Regulation and Stability of Banks in Large-scale Crises: An Historical Approach

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Abstract

The traditional debate on the effect of regulation on banks' business model has gained renewed attention today. The historical evidence suggests that the constraints imposed on banks after a crisis must be carefully calibrated in order to allow them to optimise profitability and to secure their assets.

This paper discusses the influence of regulations and stability ratios on banks' business model during large-scale crises. Examining the situation both pre- and post-crisis serves for more detailed study of the efficiency of regulatory requirements. The analytical intent is to determine the most efficient ways to restore financial stability. In other words, the question is the extent to which the stability ratios must be internalized by banking institutions in order to prevent financial instability.

1. Introduction

The long-standing debate on how regulation affects the business model of banks has gained renewed attention today (Hellwig, 2015). The recent financial crisis provided the occasion and above all underscored the necessity for further study of the relationship between banking regulation and banks' risk management (Paulet, Parnaudeau, Abdessemed, 2014a, b).

The subprime crisis has shown how important it was for banks to be able to strengthen their capital buffers. However, since banks' risk aversion influences that ability significantly, this is not so simple.

Banks with low risk aversion tend to prefer lower levels of capital (Diamond and Dybvig, 1986; Kim and Santomero, 1988; Berger and Bowman, 2010; Eken, Kale and Selimler, 2013), while those that are more risk-averse tend to increase their level of capital when risks increase (Demirguc-Kunt and Huizinga, 2000).This behavior constitutes a strong argument for regulatory minimum capital standards.

Government intervention in markets is justified to create and enforce rules that restore stability. It also protects markets against undue concentration, thus keeping them competitive (Blinder, 2009). By regulation, governments seek to ensure both financial and economic stability. Capital requirements designed to help institutions cope with large-scale crises have induced different actions, albeit with some similarities. It was only after recognition of the effects of losses on banks' loans to foreign sovereigns that US regulators began to reinstate minimum capital ratios (Tarullo, 2011).

Today, US banking regulators' agenda is largely compromised. Despite some regulatory advances, the risk remains a danger to large banks (Valladares, 2015). And in Europe, since the subprime crisis, more still needs to be done (Dombret, 2015).

The degree of constraints imposed on banks must be carefully calibrated to allow the institutions to optimise profitability and to secure their assets. Historically, the evidence indicates that stiffer regulatory requirements are generally imposed following major financial reversals. Going by historical experience, in such crises regulatory constraints would not appear to be the prime driver of banks' strategic management (Paulet, Parnaudeau, Abdessemed, 2014b).

Hence, the impact of financial regulation on banking structures will vary with its objectives. This is why one must distinguish between structural regulation and prudential regulation, and also consider crisis management and resolution at financial firms (Mishkin, 2001). Structural regulation is designed to restore the working discipline of the financial sector. Prudential regulation is designed to identify and control the risk exposure of individual banks and of the whole financial system. Crisis management and resolution serve to reduce the costs and the damage of distress when it occurs.

Regulation enhances financial stability when the banking institutions modify their business strategies in order to improve risk management (Paulet, Parnaudeau and Abdessemed, 2014a,b). Hence, analyzing the various regulatory tools (Mishkin, 2001), as proposed in Table 1, is also a way of understanding the evolution of financial regulation (White, 2009; Hellwig, 2015) and its implementation after the crises of 1929 and 2008.

Table 1
A classification of regulatory tools

Structural regulation	Prudential regulation	Management of crises
Group 1 1. entry controls 2. limits on economies of scale 3. limits on economies of scope and diversification 4. limits on pricing (interest ceilings)	*Group 2* 5. capital requirements 6. disclosure requirements 7. bank examination (auditing, stress tests, etc.)	*Group 4* 9. liability insurance 10. financial infrastructures
	Group 3 8. supervision, which can be based on the discretionary power of the authorities or on controls on the application of fixed rules	

During the years from 1927 to 1931, regulation consisted in government intervention. The State stepped in as lender of last resort, tracing out an informal route (or, in the case of the United States' guarantee to depositors, a formal path; see Verdier, 2002, and Goodhart, 1988). Central institutions imposed a ratio of state-guaranteed deposits to make the system secure. This corresponds basically to groups 1 and 3 of the above table.

