglomerate membership is found to reduce banks' default risk as it has a positive effect on a bank's Z-score overall. By contrast, no significant effect is shown on the ROA. By and large, these results invalidate the moral hazard assumption associated with financial conglomerates but rather highlight financial solidarity mechanisms within conglomerates.

## 2 Résumé non-technique

Le paysage financier français se caractérise par la présence de conglomérats financiers ou grands groupes de "bancassurance", combinant activités bancaires et activités d'assurance. Historiquement, le développement de tels groupes fut lié à la croissance du marché de l'assurance-vie. Il n'y a pas de consensus dans la littérature économique sur l'analyse coût-bénéfice de l'appartenance à de tels conglomérats ni sur le point de savoir si le concept de "conglomerate discount" développé en théorie de l'entreprise peut s'appliquer aux conglomérats financiers.

L'objectif de ce papier est de mettre en lumière les effets pour une entité de l'appartenance à un conglomérat financier en matière de rentabilité, de prise de risque, de risque de défaut et résilience du financement intragroupe. A cette fin, nous estimons plusieurs modèles du rendement des actifs (ROA), de l'écart-type du ROA, du Z-score, une mesure du risque de défaut d'une entreprise, et de l'écart-type de la croissance du financement intragroupe, en utilisant les données de supervision disponibles à l'ACPR sur base sociale pour les banques françaises, afin de comparer les entités appartenant à un conglomérat financier par rapport à celles des autres banques.

Nos résultats indiquent que la participation à un conglomérat financier a un effet stabilisateur sur la volatilité du ROA et la croissance du financement intragroupe et que cet effet est même plus fort en période de stress financier. Par ailleurs, la participation à un conglomérat financier réduit le risque de défaut des banques car elle a un effet positif sur leur Z-score. En revanche, aucun effet significatif n'est trouvé sur le niveau du ROA. Au total, ces résultats invalident l'hypothèse d'aléa

moral associée à l'appartenance à un conglomérat financier mais illustrent au contraire les bénéfices de l'appartenance à un conglomérat du fait des mécanismes de solidarité financière intra-groupe.

### 3 Introduction

The French financial landscape presents a specific feature linked to the presence of large groups of "bancassurance", combining activities of banking and insurance. The existence of such large and diversified groups raises various questions in terms of profitability, resilience, diversification of risks, competition and systemic risks. Historically, the bancassurance model emerged in France in the 1980s as a response to the development of the life insurance market. Therefore this model addressed industrial objectives more than it pursued a diversification objective: bancassurance groups allowed their managers to optimise the branch network for the distribution of life insurance products.

In the European Union, the identification criteria and the rules applicable to the oversight of financial conglomerates are specified in a European directive dated 2002, called "FICO" directive. Three cumulative conditions are needed for the implementation of the FICO status: (i) the head of the group must be a "regulated entity"; (ii) at least one entity of the group belongs to insurance sector and at least another belongs to the banking and investment services sector; (iii) the consolidated or aggregated activities of the group in the insurance, banking and investment services sectors must be significant, with a ratio of the total balance sheet in the financial sector to the total balance sheet of the group higher than 40 percent.

The literature on financial conglomerates is both scarce and inconclusive. It often focuses on whether the concept of conglomerate discount developed in corporate finance theory can be applied to financial conglomerates or not. The "conglomerate discount" refers to the lower value of the stock of a company operating in multiple, unrelated businesses, applied by markets compared to the stock of companies with narrower focuses because of limited synergies with the core business of the firm (Lamont and Polk (2002); Burch and Nanda (2003)). Typically, conglomerate discounts can be observed when companies divest parts of their activities that have limited synergies with their core businesses. However, the literature rather finds that the conglomerate discount does not apply to financial conglomerates, using either US data (Elsas et al. (2010)) or European data (van Lelyveld and Knot (2009)). First, banking groups often enjoy a public guarantee on the value of their deposits, undermining the Modigliani-Miller theorem (Modigliani and Miller (1958)). Therefore, it cannot be demonstrated that the value of a financial conglomerate is independent of the structure of its funding. Second, the benefits of diversification of banks towards other financial activities seem to be well perceived by rating agencies (FitchRatings (2019)), whose rating decisions have an impact on banks' funding costs.

On the opposite side, some studies do emphasize a substantial and persistent conglomerate discount among financial intermediaries (for example Schmid and Walter (2009) on a US dataset). Recent literature has attempted to explain why diversified banks (i.e. financial conglomerates) trade at a discount compared to a matched portfolio of specialized stand-alone banks by the fact that these diversified banks have asset returns with lower skewness (Bressan and Weissensteiner

(2021)).

There is no consensus either on the cost and benefit balance of diversification for financial conglomerates. Benefits would stem from a boost in revenue and a reduction in costs resulting from functional diversification and economies of scale and scope; they would exceed the costs of increased complexity and the associated agency costs (Baele et al. (2007)). Another benefit could result from the complementarity in the structure of funding between banks and insurance companies: banks typically have a positive duration gap in their balance sheets. Their liabilities, made of sight deposits mostly, have a short maturity while their assets, comprising loans to non-financial customers, have a long maturity. The opposite is true for the life insurers: their liabilities are made of long-term insurance premia whose maturity tends to exceed the maturity of their assets. Combining these two types of funding models in a consolidated structure might enable the parent company to diversify and better hedge liquidity risks. In addition, the financial conglomerate ensures the financial solidarity between the different entities of the group. Finally, another benefit could result from business synergies, as banks' branch networks can be used to distribute insurance products, such as life insurance contracts.

