Banking Behaviour in Large-Scale Crises: Lessons from History

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Abstract

This paper aims to explore the way banks modified their behaviour after the subprime crisis. Historical evidence suggests that enhanced regulation requirements generally follow important financial reversals. Accordingly, a comparison between (1927-1931) and (2006-2009) periods is made. Despite the considerable differences between the 1929 depression and the subprime crisis, banking practices for those two periods were widely affected. By learning lessons from past experience, the purpose is to distinguish between coercion and deliberate strategy. The statistical analysis of the economic and financial impacts that has been carried out for both periods has enabled discussion of notions of resistance and profitability in banks. Finally, we provide evidence that during these crises, changes in strategies are rather proactive. Imposed regulatory constraints do not appear to have been the prime driver of the strategic management of banks.

1. Introduction

The subprime crisis is one of the major crises that banking systems have had to cope with in recent years, and can be considered the epitome of systemic risk. In this context, one of the key questions is to determine the effects that this contemporary crisis has on the way banks deal with profitability issues. To put it another way, in terms of risk appraisal and therefore of profitability, has the behaviour of banks changed

since the crisis? History provides some explanatory elements in which regulation plays an important role (Mitchener *et al.*, 2010), as in the past, the banking system was less regulated. Before World War I there were no controls on international financial transactions and international capital flows reached high levels (Barry Eichengreen, 2008). Banks benefited from this particular industrial period and speculation led them to realize a high level of profits (White, 1984). These unregulated periods are significant: unregulated banking practices did not cause inflation of the money supply. This still holds true today.

Unregulated competition between banks did not automatically imply financial instabilities (Calomoris and Wilson, 1998). Without the government acting as a lender of last resort (Goodhart, 1998), and without any deposit guarantees, stability was possible as depositors were more careful in choosing their banks. In addition, banks had to be more selective in choosing their asset portfolios, in order to attract cautious customers. The interwar period saw the collapse of the financial and banking system, which in turn led to greater control of institutions and markets (Eichengreen, 2008). After World War II, control was gradually relaxed and deregulation enabled banks to undertake any kind of banking activity (Paulet, 2005). Speculation and securitization led banks to adopt more high-risk management.

Today, however, banks benefit from deposit guarantees and lenders of last resort, which gives them considerable protection from failure. It is therefore true to say that when a bankruptcy occurs, it is an expression of a government's will.

The study of banks' balance sheets gives us the opportunity to explore changes in conduct just before and after large-scale crises. We used Principal Component Analysis (PCA) to evaluate the banking behaviour during those periods. Our results

highlight differences among banks. During the 1920s and 30s, NY city banks adopted different strategies to satisfy depositors' preference for low-risk deposit, depending on the costs of issuing equity, shifting from a combination of rising risk-taking and capital in the 1920s to a sharp contraction in the supply of loans and a move into riskless assets[1]. However, their activities were essentially confined to their status. In 2007, universal banks, freed from their statutory straightjackets, adopted a proactive management.

2. Concentration, speculation and risk management: a delicate arbitrage between profit seeking and stability

During the subprime crisis and the great depression banks did not sufficiently avert excessive exposure to risks. The interactions of financial markets facilitated the transmission of systemic risk, which increased the risk of being stuck with uncollectible claims on other banks. This generated liquidity and solvency problems for banks, and governments needed to intervene to avoid bank runs. Could the level of concentration of institutions on the market influence the strategy of banks?

2.1 Concentration and profitability

Banking crises have often resulted in a process of concentration. The aim of this section is to demonstrate the latter by studying the periods of the great depression and the subprime crisis. According to Verdier (2002), the process of concentration is an expression of the converging interests of governments

[1] Calomiris and Wilson (1994).