This practice does not differ drastically from the latest requirements laid down by the banking authorities, who imposed a ratio of around 100% between banks' credit and their deposits (Likkanen report, 2012). Despite the banks' voluntary strategy of seeking to be present in all three categories of regulation, the regulatory organi-

sations' proposals would appear to have sparked renewed debate on the size and efficiency of banks and the degree of concentration of the banking industry that are suitable to guarantee the stability of the global system.

Harsher competition has driven banks towards greater concentration and internationalisation. The less concentrated the banking system is, the more vulnerable the credit institutions are (Uhde, 2009). This parameter is not particularly relevant for the recent period, as most banking systems are highly concentrated (Paulet, Parnaudeau, Abdessemed, 2014b). During the Depression, by contrast, the relative fragility of banking systems was due partly to the level of concentration. Countries such as Canada, the United Kingdom and Australia, whose degree of concentration exceeded 70%,were much more resistant to the crisis than the United States or Belgium, where banking structures were more segmented.[1]

Capitalisation rules and financial disclosure – i.e. Group 2 above – are more traditional tools favoured by regulators to restore stability to the banking system. Through time, crises have prompted monetary authorities to stiffen the capital ratio constraint. During the 2008 crisis, it was used broadly to urge bankers to engage in more careful risk management (Paulet, Parnaudeau and Abdessemed, 2014a). Group 4 is partly explained by the resolution of the crisis; the comparison of the two crises will enable us to note the similarities and the differences between the ways in which they were managed.

This article discusses the influence of regulations and stability ratios on banks' business model during large-scale crisis. By comparing pre- and post-crisis situations, we conduct a more detailed study of the efficiency of regulatory requirements. Our ultimate aim is to determine, analytically, the most efficient ways to restore finan-

[1] For more details see: Herbert Baer and Elizabeth Pongracic, "The Development 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, No. 16269, August 2010.

cial stability following a crisis. The question, in other words, is the extent to which stabilising ratios must be internalised by banking institutions in order to prevent financial instability.

2. Universal banking and financial stabilisation in the Depression and in the subprime crisis

The debate over the origins of the banking crisis centres on different interpretations of three developments:

1) a decline in the quality of bank assets,
2) a loss of public confidence in the banking system, and
3) a sharp slump in one or more sectors of the economy.

In the 1930s, the sectoral slump was in agriculture and farm incomes. During the subprime crisis, the real estate sector provoked a global economic slump. Globally, financial crises have been the result of market failures. Governments then try, subsequently, to overcome the undesirable effects. Two types of regulation are possible: one based on banks' capital and the second on liquidity (Allen and Gale, 2007). Requiring banks to hold more liquidity than they would otherwise choose to hold sets the priority on welfare enhancement. We focus on this aspect in order to determine which types of banking structure are most resilient to shocks.

Crises always put liquidity constraints both on firms, which are seeking funds for their investment projects (Bhattacharya, 2004, 281) and on banks, which need them to fulfill their short-term obligations (Caouetteet al., 2008, 546). Banks create liquidity from illiquid assets, and it is well known that a bank's success or failure depends on liquidity risks (Diamond and Dybvig, 1983). Also, the analysis of liquidity risk is important for banks in determining their profitability or interest margins (Kosmidou et al., 2005).

The literature mentions several ways in which liquidity risk impacts on banks' profitability. Liquidity is positively correlated with the bank's market value, when the bank is earning good profits and can access sufficient funds to meet payment obligations as they fall

due (Barth et al., 2004). By the same token, poor liquidity undermines the market value of the bank, as a loss-making bank will have greater difficulty in accessing sufficient funds to meet its payment obligations (Kosmidou et al., 2005).