On the negative side, as regards financial conglomerates having a banking parent company, the new activities in which banks tend to diversify are found to be more volatile than traditional interest-bearing activity (Stiroh and Rumble (2006)). Moreover, the effect of geographic diversification on bank risk and return is found to depend on the bank's size and to be positive for small and very large banks only (Meslier-Crouzille et al. (2016)). In addition, intragroup exposures might create contagion risks and increase interconnectedness between entities. This may entail systemic risks in a financial crisis. For example, during the Global Financial Crisis (2007-2009), there was evidence of a correlation in default risks between parent banks and their subsidiaries, especially the foreign ones, due notably to the parent company's action to rapatriate liquidity at the central level (Anginer et al. (2017)). However, this finding does not concern insurance subsidiaries necessarily but rather banking subsidiaries or investment funds.

This paper does not address the issue of the financial conglomerate discount but investigates the research question of the relative resilience of French bancassurance groups in terms of volatility of profits and stability of intragroup funding. By doing so, it fills a gap in the literature and in supervisory practices, as supervisory stress tests of financial institutions usually treat banks and insurance companies separately and not at a consolidated level, a point highlighted by the IMF (International Monetary Fund (2019)). In particular, the paper will describe the intragroup refinancing structure, discuss the stability of intragroup exposures, and assess the relative profitability and liquidity risks within French financial conglomerates.

The remainder of this paper is organized as follows. Section 4 presents some descriptive statistics on the funding structure of some French bancassurance groups and simple correlation analysis. The results of the econometric regressions are presented and interpreted in Section 5. Section 6 concludes.

## 4 Data and descriptive statistics

### 4.1 Data

Two different supervisory databases were used for this study. First, we exploited the Conglomer reporting files sent by seven French groups (BNP Paribas, BPCE, Groupe Cr dit Agricole, Groupe Cr dit Mutuel, HSBC Continental Europe, La Banque Postale, Soci t  G n rale) at a half-yearly frequency since 2015. This compilation resulted in a balanced panel dataset of 7 groups, covering 13 periods (2015S2 - 2021S2), and the Covid-19 crisis in particular. This database allowed us to compare the financial conglomerates one with another. Second, files on intragroup positions from the banking side were extracted from the BAFI/SURFI database on a solo basis, at a quarterly frequency since 1993. This database was used to compare exposures within financial conglomerates with intragroup exposures in other groups.

The Intragroup operations sheets of the Conglomer files provide the breakdown of the refinancing operations between the banking part and the insurance part of the conglomerate between four categories on an aggregate basis: short-term debt, medium- and long-term debt, own funds instruments and off balance-sheet items. There is a total of twelve sub-items: current and term accounts, loans, repo, debt on borrowed securities, negotiable debt instruments, both at short-term and medium- and long-term, subordinated debt, senior debt, held for trading items; guarantees, commitments and other off-balance sheet items.

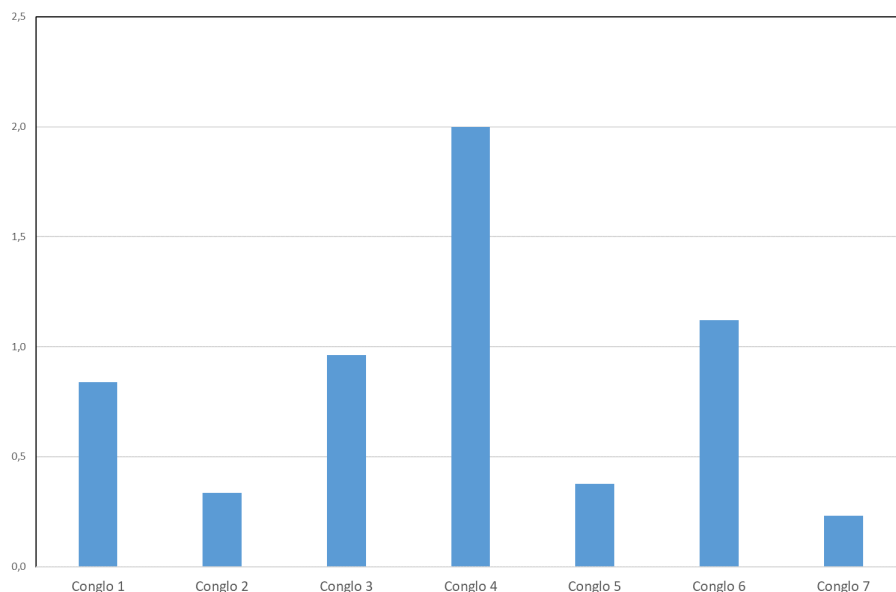
Finally, publicly-available and commercial databases were used to get macroeconomic and macrofinancial data, notably GDP growth and the Consumer Price Index (CPI) inflation rate (from Insee) and financial market indices (from Bloomberg). The latter include the Chicago Board Options Exchange SPX Volatility (VIX) Index, an indicator for worldwide risk aversion, but also liquidity in international markets as liquidity is inversely correlated with volatility. We expect a negative sign on the coefficient of this variable in the liquidity equation as the higher the VIX index, the higher the investors' risk aversion, the lower market liquidity and thus the lower funding liquidity expected for banks.

Our models are estimated on a quarterly basis. Therefore, we calculated simple quarterly averages for series having a higher frequency, namely financial variables and the consumer price index. As regards series with a lower frequency (net result, ROA), we annualized the half-yearly result and interpolated the series.