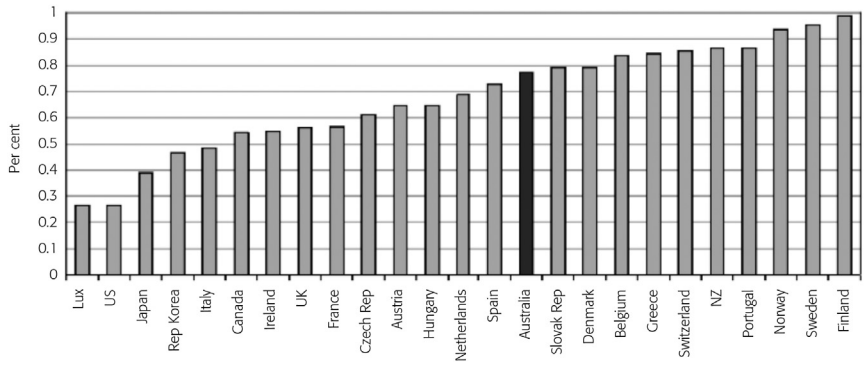
and regulators in consolidation. This reduces the intervention role of states and stabilizes the system. The more profitable a bank is, the more it can benefit from its position in the market. The bank can take advantage by absorbing the more fragile institutions. This can be interpreted as a voluntary move and not a strict constraint emerging from regulation. The second element to influence the resistance to shocks is the continuous appetite of banking institutions to create new products to increase their profit level.

Moreover, Neumark *et al.* (1992), considered that 'banks in concentrated markets are slower to raise interest rates on deposits in response to rising market interest rates, but are faster to reduce them in response to declining market interest rates'. The market power of banks directly influences their management. Here, historical experience shows that there are some tendencies for larger banks to be more efficient, up to a certain size. Banks must be large enough to diversify their assets and liabilities adequately. This does not require being large relative to the entire banking system. In fact, the subprime crisis is a more nuanced situation. Banks had to face liquidity constraints induced by junk funds, and this led to some mergers. The degree to which a bank is integrated in the banking sector is important if one is to appreciate its resistance to systemic shocks (Black *et al.*, 1997). It may constitute a factor of vulnerability, inasmuch as the possible failure of a very large institution would have considerable repercussions on the entire financial system.

These concepts were largely illustrated during the Great Depression. New York City banks during the 1920s and 1930s were large, publicly-traded institutions, which favoured profitability over secure risk management (eg. Calomoris and Wilson, 1998). In Europe, Banca Commerciale and Credito Italiano

were mainly involved in financing industrial companies. Hence, the collapse of the domestic financial market in 1925 forced them to increasingly transform their loans into shares or bonds of manufacturing firms. Profitability and their position in the market were the key factors of their management (eg. Brambilla and Piluso, 2008). Facts were somehow different during the subprime crisis. If concentration influences banking strategy, financial innovations could be a source of profit but also a source of increased risk for the market's main institutions. Moreover, the increased level of competition has forced the banks to increase their size, leading them to more fragility in Europe (cf. Paulet, 2005). In Europe, this phenomenon is extremely important as the concentration index exceeds 50% in the majority of cases. Our argument will be to use balance sheet data from banks to provide empirical evidence of the negative or positive impact of national banking market concentration on the soundness[2] of banks (Fig. 1).

Figure 1
International banking concentration (average 2000-2007)*



* Market share of the four largest banks (1 = 100 per cent).
Source: OECD, from World Bank, Financial Structure Dataset.

[2] For more information on this concept, see Uhde *et al.* (2009).

2.2 Securitization and risk management

For major commercial banks, financial innovations and new products induced an explosion of their off balance sheets (Paul de Grauwe, 2008). For investment banks, the habit was to lend money to hedge funds, while accepting stocks and other securities as collateral. In doing so, these institutions created an unbalanced maturity structure in their balance sheets between assets and liabilities. These attitudes are at the root of a profound systemic risk for the whole banking system. How can this phenomenon be explained?

The 1920s saw a rapid economic expansion, which in combination with financial innovations such as investment trusts led to marked rises in equity values. Stock-market speculation was financed by rapid increases in borrowing. There was a large and broad-based expansion of private debt in the 1920s; outstanding corporate bonds rose from $26 billion in 1920 to $47 billion in 1928 (over 50 per cent of GNP). Small businesses and households increased indebtedness sharply; outstanding mortgages rose from $11 billion in 1920 to $27 billion in 1929. Only White (2009) acknowledges the importance of the 1920s real-estate securities market as a precursor to more modern markets. "More and more," wrote E.H.H. Simmons, President of the New York Stock Exchange in 1929, "real estate organizations have taken the public into partnership with them by adopting the corporate form, and by issuing shares as well as bonds".