How is the structural business model of a bank affected by the liquidity constraint? Historically, universal banks were considered to be less liquid than investment banks (cfr. Verdier, 2002). Nineteenth-century stock markets, even the most highly developed ones, were grounded on the government bonds issued to finance the industrial revolution. That is, the historical solution to prevent a shortage of liquidity was the chartering of banks by the central bank, which rediscounted commercial and industrial paper presented by banks. Universal banks represent the conjunction of three factors. The first was their participation in industrialisation, providing the liquidity that equity markets, private fortunes and corporate profits were unable to supply. The second was a liquidity constraint, which originated in a segmented deposit market, in which local and state banks were already well entrenched. In traditionally centralised countries like Britain, France, Belgium, or the Netherlands, the deposit market was open to capture by the newly created joint stock banks. In decentralised countries, this market was dominated by local savings banks, credit cooperatives and mortgage associations. Hence, the deposit market was fragmented into four sectors: the profit sector (joint stock banks chartered by the central government and non-incorporated commercial banks), the non-profit sector (private savings, credit cooperatives and mortgage associations), state institutions (postal giro, postal savings, and other state savings or cooperatives), and local establishments (locally chartered commercial banks in federal states). The third and last factor was the existence of a liquidity guarantor to serve as lender of last resort for the largest banks under its supervision (cfr. Goodhart, 1988). This liquidity guarantee was the necessary condition for the survival of universal banking and explains why the banks that failed were (with very few exceptions) among the smallest.

As the liquidity ratio is the core of our argument, some discus-

sion of monetary policy in crisis periods is indispensable. During the Depression, monetary policy counteracted market forces and reduced speculation. In the US, between 1928 and 1930 the money supply was restricted, when additional liquidity was needed to stimulate the economy (Aiginger, 2009). Apart from the American situation, world money supply expanded until 1929, was then flat until 1931, and then contracted strongly until 1934. In part this was due to the application of the gold standard: the countries that were losing gold were automatically forced to be restrictive, while those with inflows of bullion sought to sterilise it by monetary policy. Hence, the money supply multiplier was lowered endogenously owing to lower demand and higher risk aversion, which kept the real interest rate high while prices were falling.

In the recent period the situation is somewhat different. Both theory and empirical evidence support the argument that risks are more likely to be reduced than increased when banks are permitted to engage in financial transactions (Uhde and Heimseshoff, 2009). Concerns over systemic risk should be addressed not by restricting the size and scope of banks (whether universal or specialised) but by allowing greater diversification while raising capital requirements (Benston and Kaufman, 1988). During the last crisis, universal banks proved to be more diversified and better capitalised. In the event, one of the great independent investment banks (Bear Stearns) failed and was absorbed by JP Morgan Chase with the aid of large-scale taxpayer assumption of risk. A second (Merrill Lynch) was absorbed by Bank of America with the encouragement of the Treasury and the Federal Reserve on highly favorable terms for Merrill shareholders and employees. A third (Lehman Brothers) was allowed to fail, triggering substantial turmoil in global financial markets. The other two (Goldman Sachs and Morgan Stanley) became bank holding companies in order to obtain access to Federal Reserve refinancing. As far as universal banks are concerned, the situation is quite different. UBS and Royal Bank of Scotland were rescued by government. Others, such as Credit Suisse, Barclays, and Deutsche Bank, managed to survive on their own. BNP Paribas participated in the

rescue of Dexia and Fortis. So the general experience has been that the universal banks are more resilient to financial shock. As regards the money supply, in the current crisis monetary policy has slashed discount rates to near zero and injected a flood of liquidity by open market purchases and unconventional operations of "quantitative easing", including the purchase of commercial paper (K. Aiginger, 2009). This supports the argument of Almunia (2010) that monetary policy is not effective when the banking system is in distress and the interest rate is near zero.