### 4.2 Descriptive statistics

As regards the comparison between financial conglomerates, a first observation that can be made concerns their heterogeneity in terms of insurance business share and intragroup refinancing patterns. First, the share of the insurance business result in the group's total net result varies from 6 percent to 30 percent. Second, although the 7 conglomerates in the database have a banking holding company, the relative weight of the refinancing operations amount of the banking part vs. the insurance part differs significantly from one conglomerate to another. Whereas the amount of the refinancing operations of the banking part vis- -vis the insurance part exceeds that of the

Figure 1: Share of intragroup financing in total funding at end-December 2021 (in %)



Source: ACPR

insurance part vis-à-vis the banking part in three conglomerates on average across the period of observation, four exhibit a higher amount of the refinancing operations of the insurance part. This means that in three conglomerates, the banking part has a net borrowing position vis-à-vis the insurance part. In the other four conglomerates, the banking part has a net creditor position vis-à-vis the insurance part. This implies different liquidity risk sharing mechanisms between the entities from one conglomerate to another. However, these net creditor/debtor positions are not stable from one date to another. For example, as of end-2021, the latest date of observation, only two financial conglomerates exhibit an amount of the refinancing operations of the banking part vis-à-vis the insurance part exceeding that of the insurance part vis-à-vis the banking part.

Moreover, the share of intragroup funding in total funding (liabilities + capital) varies in a magnitude of 1 to 10 from one financial conglomerate to another, with a minimum share of 0.2 percent in a conglomerate at end-December 2021 to a maximum of 2 percent in another (see Figure 1). Therefore, this share appears moderate. Moreover, it is relatively stable across time within each conglomerate.

Overall, financial conglomerates rely mostly on medium and long-term debt for their intragroup refinancing, with an average share of 67 percent regarding the banking part (see Table 1). Heterogeneity between conglomerates should be noted again as at some dates, the share of short-term debt in some conglomerates reached 67 and even 100 percent (see Figure 2). In any case, own funds make up a small part of total intragroup refinancing, with an average share of below 5 percent. Finally, the relative weight of intra-group financing vis-à-vis off balance sheet items varies greatly from one conglomerate to another.

In more details, senior debt is the instrument most widely used by banking entities in their intragroup refinancing, followed by current accounts, medium- and long-term debt on borrowed securities and medium- and long-term commercial papers, with shares exceeding 10 percent.

The picture is significantly different for the insurance part, with refinancing patterns very polarized (see Table 2). The insurance parts of financial conglomerates rely mostly on short-

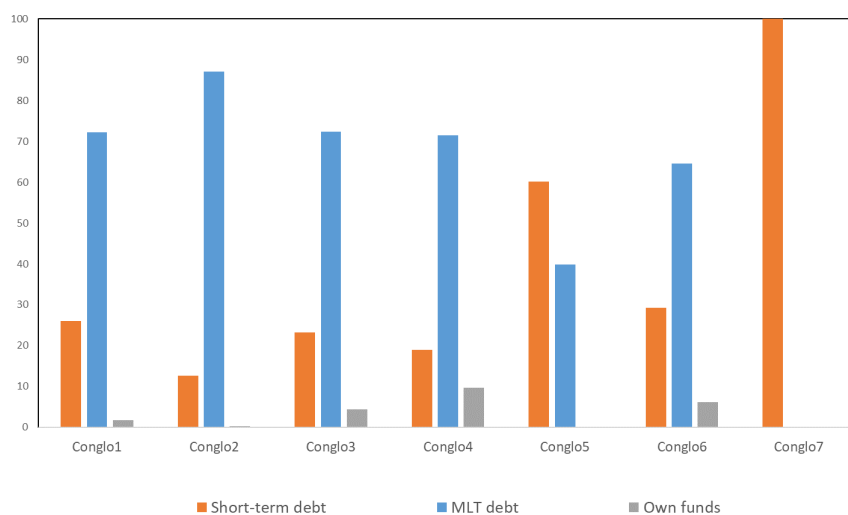


Table 1: Structure of intragroup financing (in %): Banking part

Variable	Obs.	Mean	Std. Dev.	Min	Max
Short-term debt	79	29.3	25.3	3,5	100
<i>o/w Repos</i>	65	2.0	7.9	0	50.6
<i>o/w Debt on borrowed Securities</i>	73	1.8	4.1	0	16.9
Medium- and long-term debt	79	67.1	25.6	0	96.5
Own funds	79	3.6	5.6	0	31.6
Total intragroup financing (as a share of the sum Intragroup funding+OBS)1/	79	40.5	35.5	1.1	100
Off balance sheet (as a share of the sum Intragroup funding+OBS)1/	79	59.5	35.5	0	98.9