Residential mortgage securities, known at the time as "guaranteed mortgage participation certificates (GMPCs)", are included in this study to bring attention to the prominence of more complex securitization. These securities represented pools of residential mortgage cash flows from a geographically diversified nexus of cities and towns across the United States.

They were issued by large title and insurance companies, who generally guaranteed their coupon at 5%. In essence, GMPCs functioned similarly to agency mortgage-backed securities, and while the guarantee did not carry any implicit support by the government, the title and insurance companies were considered among the most stable financial intermediaries. White (2009) links these companies to modern financial intermediaries and outlines the risks they posed to the broader financial system. Hence, securitization process existed during the Great Depression, but without any common measure in comparison to what happened during the subprime crisis. This is what we now intend to explain.

During the 1990s, several things occurred that changed the banking sector. Deregulation, by allowing the entry of new actors, also increased the potential conflicts of interests that existed among them. Simultaneously, the Glass Steagall act was abolished in the United States, most likely because, over time, banks had found ways not to apply it by using subsidiaries to carry out activities they were not allowed to undertake.

In addition, managers and bankers often used new financial engineering techniques (IAAS) to distort information regarding their financial situation (cf. Enron and WorldCom affair). These practices have not served the public and are at the origin of systemic risk. Deregulation has hence created new systemic risk as bankers and financial intermediaries have become more eager to make short-term profits than in the past, which has led to securitization playing a more important role. This constitutes a major difference with the 1929 Depression in comparison with today's context, where securitization, risk management and the size of institutions are the main factors that characterize banking behaviour.

Securitized banking has played an increasing role alon-

gside traditional banking (Gordon and Metric, 2009). Traditional banking is the business of making and holding loans, where insured demand deposits are the main source of funds; securitized banking is the business of packaging and reselling loans, where the main source of funds is repo agreements.

Our paper intends to study banking behaviour during two periods: (1927-1931) and (2006-2009). The question raised by our research is the extent to which the crisis has caused banks to adopt new strategic behaviors (and if so, which ones) beyond the evolution of regulatory imperatives.

3. Banking behaviour over the two crisis periods (1927-1931) and (2006-2009)

To correctly evaluate the banking strategies over these two periods, we intend, first, to highlight their specificities and their influence on performance. We will proceed by emphasizing the key parameters to be taken into consideration when mapping the evolution of risk management during financial shocks.

3.1 Striking similarities

Between 1927-1931, regulation had to be replaced by government intervention. The state stepped in as a lender of last resort, laying out an informal route (formal in the United States' guarantee to depositors, cf. Verdier 2002, and Goodhart, 1988). Central institutions imposed a ratio of state-guaranteed deposits to secure the system. Hence, the 1929 crisis is not only the result of an uncontrolled credit supply. Due to the instability of the financial markets, banking institutions during both periods were prepared to take advantage of the fluctuations of share

prices until the point of rupture of the market. Therefore, they were incapable of anticipating the collapse of asset prices and the consequences for their activities. Our analysis shows that, after the shocks of the Great Depression in 1929, banks did not fundamentally change their everyday practices. The more fragile institutions simply left the market. Commercial banks, with more diversified portfolios, managed to maintain their position in the market without fundamentally changing their risk management. During the interwar period, competition was limited by nationalism and protectionism, which may partially explain the absence of a profound transformation in bank behaviour.

Nowadays, the banking environment has a different competitive framework. The current striking developments in financial integration and corporate governance are directly influenced by uncertainty and an unstable environment, which has led to increased competitive attitudes among banking institutions[3]. This harsher competition has moved banks towards concentration and internationalization[4] as stated in the preceding section.

Concentration is, then, one element to explain the impact of crisis on banking structure. The less concentrate the banking system, the more vulnerable are the institutions (A. Uhde, 2009). If this parameter is not crucial for the actual period as shown in figure 1 (as most banking systems are highly concentrated), the fragility of banking system during the Great Depression is partly explained by the level of concentration. Countries such Canada, United Kingdom and Australia, whose degree of concentration exceed 70%, resisted the crisis much better than USA or Belgium where banking structures were more segmented[5].

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[3] Parnaudeau (2011-a).

[4] See Marois (1997).

[5] For more details see: Herbert Baer and Elizabeth Pongracic, *The development*

3.2 Performance, resistance and management over these two periods

To study banking behaviour during these two specific periods we must examine not only their performance, but also their market share. Between 1927 and 1931 financial markets were not very developed. Hence, it is difficult to evaluate the importance of purely speculative transactions (like securitization). To include this parameter in our analysis, we have characterized banking activities using their statutes.