In conclusion, as far as the liquidity constraint and monetary policy are concerned, the two periods appear to have been marked by contrasting considerations for specialised and universal banking institutions.

3. Methodology: a comparative and empirical approach to the loan-to-deposit ratio in large-scale crises

Some studies have investigated the link between liquidity ratios and stress, using the loan-to-deposit (LTD) ratio – among other variables – as a sign of liquidity problems at banks (for instance, Le Leslé, 2012, and Betz et al., 2014). Berg (2012) explains the relationship between loans and deposits in the context of a financial flow model. In this framework deposits can create loans, since an increase in deposit funding improves banks' liquidity position and hence their scope for extending loans (loans are the monetary counterpart of deposits).

The LTD ratio measures the coverage of loans with stable funding sources, ordinarily deposits of households and non-financial companies. When loans exceed the deposit base, banks have a funding gap and have to access financial markets. A large funding gap thus implies significant dependence on market funding, which can be more volatile and/or expensive than retail funding, especially where it is unsecured. The LTD ratio basically measures the structural dimension of liquidity risk, which is rooted in the business models of banks and the structure of the financial system. The ratio

can accordingly be used by the macro-prudential authority to address both structural and cyclical liquidity risks.

Tables 2 and 3 show how the LTD ratio evolved before and after the Depression and the subprime crisis. In the case of the 1929 crisis, only the situation preceding the shock is considered, insofar as the Depression was followed by the run-up to the Second World War, when data were unavailable. Our sample covers the US, the UK, Germany, France and Denmark, which display a diverse range of financial structures. Most modern banking structures were formed during the industrialisation of the nineteenth century. They vary from extreme specialisation (as in Britain, where merchant banks, colonial banks, clearing banks, issuing banks, jobbers, stockbrokers and savings banks each engaged in distinct financial activities) to the virtual absence of specialisation (as in Germany, where all these activities were handled indistinctly by large banks).

Alexander Gerschenkron (1962) suggested an economic fundamental as the explanation for the development of diverse banking structures: bank-firm-state relations, in his view, reflected the availability of capital at the time of industrialisation. Most economic historians go by Gerschenkron in accounting for disparities in political institutions among capitalist countries. In particular, British industrialisation was self-financed, manufacturers ploughing profits back into their own factories; French industrialisation (1850-1870) was financed by investment bankers, who raised long-term funds and lent to manufacturers; German industrialisation was financed by universal bankers, intermediating between depositors and industrialists. Further, the variable development of financial markets can explain the place of banking structures and the different national regulations governing financial structures and markets. For example, the German system, in contrast to Britain, can be described as having a more highly developed financial market. This explains why the German commercial banks, or Großbanken, were the choice partner for industry. The Hausbank system was and still is considered the key factor in the financing of firms' projects. This diversity among financial structures will be crucial to the interpretation of our findings.

In comparing the impact of a large-scale crisis on banking structures in an identical sample of countries, we concentrate on commercial banks. Cooperative banks, thanks to their by-laws and their level of capitalisation, are generally more resilient to shocks (Paulet, 2011).

Table 2
LTD ratios before the Great Depression

	1913	1929
Denmark	105.95	193.3
France	131.6	197.8
Germany	73	109.4
United Kingdom	90	92
United States	76	73

Sources: League of Nations, 1939, *Money and Banking 1937/38*, Geneva; Mitchell, B.R., 1992, *International Historical Statistics: Europe 1750-1988*, 3rd edition, New York: Stockton Press; Computations based on data from Raymond Goldsmith, *Comparative National Balance Sheets, A Study of Twenty Countries, 1688-1978*, University of Chicago Press, 1985; Banque de France, *Statistiques monétaires et financières annuelles*, Paris. Conseil National du Crédit, *Rapport Annuel*, Paris. Deutsche Bundesbank, *Monatsberichte der Deutschen Bundesbank*, Frankfurt am Main. Total private credit is the sum of the following national accounts items: mortgages, consumer credit, loans by banks and other financial institutions, corporate stocks and bonds, trade credit, and other private credit. The figures exclude government debt.