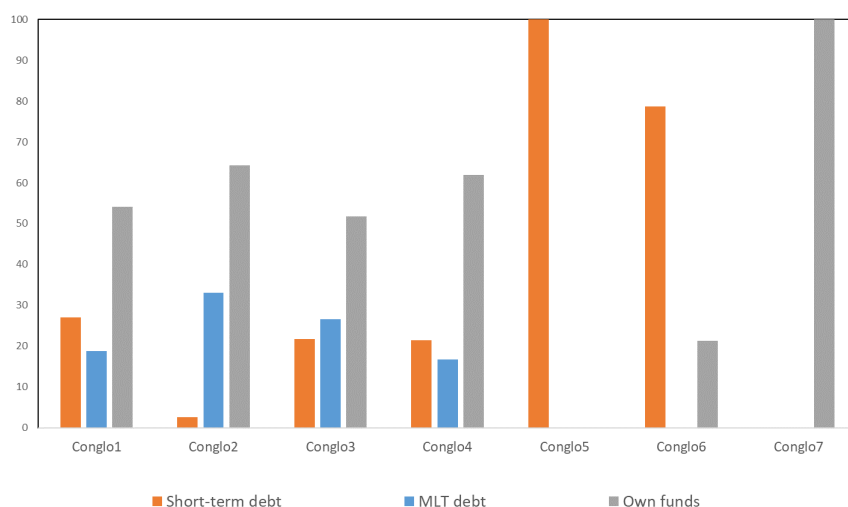
Note: 1/ OBS: Off Balance sheet Source: ACPR

Figure 2: Structure of intragroup financing (in %): Banking part



Source: ACPR

Figure 3: Structure of intragroup financing (in %): Insurance part



Source: ACPR

term debt and own funds for their intragroup refinancing. This reflects the fact that the holding companies of the 7 financial conglomerates under study are banks and their financial links with their insurance subsidiaries is made of capital participation. It should be noted that in one conglomerate the share of own funds financing in insurance entities is nil (see Figure 3), consistently across the dates of observation. Finally, the insurance entities of financial conglomerates seem to rely less on off balance sheet financing from the group than the banking entities.

In more details, short-term repo transactions and current accounts are the instruments most widely used by insurance entities in their intragroup refinancing, with shares of close to 30 and 15 percent, respectively.

Table 2: Structure of intragroup financing (in %): Insurance part

Variable	Obs.	Mean	Std. Dev.	Min	Max
Short-term debt	81	40.4	36.6	0	100
<i>o/w Repos</i>	70	30.9	32.7	0	99.9
<i>o/w Debt on borrowed Securities</i>	60	0	0	0	0
Medium- and long-term debt	81	15.3	15.0	0	62.3
Own funds	81	44.4	26.9	0	100
Total intragroup financing (as a share of the sum Intragroup funding+OBS)1/	72	74.1	26.5	18.2	100
Off balance sheet (as a share of the sum Intragroup funding+OBS)1/	72	25.9	26.5	0	81.8

Note: 1/ OBS: Off Balance sheet Source: ACPR

### 4.3 Stability of intragroup financing

Overall, the amount of the refinancing operations of the banking part exhibits a much higher volatility than the amount of refinancing of the insurance part, with an average standard deviation of the half-yearly growth of these items of 77 and 24 percent, respectively.

Four items stand out with the highest volatility at the 6-month horizon:

- the short-term debt on borrowed securities of the banking part;

- the medium and long-term debt on borrowed securities of the banking part;
- the current and short-term accounts of the insurance part;
- and the short-term debt on borrowed securities of the insurance part.

This confirms that even within a conglomerate, short-term debt is much more volatile than medium- and long-term debt. However, this volatility depends on the macroeconomic and financial current situation and is linked to the greater ability of financial conglomerates to borrow in financial markets, in particular in the short term.

As regards the comparison between institutions belonging to a financial conglomerate and other banking institutions, every bank-specific variable has been winsorized at the 5th and 95th percentiles to get rid of extreme values. The difference between the two groups are always statistically significant, albeit not always very large. On average, entities that belong to a financial conglomerate exhibit a larger size than the others in terms of total assets but their number of observations is much lower. In terms of aggregate size, the total asset share of entities belonging to a financial conglomerate amounts to 77 percent of the total banking sector assets over the whole period of observation, and even to 85 percent during the most recent period, reflecting a concentration trend. It can be noted that on average financial conglomerate entities exhibit a lower Return on Assets and a lower standard deviation of their ROA over a three-year rolling window, but a higher standard deviation of the growth in intragroup funding. Entities belonging to a financial conglomerate also exhibit a higher 3-year rolling Z-score, a measure of banks' default risk, calculated at the ratio of the sum of the backward moving averages of the Return on assets and the leverage ratio over a 3-year rolling window, divided by the standard deviation of the ROA over 12 quarters (see Equation 1 and Table 3). The Z-score indicates the number of standard deviations that a bank's ROA has to fall below its expected value before its equity or own funds become depleted. Therefore, it measures a bank's default risk: the higher the Z-score, the lower the bank's probability of default.

$$Zscore_{i,t} = \frac{\overline{ROA}_{i,t} + \overline{Leverage}_{i,t}}{SdROA_{i,t}} \quad (1)$$

where  $\overline{ROA}_{i,t}$  and  $\overline{Leverage}_{i,t}$  are backward moving averages of the ROA and the leverage ratio ( $\frac{Equity}{TotalAssets}$ ) over a 3-year rolling window.

As regards the bank-specific control variables other than size, entities belonging to a financial conglomerate display a lower average risk density, solvency ratio and Non Performing Loan ratio. By contrast, for the business models of the entities, approximated by the share of loans to the non-financial customers in total assets, it can be noted that the share for entities belonging to a financial conglomerate is 9 percentage points higher than the share for entities not belonging to a conglomerate. This likely reflects the more specialised activity of entities outside financial conglomerates.