We distinguish three categories of banks: profit banks, which cover the current commercial banks; non-profit banks, which are represented by savings and deposit banks; and finally state banks. Some explanations are required for the latter category. Due to the lack of long-term finance and commercial banks' inability to provide the necessary level of liquidity to enterprise, state banks aimed to supply large loans and to support (higher) risk of long-term investment (cf. Sayers, 1957).

State credit banks emerged all over the world during this period, and had significant weight in some countries, for example, Belgium or France. In other countries such as Austria, Canada, the United Kingdom or the United States, however, these institutions had a very limited position on the banking landscape.

Two ratios will be used in this analysis: the assets of profit, non-profit and state banks with regard to the whole banking system, and the deposits for the same categories of banks. These elements will provide an insight into the risk taken by different institutions and the way they covered the latter. In general, during the 1927-1931 period banks observed high liqui-

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of Banking Structure in Five Countries, unpublished paper, Federal Reserve Bank of Chicago (1984) and R.S. Grossman and C.M. Meissner, *International Aspects of the Great Depression and the Crisis of 2007*, NBER Working Paper, n. 16269, August 2010.

dity ratios, but this was particularly true for commercial banks. This was supposed to prevent them from speculating on financial markets. Hedging activities did exist in 1920, but were essentially for enhancing efficiency and risk coverage purposes. For that reason, these activities had no common measure with the ones observed in the (2006/2009) period (Battilossi, 2000). Hence, as current ratios refer to sophisticated risk evaluations, they are not relevant for a study of the Great Depression context.

As far as the subprime crisis is concerned, two main factors are emphasized: performance and risk management. In their study of the European banking landscape, Staikouras et al. (2008) used non-interest cost ratios, the asset, liability and funding management of banks to deepen profitability records. In the same perspective, this paper intends to analyze how crises could affect the parameters that determine performance. This refers to risk management.

4. Findings and discussions: banks' behaviour over the two periods

Principal component analysis (PCA) is often used in studies of bank performance and its determinants (both at micro and macro level) as an alternative to DEA (Data Envelop Analysis), SFA (Stochastic Frontier Analysis), or panel approaches such as GMM. Such an analysis is used to identify patterns in the data and clusters of banks with similar characteristics. The study of the positioning of banking institutions just before and after these two crises enables us to perform an interesting analysis of changes in managerial practices. Naturally, there are considerable differences between the 1929 depression and the subprime crisis. It is worth pointing out, however, that for both

periods, the new regulatory constraints do not appear to be the prime driver of the strategic management of banks.

In order to show this, a specific list of indicators has been constructed (Table 1).

TABLE 1
Indicators & Sources

Indicators	Sources
For banking institutions: Equity, Tier 1 & Tier 2, Risk Weighted Assets Net Interest Income Total Income Loan Loss Provisions Cost Income Ratio Total Non-Bank Loans Interbank Loans	Annual reports and in particular balance sheets of the chosen banking institutions **Banks** Abn Amro, Banca Intesa, Banque populaire, Barclays BBVA, BNP Paribas, Caisse d'Epargne, CAIXA Commmerzbank, Credit Suisse, Danske, Deutsche Bank Dexia, Dnb Nor, HSBC, Nordea, Northern Rock, Rabobank Santander, Société générale, Triodos, UBS
For banking categories Total Deposits and Total Assets for Canada, United Kingdom, Australia, USA, Belgium	• *Annuaire Statistique de la Belgique*, Institut National de Statistique, Ministère des Affaires Economiques, vol. 15 (2011) which produces data from 1923 onwards. • Australian Financial System, *Interim Report of the Committee of Inquiry*, May 1980, Australian Government Publishing Service. Canberra. • League of Nations, 1939, *Money and Banking 1937/38*. Geneva. • Mitchell B.R. 1983, *International Historical Statistics: The Americas and Australasia*, Detroit: Gale Research Company. • Mitchell B.R. 1992, *International Historical Statistics: Europe 1750-1988*, 3rd edition, New York, Stockton Press. • Urquhart M.C. and K.A.H. Buckley, 1965, *Historical Statistics of Canada*, Cambridge, Cambridge University Press. • *Annual Abstract of Statistics*, Central Statistical Office, London, Government Statistical Service, Several year.