Table 3
LTD ratios during the subprime crisis

	Before the subprime crisis (average 1992-2006)	After the crisis (average 2009-2013)
Denmark	160	170
France	130	108.1
Germany	160	130
United Kingdom	87	81
USA	98	71

Source: Aggregate data for the largest 5 commercial banks using annual balance sheets.

To interpret our findings, the level of LTD will be analysed in correlation with the money multiplier (MM) defined as MM = 1/(1-

LTD). This enables us to provide empirical evidence on commercial banks' liquidity risk and their ability to create money and distribute credit to the real economy.

Two significant cases warrant discussion. The first is a situation in which LTD is below 100%. The lower the money multiplier, the greater the deposit risk; in this case, commercial banks might lack sufficient cash to cover withdrawals. The money multiplier calculated by the above formula provides information on commercial banks' liquidity position and in particular on the different forms of deposit (current accounts, savings accounts, investments, etc.). So if LTD is below 100%, the lower the LTD, the lower the multiplier; and the greater the "stickiness" of funds, and the lower the liquidity risk.

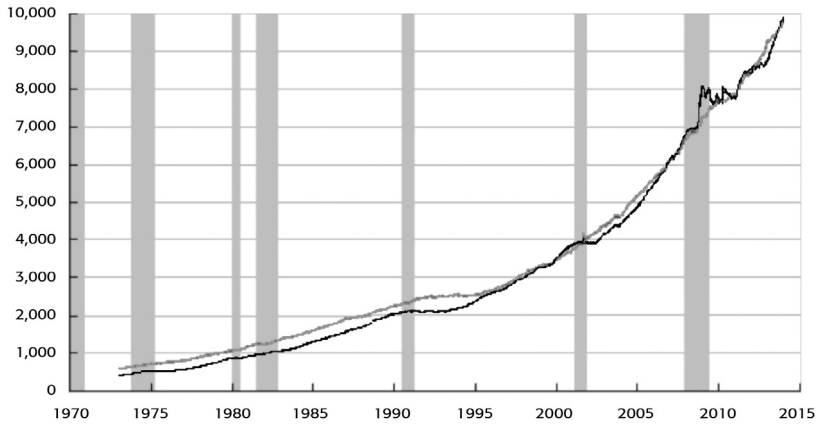
On the contrary, an LTD ratio above 100% increases the money multiplier. Of course the ratio cannot rise infinitely: the monetary authorities always control the money supply.

Our calculations illustrate the two situations. For the two crises, the United Kingdom and the United States have LTD ratios below 100% while the continental European countries exhibit ratios of more than 100%. How to explain these differences? The most surprising case is a ratio below 100% following a crisis and a credit crunch in which enterprises have had trouble funding investment projects. Various explanations are possible. For one, credit demand might be low owing to the economic uncertainty. Second, regulatory capital requirements may be preventing banks from extending more credit.

In fact, if reserves are counted together with deposits, the funding gap between loans and deposits is reduced and so is the divergence between Europe, the UK and the US (Figure 1). This validates the thesis that regulation is a key factor in explaining the resolution of the shock and its impact on banking institutions. For continental Europe, because of the Basel rules reserves are already included in the ratio, which explains part of the difference with respect to the United States. When calculated on a homogeneous basis, in fact, the magnitude of the divergence in LTD between Europe, Britain and America is reduced.