Table 3: Descriptive statistics of the main variables- Differences between entities belonging and not belonging to a financial conglomerate

Dummy variable: Conglo or Non-conglo	Conglo: Obs	Conglo: Mean	Conglo: SD	Nonconglo: Obs	Nonconglo: Mean	Nonconglo: SD	Difference: Mean	Difference: Std. Error	t-test
Model variables									
ROA (in %)	36,907	1.01	2.08	77,631	1.07	3.00	-0.06	0.02	3.725***
Sd_ROA (in %)	36,910	0.56	0.86	76,594	1.08	1.31	-0.52	0.1	69.64***
Z-score	13,235	95.55	66.93	29,134	58.03	59.40	37.53	0.65	57.88***
Std. dev. of growth in intragroup funding (in %)	20,137	100.84	104.51	28,869	97.44	101.75	3.40	0.94	3.603***
Size (asset market share, in %)	36,907	0.21	0.97	77,631	0.05	0.32	0.16	0	41.86***
Solvency ratio (in %)	14,478	24.66	35.72	41,404	47.71	51.93	-23.06	0.47	49.48***
Risk density (in %)	36,907	24.03	36.63	77,631	36.22	44.87	-12.19	0.27	45.49***
Loan share in total assets (in %)	30,766	49.55	32.77	62,184	40.59	33.69	8.96	0.23	38.50***
NPL ratio (in %)	30,310	5.32	10.39	60,970	5.95	11.951	-0.62	0.08	7.726***

Source: ACPR

Table 4: Correlation between main variables

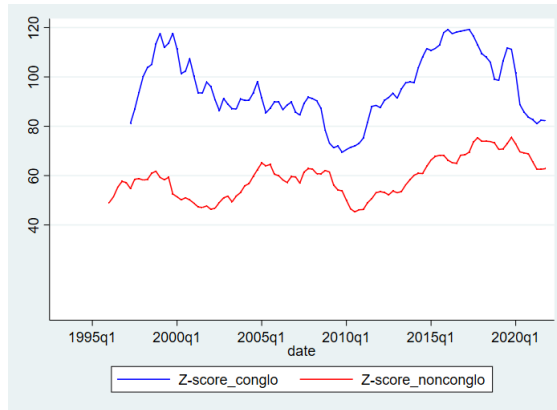
	ROA	SdROA	Z-score	Std. dev. in Intragroup Funding	Size	Solvency ratio	Risk density	Loan share	NPL Ratio	GDP Growth	Euribor-OIS spread
ROA	1.0000										
SdROA	0.2058*** (0.0000)	1.0000									
Z-score	-0.0736*** (0.0000)	-0.4682*** (0.0000)	1.0000								
Sd Intragroup Funding growth	-0.0310*** (0.0139)	0.0058 (0.1995)	-0.1008*** (0.0000)	1.0000							
Size	-0.0371*** (0.0000)	-0.0897*** (0.0000)	0.0055 (0.2593)	-0.0517*** (0.0000)	1.0000						
Solvency ratio	0.0927*** (0.0000)	0.3092*** (0.0000)	-0.0284*** (0.0000)	-0.0281*** (0.0002)	-0.0766*** (0.0000)	1.0000					
Risk density	0.0464*** (0.0000)	0.0592*** (0.0000)	0.0716*** (0.0000)	-0.0764*** (0.0000)	-0.0367*** (0.0000)	-0.3289 (0.0000)	1.0000				
Loan share	-0.0916*** (0.0000)	-0.2844*** (0.0000)	0.2413*** (0.0000)	-0.0514*** (0.0000)	-0.0575*** (0.0000)	-0.3081 (0.0000)	0.0578*** (0.0000)	1.0000			
NPL ratio	-0.0168*** (0.0000)	0.1580*** (0.0000)	-0.0227*** (0.0000)	-0.0394*** (0.0000)	-0.0486*** (0.0000)	0.0701*** (0.0000)	0.0915*** (0.0000)	-0.1028*** (0.0000)	1.0000		
GDP growth	0.0226*** (0.0000)	0.0022 (0.4592)	-0.0120*** (0.0132)	0.0209*** (0.0000)	-0.0111 (0.0002)	0.0276*** (0.0000)	-0.0249*** (0.0000)	0.0001*** (0.9799)	-0.0110*** (0.0012)	1.0000	
Euribor-OIS spread	0.0052 (0.1410)	0.0261*** (0.0000)	-0.0303*** (0.0000)	0.0913*** (0.0000)	0.0015 (0.6619)	-0.0828*** (0.0000)	0.0346*** (0.0000)	0.0290*** (0.0000)	-0.0170*** (0.0000)	-0.2542*** (0.0000)	1.0000

**Note:** p-values are mentioned in brackets, as an indicator of confidence.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

**Sources:** ACPR, INSEE and Bloomberg - Author's calculations.

Figure 4: Evolution of the Z-score for banking entities belonging to a financial conglomerate and other banking entities



Source: ACPR

A correlation analysis between the ROA, its standard deviation, the Z-score, the growth in intragroup funding, macrofinancial variables and the bank-specific control variables shows a moderate but significant correlation (see Table 4).

Finally, Figure 4 shows the parallel time profile of the average (unweighted) Z-score for entities belonging to a financial conglomerate and those not belonging to such a group since 1993. It shows a similar time profile of the series for the two groups of entities, although the Z-score of entities participating in financial conglomerates stand at a higher level than that of external entities over the entire period.