In this list, Equities, Risk-Weighted Assets, Loans and Total Deposits give information on the returns of banks. For example, risk-weighted assets are the assets of off-balance sheet exposure of banks, weighted according to risk. Then cost-income ratio, net interest income, total non-bank loans and loan loss

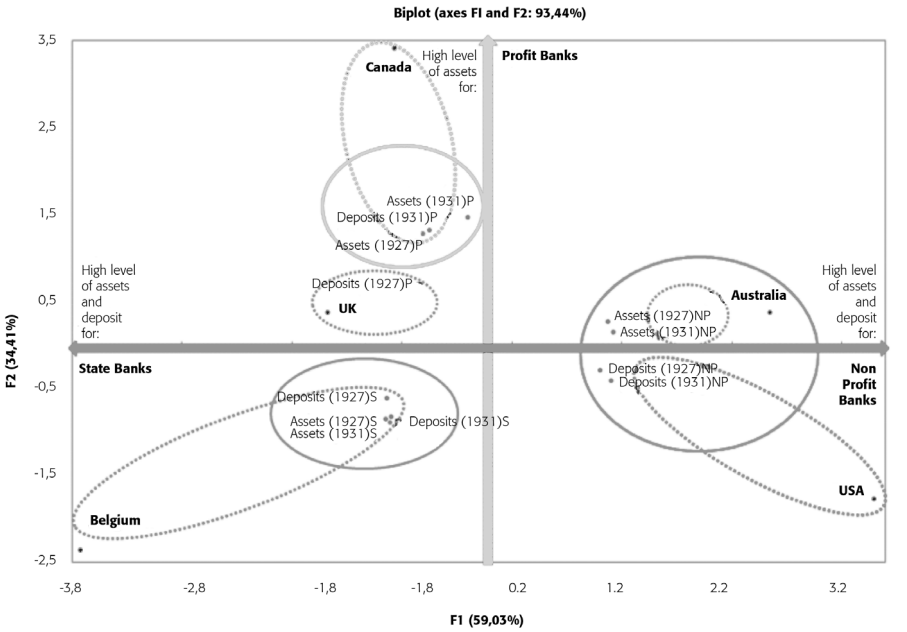
provisions are giving information on banks' productivity and efficiency. Capital adequacy inducing regulatory requirement on bank liquidity and bank leverage are illustrated by Tier 1 and Tier 2.

In a recent study, Cornett *et al.* (2011) showed that banks that relied more heavily on core deposit and equity capital financing continued to lend, whereas banks that held more illiquid assets reduced lending, and increased asset liquidity. Our mappings (Figure 2, 3 and 4) will show dissimilarities in banks' behaviour.

4.1 From 1927 to 1931: Management behaviour depends on a bank's status

Resistance to shocks and consequently the evolution of their behaviour depend on banking structure. As we can see in the graph provided (Figure 2), different groups are present. Nonprofit banks and state banks form an initial group strongly associated with the first axis (F1, 59,03%). These institutions exhibit a high level of assets and deposits. However, there is a strong contrast between Belgium and Australia and the United States. This is consistent with the level of concentration of banking institutions in these countries. Canada and United Kingdom could be considered as non-crisis countries (A. Uhde *et al.*, 2009), whereas United States and Belgium were more vulnerable facing the crisis. In Belgium, state banks collect significant amounts of assets and deposits, whereas their importance in Australia and the US is negligible. There is still a small difference between Australian and American nonprofit banks. In Australia, assets are the highest. Conversely, in America, deposits represent the highest figure on the balance sheets. The United Kingdom is located in between those countries, but can also be partially associated with Canada, as British profit banks display significant levels of

FIGURE 2
Mapping banking activities before and after the 1929 crisis



assets in their balance sheets. The second axis (F2, 34.41%) is strongly associated with Canadian profit banks. These banks hold very high amounts of assets (more than 80%). This confirms the argument of Bordo *et al.* (1994), which maintains that profit banks were traditionally highly leveraged because of the large amount of loans they granted firms.