The second important point for the analysis of the LTD ratio is

Figure 1
Loans and Deposits including Reserves in the case of US commercial banks



Legend: black = loans and leases; gray = deposits (all commercial banks). Shaded areas indicate US recessions. Source: research.stlouisfed.org.

the individual bank's business model. Institutions that focus on core banking business have high loan-to-deposit ratios, while investment banks tend to have lower ratios, since their operations require more liquid assets. This naturally harks back to the traditional debate on the separation of specialised from universal banks. On this point academic and professional positions diverge. US banks, at the epicenter of the financial disaster, experienced the worst decline (465 US banks failed between 2008 and 2012). However, Markman and Venzin (2014) find no significant correlation between product diversity, market diversification and resilience. This basically illustrates the main characteristics of universal banks. For these authors, a bank's resilience depends more on how it is managed than on size, location, product diversity or international expansion. Here the universal banks, and specifically the German banks with their Hausbank system, have proven to be better than specialised institutions at gauging moral hazard and adverse selection (Edwards and Fisher, 1993). Similarly, Chaffai and Dietsch (2015) offer evidence that retail banking institutions and universal banks in general withstood the crisis better than other banks. Given the foregoing, one wonders what con-

sideration can be thought to justify the regulatory separation between ordinary deposit-taking and investment banks.

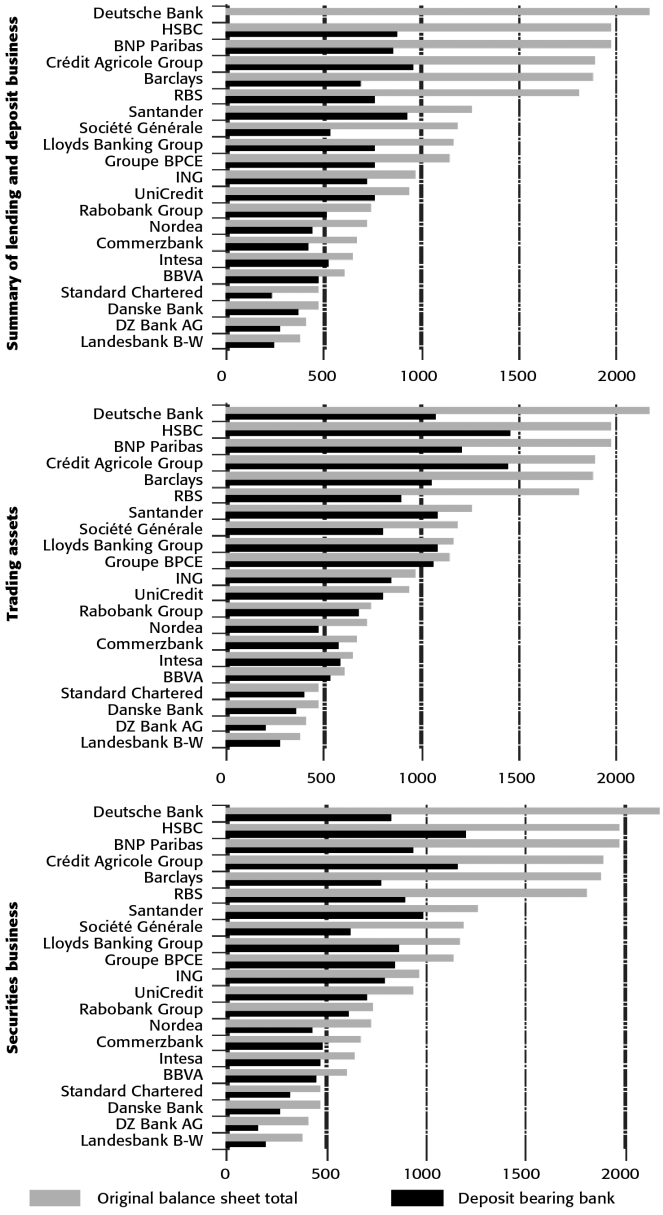
An analysis of 21 European banks provides suggestive evidence on points of separation between lending, trading and securities business for financial institutions. The figure below illustrates the different scenarios. Klaus and Schäfer (2013) observe that if lending and deposit business were separated, 17 institutions would still have balance-sheet assets of over € 300 billion, far exceeding the limit set by the authorities for protected institutions (Figure 2).That is, reduction in size would not appear to be a relevant tool to guarantee stability for the banking system.