## 5 Empirical estimation

### 5.1 Model set-up

We now want to determine whether the participation of an entity in a financial conglomerate has an impact or not on the ROA and the standard deviation of the ROA, its Z-score, taken as a measure of default probability, and on the volatility of the intragroup funding growth. To that end, we estimate four models with the four different dependent variables just mentioned. Our explanatory variables are macroeconomic, financial and conglomerate-specific as we want to determine the sensitiveness of resilience measures to changes in macroeconomic and financial conditions. Our explanatory variables are the following:

- an aggregate financial risk variable taken from Bloomberg, namely the Chicago Board Options Exchange SPX Volatility (VIX) Index, an indicator for worldwide risk aversion. We identify periods of high level of the VIX index with a dummy variable equal to 1 when the current value of the VIX index exceeds the median value of the distribution. They denote periods of higher financial instability and risk aversion. We expect a positive sign on the coefficient of this variable for the estimation of result growth volatility: as investors' risk aversion gets higher, the financial situation becomes more unstable and benefits should become more volatile. Likewise, a positive sign is expected on the coefficient of the variable for the intragroup funding growth estimation as the higher the VIX index, the higher market volatility and

thus the larger the intragroup funding to offset the decline in market funding. However, groups' practice consisting in centralising the issuance of debt securities for the whole group in a single entity might blur the effect of funding market developments on the funding of the group's other entities. Our empirical strategy might allow us check whether parent companies tend to rapatriate the liquidity from their subsidiaries during crisis times. Finally, a negative sign is expected on the high VIX dummy for the estimation of the Z-score as banks' risk-adjusted profitability is expected to decline in periods of higher financial risks;

- another aggregate financial variable: the 3-month Euribor rate or the spread between the 3-month Euribor rate and the Eonia swap rate. The Eonia swap rate is taken as the risk-free rate while the 3-month Euribor rate reflects banks' funding costs and the transmission of monetary policy. The spread between the two rates is a standard indicator of banks' liquidity risk and default risk as valued by financial markets. A negative sign is expected on the coefficient of this variable in the estimation of banks' profitability and the Z-score as an increase in the Euribor rate should reduce banks' net interest margin and thus their profits;
- a macroeconomic variable, namely GDP growth, taken from INSEE (French National Statistical Institution). This variable is expected to have a positive effect on the Z-score as a more buoyant economic activity is supposed to result in higher financial income and to reduce credit risk, and an ambiguous effect on net result growth volatility and intragroup funding growth;
- bank-specific control variables taken from the SURFI database (French Prudential Supervision and Resolution Authority/Banque de France). They comprise a risk variable captured by the average risk density of a bank's assets, defined as the ratio of risk-weighted assets to total assets; the solvency ratio calculated as the ratio of total own funds to risk-weighted assets; the size of the institution; and a ratio capturing the bank's business model, namely the share of loans to non-financial customers in total assets, that can be also seen as the inverse of a liquidity ratio. Indeed, loans to non-financial customers are the least liquid assets in a bank's balance sheet. All bank-specific control variables are lagged to avoid endogeneity issues;
- and a dummy variable for financial conglomerate membership built from the "Etat civil" database: it takes the value of 1 for the entities belonging to the 7 financial conglomerates abovementioned that report the Conglomer files and those belonging to two other financial conglomerates identified by the FICO directive: AXA Group and Neuflyze Bank. The dummy variable takes the value of 0 for the other entities. It is time-varying.

Our models are estimated on a quarterly basis. Therefore, we calculated simple quarterly averages for series having a higher frequency, namely financial and macro variables, and interpolated banks' income statement items that have a lower (half-yearly) frequency. We end up with a panel of 1,966 banks and 114,538 observations. Among these observations, there are 756 points at which an entity entered a financial conglomerate and 182 at which an entity exited a financial conglom-

erate. We start the period of estimation in 1996Q1 given the 3-year backward rolling window used for several of the dependent variables. The period of estimation ends at 2021Q4.

We estimate a panel model with fixed effects. The reduced form of our equations can be read as follows for bank  $i$ :

$$Y_{i,t} = \phi dconгло_{i,t} + \delta dhighvix_t + \eta dhighvix_t * dconгло_{i,t} + \beta X_t + \lambda Z_{i,t-1} + \alpha + \sigma_i + \eta_t + \epsilon_{i,t} \quad (2)$$

where  $Y$  is the dependent variable;  $dconгло$  a dummy variable denoting financial conglomerate membership;  $dhighvix$  a dummy variable denoting periods of financial instability;  $dhighvix_t * dconгло_{i,t}$  an interaction term between the high Vix dummy variable and the financial conglomerate dummy;  $X$  a vector of explanatory macroeconomic variables;  $Z$  a vector of bank-specific control variables;  $\alpha$  the intercept,  $\sigma_i$  denotes individual bank fixed effects,  $\eta_t$  time fixed effects;  $\epsilon$  the vector of error terms;  $\phi$ ,  $\delta$ ,  $\eta$ ,  $\beta$ , and  $\lambda$  are vectors of coefficients to be estimated.

In this equation, our variable of interest is  $\eta$ , the coefficient of the interaction term between the financial conglomerate membership and the high VIX dummy variables as we want to shed light on the impact of financial conglomerate membership on the volatility of profitability and default risk in financial instability periods. In an ideal set-up, we would have liked to design a natural experiment by estimating a difference-in-difference model. However, we were not able to identify an exogenous event affecting entities composing a financial conglomerate specifically. Therefore, we tried to implement an alternative approach as a proxy in which exogenous events are identified by periods of financial instability. The identification relies on a between-approach rather than on a within-approach.