Looking in more detail at the ellipses in fig. 2, there are no striking differences between 1927 and 1931. For each category of bank, the associated amounts (assets or deposits) are very close to each other. In Australia for example, there is no significant difference: asset amounts in 1927 represented 23%, and reached 30% in 1931. The same phenomena are apparent for USA, Belgium and Canada. This also fits the results obtained by Richard S. Grossman (1994), "The Shoe that Didn't Drop".

This exceptional stability is mainly due to the structure of the commercial bank system and the attitude of the lender of last resort. To satisfy their depositors, banks develop activities with a reduced level of risk. The impact of the crisis thus depends on their statutes and the level of protection of the last-resort lender, especially for countries where concentration was low. This argument is less valid for Canadian banks, where the banking concentration was high. As a whole concentration and banking structure are the main factors which explain the impact of financial crisis on banking institutions.

4.2 When competition creates incentives to make strategic moves: the case of 2007

An enhanced competitive environment that caused banks to adopt more aggressive attitudes characterizes this second period. If, according to Northcott (2004) and Carbo *et al.* (2009), there is no consensus regarding the "best" measure by which to gauge banking competition[6], a solution may lie in the convergence of all the indicators retained.

These mappings consequently provide an opportunity to identify different kinds of groups. In 2006, Deutsche Bank, UBS, Credit Suisse and Barclays constituted a core group seemingly focused on profitability concerns (Cost Income ratio, Loan Loss Provisions, Total Deposits…). BNP Paribas was only partially associated with this cluster, as equity concerns (expressed in terms of Total Assets, and Net Interest Income) were also responsible for its position in the diagram. This cluster was in direct opposition with another group, consisting of Nordea, Dexia and Commerzbank. These institutions faced great diffi-

[6] For more information on the measurement of competition, see Carbo *et al.* (2009), Verdier (2002).

culties during the crisis. They transformed their banking practices to regain profitability and stability.

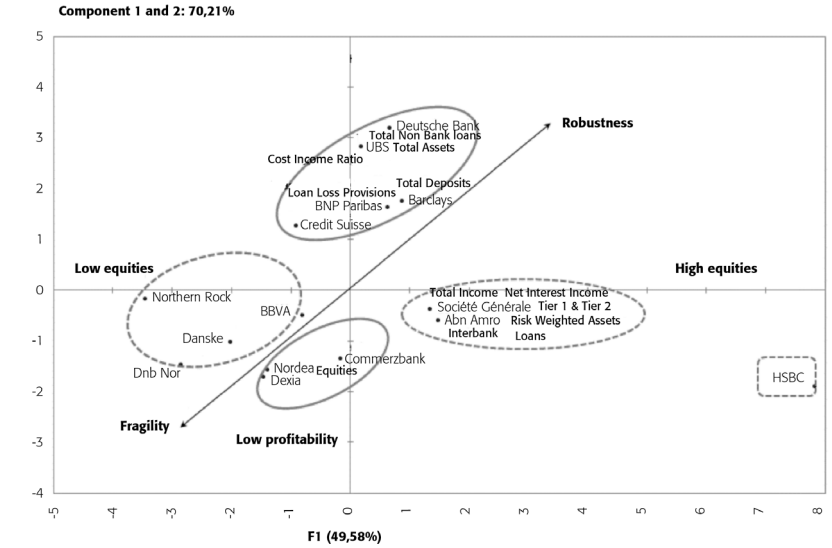
Dexia has to be considered apart, as different institutions took measures together to insure its rescue. Hence, the evolution of Dexia's banking behaviour cannot be considered a deliberate choice of the bank but more a constraint made by other institutions to keep it in the market.

On the other axis, HSBC, Société Générale and Abn Amro are pooling. For the first two banking institutions, high equity requirements are associated with weighted exposures to risk. This exposure is more questionable in the opposing group, composed of Northern Rock, BBVA, Danske and Dnb Nor. In 2009 (Figure 4), the banking clusters initially obtained are confirmed in their positions. However, the subprime crisis strongly affected the robustness of several banking institutions (Fragility/Robustness axis). UBS experienced reduced profitability. Abn Amro tried to focus on equity requirements to manage its assets more efficiently (and has drastically reduced its costs since its nationalization). Dexia found itself in the "fragile" group.

Capital requirements are a tool to restore stability for banking institutions that affect competition and consequently profitability. Regulation can alleviate the competition/stability trade off but not eliminate it (Vives, 2011). The design of optimal regulation has to take into account the intensity of competition and profitability.