Referring now to the Liikanen report and the limitation on banking activities, one can ask whether this measure may be more effective than its predecessors. According to the High-level Expert Group on restructuring the EU banking sector, a commercial bank could be allowed to undertake the following activities:

- Lending to large, small and medium enterprises
- Trade financing
- Consumer loans
- Mortgage loans
- Loans to banks
- Participation in syndications
- Simple securitisation for financing
- Asset management
- Investment and debt in regulated money market funds
- Use of derivatives for asset and liability management
- Purchases and sales of assets for liquidity management
- Hedging services to non-banks via swaps or options up to a predetermined risk limit
- Securities underwriting and related activities.

This report has the merit of seeking to curb off-balance-sheet assets by limiting the use of derivatives in respect of non-financial institutions. However, the US experience of the Glass Steagall Act demonstrates that banks can readily circumvent legislative restrictions by acting through subsidiaries.

FIGURE 2
Balance sheet totals wth different separation points in 2011
(billions of euros)



Source: calculation by DIW Berlin based on data from a report by the High-level Expert Group on reforming the structure of the EU banking sector (2012).

The clear conclusion from the discussion is that separation does not, per se, guarantee the stability of the banking system. As we noted in the previous section, universal banks, at least in Europe, withstood the last crisis better than specialised institutions. The rationale for a segregated banking system rests on banks' ability to absorb part of the losses they incur in the conduct of their business activities. This differs radically from the goal pursued by the regulatory authorities during the 1929 crisis and the Depression. Back then, governments believed that segregation was the best way to impose stricter risk management on banks.

In today's global context, there is another problem to consider. In a financially integrated world, any such reform is feasible only on the condition of international coordination (Eichengreen, 2011). Suppose that one institution, say a Canadian commercial bank, is allowed to take deposits from French savers and invest in risky assets. French banks will protest that they are at a competitive disadvantage, as these foreign branches are not subject to the same restrictions as French banks. In order to be effective and accepted, therefore, a hypothetical re-edition of the Glass Steagall Act in a new form would have to be coordinated internationally.

Assuming international coordination raises a series of further questions: which authority is to be in charge of implementation? One possibility would be the Basel Committee with the help of the IMF and possibly the World Bank in their Financial Sector Assessment Program exercises. How is supervisory power and responsibility to be shared among all these organisations? These are among the many questions that must be resolved as a prerequisite to the application of a new Glass Steagall Act to control banking institutions.

4. Conclusion

Our discussion suggests one key conclusion: namely, that the accumulation of new rules (higher capital adequacy ratios, the introduction of liquidity ratios, new rules on market risk, etc.) could be

an impediment to banks'playing their assigned role as financial intermediaries. The new, considerably stricter Tier 1 capital ratio constrains banks to choose between increasing their lending margins and reducing their risk-weighted assets. The obligation to hold high-quality liquid assets, in particular sovereign securities and reserves with central banks, will heighten the competition to attract customer deposits. But a system based on separation of different kinds of banking business is not really the solution for guaranteeing stability. Regulation better suited to the business model of the banks would appear to be more appropriate.

Even if regulation does help to stabilise banking institutions, the core factor for equilibrium in the long run is the business models of the financial establishments themselves. Banking activities and risk management need to be considered together, simultaneously, to ensure systemic stability and guarantee the availability of credit to firms. To recall the argument of Reinhart and Rogoff (2009), the most commonly repeated advice in times of expansion, in the run-up to financial crisis, reflects the perception that "this time is different". It is clear that banks take on excessive obligations during expansions, failing to properly consider the repercussions that these risky positions will have in times of recession. We have seen above that banks' resilience to shocks varies from institution to institution, depending on individual business models. There is a delicate trade-off between increased welfare and financial stability, obliging banks and regulators alike to determine the threshold that enables financial institutions to enjoy sufficient profitability without endangering the economic fundamentals or the technological innovation that is indispensable to national growth.

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