Moreover, one could consider that a bank's decision to enter a financial conglomerate is itself endogenous and might depend on the performance and strategy of the head of the group and the entity itself. In that case, the financial conglomerate membership could be correlated with the error term. To remedy this bias, we tried to carry out a Heckman correction (Heckman (1979)) and to estimate an instrumental variables model in which the financial conglomerate membership dummy was instrumented by the same macroeconomic and bank-specific control variables as in the main equation. However, the number of entries into a financial conglomerate was found to be too low compared to the total number of observations (0.6 percent) to really change the results of the main equation. Moreover, in a logit estimation, the financial conglomerate dummy variable was not found to be significantly affected by the explanatory variables included in the main equation.

## 5.2 Results

We first examine the baseline estimation of the Return on Assets, a standard measure of profitability normalised by the bank's assets. Results are displayed in Table 5. Overall, the explanatory power of the model is low, with an R-squared of 2 percent only. The results on the whole period in column 1 indicate an insignificant impact of the financial conglomerate membership on the ROA, either in low VIX or high VIX periods. By contrast, as expected, periods of high VIX result in a decline in the ROA (significant coefficient of -26.09), while the Euribor rate has an unexpected pos-



itive impact on the bank's profitability whereas it is meant to capture banks' funding costs. This positive effect of the Euribor rate may reflect banks' market power that enables banks to increase their net interest margin in periods of market interest rate rise. GDP growth turns out to have a positive and significant effect on the ROA, as expected, only when we exclude the 2020/2021 health crisis due to its exceptional character (column 2). As regards bank-specific control variable, their effect on the ROA is usually not statistically significant. The absence of financial conglomerate membership impact on banks' profitability requires further investigation.

Table 5: **Results of the estimation of the ROA**

VARIABLES	(1) Whole period	(2) Without health crisis
$d_{HighVix} * d_{Conglo}$	-0.058 (0.058)	-0.118* (0.064)
$d_{Conglo}$	0.116 (0.104)	0.120 (0.105)
$d_{HighVix}$	-26.089*** (10.089)	-2.287 (2.720)
GDP	0.465 (0.419)	15.438** (6.125)
Euribor	6.873*** (2.649)	0.543 (0.766)
$Size_{t-1}$	-0.061 (0.091)	-0.078 (0.096)
$Risk\ density_{t-1}$	-0.000 (0.002)	0.000 (0.002)
$Solvency\ ratio_{t-1}$	-0.001 (0.002)	-0.001 (0.002)
$Loan\ share_{t-1}$	0.005* (0.003)	0.004* (0.003)
Constant	4.343*** (1.495)	0.599 (0.398)
Bank Fixed Effects	YES	YES
Time Fixed Effects	YES	YES
Observations	33,682	31,396
R-squared	0.023	0.020
Number of banks	842	832

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Sources: ACPR, INSEE and Bloomberg - Author's calculations

Next, we want to measure bank risk-taking to determine whether financial conglomerate membership can increase moral hazard by incentivising banks to take on more risks due to the insurance that they would be backed by the group. To that end, we estimate the standard deviation of the ROA over a 3-year backward rolling window. Results are presented in Table 5. The very significant and negative coefficient on the interaction term between the financial conglomerate membership dummy and the high VIX dummy indicates that the effect of this membership is statistically different in periods of high VIX: it has then a stronger dampening effect on the volatility of the ROA than during calmer periods. This invalidates the moral hazard assumption. As regards the

effect of bank-specific control variables, the standard deviation of the ROA increases with the asset risk density and the solvency ratio of the entity but decreases with the the share of loans to non-financial customers. Macroeconomic and financial variables as well as the size of the entity do not seem to have a significant effect on the standard deviation of the ROA.

Table 6: **Results of the estimation of the 3-year rolling Std. dev. of the ROA**

VARIABLES	(1) Whole period	(2) Without health crisis
$d_{HighVix} * d_{Conglo}$	-0.087*** (0.025)	-0.118*** (0.029)
$d_{Conglo}$	-0.044 (0.061)	-0.013 (0.061)
$d_{HighVix}$	-2.311 (2.084)	-1.198 (0.873)
GDP	0.083 (0.137)	-2.542 (2.252)
Euribor	0.594 (0.547)	0.354 (0.249)
$Size_{t-1}$	-0.042 (0.037)	-0.043 (0.042)
$Risk\ density_{t-1}$	0.004*** (0.001)	0.004*** (0.001)
$Solvency\ ratio_{t-1}$	0.002*** (0.001)	0.002*** (0.001)
$Loan\ share_{t-1}$	-0.009*** (0.001)	-0.009*** (0.001)
Constant	1.106*** (0.326)	0.855*** (0.153)
Bank Fixed Effects	YES	YES
Time Fixed Effects	YES	YES
Observations	33,742	31,445
R-squared	0.063	0.065
Number of banks	842	832

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Sources: ACPR, INSEE and Bloomberg - Author's calculations