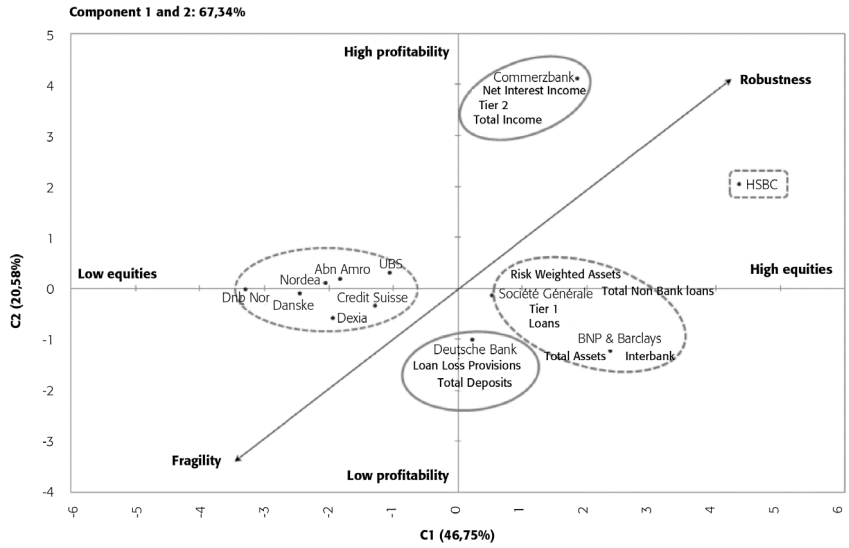
More generally, switching to Net Interest Income targets as opposed to Cost Income is a strategic move, which banking institutions can make if profitability is their main goal. HSBC has then to be considered apart: this bank is largely international and located notably in countries like Canada where capital requirements are stricter. Here, regulation is more important than proper attitudes. As a whole the comparison of figure 3 and 4

FIGURE 3
Cost Income-Risk Weighted Concerns in 2006



Source: OECD-Reuters,Forbes-Annual Reports.

FIGURE 4
Net Interest-Risk Weighted concerns in 2009



Source: OECD-Reuters,Forbes-Annual Reports.

exhibits a relationship between robustness and strategic management in 2006 and 2009 which helps us to confirm that banks' strategic moves are voluntarily chosen. They can be considered more as a choice than as a new regulatory constraint. The only exception comes from situations where governments intervened to avoid bankruptcies. Performance is then a result of new strategic choices, emerging from better evaluations of market and credit risks.

5. Conclusion

One main aim of this paper was to demonstrate that bank behaviour changed because of the 2007 crisis. The latter seems to be the case: most banks have adapted their core business. By focusing on the increased risk levels they now have to deal with, but also by looking after the increased speculative positions taken, banks are definitively adopting more cautious attitudes. In addition to considering their profit margins, they are also paying particular attention to risk-weighted assets and possible external shocks.

Is there anything in the 2007 crisis that was completely new with regard to 1929?

In the past, banking panics were essentially caused by excessively risky speculative activities, and securitization and the need for collateral increased their impact on the real economy. The evolution of asset management in banks has been directly influenced by these enhanced needs for liquidity, motivated by safety reasons. This change could be considered merely a result of the new regulations imposed by the authorities to re-establish the efficiency of the financial markets. The core result of the present discussion emphasizes that this evolution is rather the expression of the actor's will. One important lesson of the

last crisis is that regulation can help to recover stability. But the stability of the global system is, above all, a question of involvement on the part of banking institutions.

The second aspect to point out is the role of internationalization and integration of the strategic attitude of banks. Our analysis exhibits cases of resistant banks whose size and leverage are not the first criteria to define profit margin. Last but not least, equity ratio is a key guarantee for banks when it comes to enduring external shocks.

All these elements confirm our initial assumption. The subprime crisis had a strong impact on the banking landscape. The new regulations created in response to the increasing systemic risk have had a considerable influence on bank management. However, the discussion of intentional strategic moves for bank management is relevant. Banks integrate uncertainty in their profit-margin evaluations not only due to regulatory or prudential constraints but also for strategic purposes. Hence, the mappings obtained in this study showed that the market position of banks depends primarily on their ability to deal with financial instabilities and uncertainties.

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