We then estimate the Z-score, a comprehensive profit resilience measure, whose results are displayed in Table 7, as an alternative specification. As explained before, the Z-score is a finer measure of a bank's resilience than the ROA or the standard-deviation of the ROA as it takes into account the level of capital and is risk-adjusted. The picture is significantly different from the previous results. The first column refers to the whole period while the second provides results on the period without the 2020/2021 health crisis. When we add the very significant and positive coefficient on the financial conglomerate membership (15.78) and the coefficient on the interaction term between this dummy and the high VIX dummy variable (-3.59), we find a largely positive effect of the financial conglomerate membership on the Z-score. However, this effect is not statistically different between low VIX and high VIX periods as the coefficient on the interaction term is insignificant. The results are broadly unchanged when the health crisis is excluded (column 2),

except for the macroeconomic and financial variables whose effect on the Z-score becomes significant when the health crisis period is excluded. For the high Vix dummy variable in particular, its effect becomes large, with a coefficient of -11.81, and very significant when the 2020/21 years are taken out, whereas its effect is not statistically significant over the whole period. The counterintuitive negative and significant coefficient on GDP growth when we exclude the health crisis periode (coefficient of -530.97) may stem from the effect of GDP growth on equity buffer, that forms a part of the Z-score. Due to precautionary motives, banks tend to increase the size of their capital buffers in times of stress or recession and to reduce them in good times.

Table 7: Results of Z-score estimation

VARIABLES	(1) Whole period	(2) Without health crisis
$d_{HighVix} * d_{Conglo}$	-3.592 (2.632)	-1.843 (2.995)
$d_{Conglo}$	15.775*** (5.368)	15.900*** (5.579)
$d_{HighVix}$	-0.184 (8.833)	-11.805** (5.188)
GDP	-5.338 (4.916)	-530.973*** (170.478)
Euribor-OIS spread	8.162 (66.356)	478.466*** (177.167)
$Size_{t-1}$	7.939 (11.609)	9.177 (13.842)
Risk $density_{t-1}$	0.248*** (0.064)	0.193*** (0.061)
Solvency $ratio_{t-1}$	0.258*** (0.063)	0.199*** (0.060)
Loan $share_{t-1}$	0.252*** (0.081)	0.178** (0.077)
Constant	34.772*** (8.584)	45.962*** (10.922)
Bank Fixed Effects	YES	YES
Time Fixed Effects	YES	YES
Observations	30,092	27,980
R-squared	0.075	0.075
Number of banks	736	721

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Sources: ACPR, INSEE and Bloomberg - Author's calculations

Finally, we estimate the 3-year rolling standard-deviation of the year-on growth in funding received from the group on the liability side to assess the effect of financial conglomerate membership on liquidity stability. Results are shown in Table 8. The first column presents the results of the same specification as before, interacting the financial conglomerate membership dummy with the high Vix dummy variable. The sum of the negative and significant coefficient of this interaction

term (-15.48) and of the negative coefficient on the financial conglomerate membership dummy (-7) is very negative. This suggests that financial conglomerate membership has a dampening effect on intragroup funding volatility, and this effect is statistically different and even stronger in high Vix periods. Column 2 shows that this effect hold even when we exclude the recent health crisis period. Therefore, the effect of the financial conglomerate membership on intragroup funding volatility seems to be non-linear and to be significantly stronger in periods of high VIX.

Table 8: Results of estimation of Std. dev of Intragroup Funding Growth

VARIABLES	(1) Whole period	(2) Without health crisis
$d_{HighVix} * d_{Conglo}$	-15.481*** (5.800)	-14.307** (6.779)
$d_{Conglo}$	-6.996 (11.827)	-5.854 (12.119)
$d_{HighVix}$	-7.723 (150.386)	-17.485 (118.298)
GDP	-10.075 (360.275)	-111.963 (213.016)
Euribor	10.175 (227.739)	16.938 (32.844)
$Size_{t-1}$	-0.589 (4.148)	0.333 (4.080)
Risk $density_{t-1}$	0.039 (0.131)	0.006 (0.133)
Solvency $ratio_{t-1}$	-0.210* (0.125)	-0.165 (0.126)
Loan $share_{t-1}$	0.197 (0.207)	0.168 (0.209)
Constant	77.045 (250.782)	70.055*** (20.399)
Bank Fixed Effects	YES	YES
Time Fixed Effects	YES	YES
Observations	13,482	12,718
R-squared	0.071	0.073
Number of banks	391	386

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Sources: ACPR, INSEE and Bloomberg - Author's calculations

## 6 Conclusion

This study is aimed at shedding light on the effects of financial conglomerate membership on banks' profitability, risk-taking, default risk and intragroup funding resilience. To that end, we estimate models of the entities' Return on Assets (ROA), the standard deviation of the ROA, the Z-score, a measure of banks' default risk, and intragroup funding standard deviation, using quarterly supervisory data available at the ACPR on a solo basis for French banks. We find that the financial conglomerate membership has a dampening effect on the volatility of the ROA and of

intragroup funding growth, an effect that is even stronger in periods of financial stress. Moreover, financial conglomerate membership is found to reduce banks' default risk as it has a positive effect on a bank's Z-score overall. By contrast, no significant effect is shown on the ROA. By and large, these results invalidate the moral hazard assumption associated with financial conglomerates but rather highlight financial solidarity mechanisms within conglomerates.

Further extension of our analysis could consist in bringing an international perspective into the research question, in using a continuous variable capturing bancassurance activity and in comparing French "bancassurance" groups to other international banking groups. A network analysis could also shed light on the transmission of shocks through interconnections within each financial conglomerate.

Finally, the specificity of the activity of financial conglomerates requires a close cooperation between the supervisors of the different segments of the financial system (banking, insurance and financial markets), as currently carried out by the Joint Committee of the European Supervisory Authorities. As requested by the IMF, a step further could be made by implementing regular stress tests of financial conglomerates at the highest level of consolidation.

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