

**TIME TO SET BANKING  
REGULATION RIGHT**



# **TIME TO SET BANKING REGULATION RIGHT**

**JACOPO CARMASSI  
AND  
STEFANO MICOSSI**

**CENTRE FOR EUROPEAN POLICY STUDIES (CEPS)  
BRUSSELS**

---

The Centre for European Policy Studies (CEPS) is an independent policy research institute in Brussels. Its mission is to produce sound policy research leading to constructive solutions to the challenges facing Europe. The views expressed in this book are entirely those of the authors and should not be attributed to CEPS or any other institution with which they are associated or to the European Union.

Jacopo Carmassi is an economist at Assonime. Stefano Micossi is Director General of Assonime, Visiting Professor at the College of Europe in Bruges, Member of the Board of Directors of CEPS and Chairman of the Board of the CIR Group. The authors wish to thank Rym Ayadi, Carmine Di Noia, Charles Goodhart, Karel Lannoo and John Vickers for useful suggestions as well as Mario Nava and other participants in an internal seminar at the European Commission in November 2011. They are also grateful to Andrew Haldane and Priya Kothari for providing the data for Figure 9. None of them is responsible for the opinions and shortcomings in the study.

---

Cover photograph: "Traffic Light Tree" by French sculptor Pierre Vivant near Canary Wharf, London.

ISBN 978-94-6138-175-0

© Copyright 2012, Centre for European Policy Studies and the authors.

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means – electronic, mechanical, photocopying, recording or otherwise – without the prior permission of the Centre for European Policy Studies.

Centre for European Policy Studies  
Place du Congrès 1, B-1000 Brussels  
Tel: (32.2) 229.39.11 Fax: (32.2) 219.41.51  
E-mail: [info@ceps.eu](mailto:info@ceps.eu)  
Internet: [www.ceps.eu](http://www.ceps.eu)

# TABLE OF CONTENTS

---

1.	Introduction.....	1
1.1	Micro-prudential regulation .....	2
1.2	Systemic stability and macro-prudential regulation .....	8
2.	The changing business of banking .....	11
3.	Bank capital in historical perspective .....	21
3.1	The first Basel Accord .....	23
3.2	From Basel I to Basel II.....	27
4.	Fundamental flaws in Basel capital rules .....	32
4.1	Regulatory capital.....	35
4.2	Risk-weighted assets .....	36
4.3	Misguided goals and supervisory capture .....	41
4.4	Systemic risk.....	42
5.	Failed repairs with Basel III.....	46
6.	Restoring sound prudential regulation .....	57
6.1	Capital requirements: what for and how much? .....	58
6.2	Combating supervisory forbearance .....	62
6.3	Market discipline with contingent capital .....	64
7.	Conclusions .....	67
	References.....	69

## List of Figures

Figure 1. Total assets of banks as a share of GDP, by country (year-end 2010).....	13
Figure 2. From commercial loans to securities trading.....	14
Figure 3. Bank profitability increasingly driven by net non-interest income (1988-2009) .....	15
Figure 4. Return on equity for UK banks.....	16
Figure 5. Leverage, securities trading and short-term funding by large banks (2007) .....	18
Figure 6. Banks' total assets and leverage, EU and US (2000-09) .....	20
Figure 7. The capital ratio of US banks (1834-2010) .....	22
Figure 8. The effects of the Basel Accords on bank capital .....	26
Figure 9. Basel solvency ratios cannot detect the 'crisis' banks.....	33

## List of Tables

Table 1. RWA, Basel capital ratios and leverage of selected banking groups, 2010.....	37
Table 2. Low RWA (and low capital set aside) for speculative bets, 2010 .....	39
Table 3. Basel III new minimum capital requirements (as % of RWA).....	47
Table 4. Basel III phase-in arrangements .....	50

# 1. INTRODUCTION

---

When analysts and policy-makers tried to understand what happened after the 2008-09 financial crisis, excessive leverage in banking and quasi-banking (largely the Wall Street investment banks and parts of the wholesale money market) was immediately identified as the main transmission chain in the storm (Di Noia & Micossi, 2009; Rajan, 2010). Excessive leverage, in turn, was found to be made possible by the fact that some institutions that were behaving like banks were not subject to banking rules; and by a combination of lax rules on the definition of capital, off-balance commitments undertaken by banks thanks to new securitisation techniques, and massive resort to risk mitigation practices, including complacent ratings of complex securities and hedging instruments, notably credit default swaps (CDS), that reduced the absorption of regulatory capital to zero.

The reaction of central bankers was to coalesce behind the capital requirements set by the Basel Committee on Banking Supervision (BCBS) and tighten the screws of prudential regulation. They failed, however, to call into question two fundamental features of the regulatory framework: i) capital is determined on the basis of risk-weighted assets whose value is largely calculated by the banks themselves, and ii) supervisory action must remain at the full discretion of national authorities. And these features persist, despite massive evidence of manipulation of risk-weighting by banks that failed or had to be bailed out and rampant forbearance by national supervisors when large national banking groups grew out of proportion and undertook unmanageable risks.

An important permissive factor, in this context, was the opacity of regulatory capital ratios, which do not provide a reliable indicator of a bank's weakness or strength, thereby muting market discipline and making it possible for supervisors to side with their regulated banks in delaying loss recognition.

None of these failings has been corrected. As a consequence, the banking system continues to represent a potential source of financial instability much in the same way as it did when the crisis struck. We argue, therefore, that the international framework for prudential regulation of banking must be profoundly modified so as to bring about a more stable banking system, effective and independent supervision, and strong disincentives against excessive risk-taking by bank management and shareholders.

Banks are special because they provide liquidity services (insurance) to their depositors and monitoring services on the quality of loans to their investors. The maturity mismatch between their assets and liabilities and the opacity surrounding the quality of their loans expose them to 'runs' on deposits which may arise even if the bank is solvent, due to exogenous shocks affecting confidence. In this context, forcing banks to hold capital has two main purposes: the protection of small savers (and eventually taxpayers, lest the government be forced to pay for banking losses) against bank insolvency, and systemic stability, since runs are contagious and banking crises can spread rapidly when confidence evaporates.

## 1.1 Micro-prudential regulation

Under the 'representation hypothesis' proposed by Dewatripont & Tirole (1994), micro-prudential regulation of individual banks copes with agency problems arising from the inability or unwillingness of depositors to properly monitor risk-taking by their banks, in a world of incomplete markets and asymmetric information on the quality of banking assets. Deposit insurance aggravates the problem since insured depositors lose interest in monitoring their banks' performance, thus largely freeing management from market discipline. Management and shareholder incentives are further skewed in favour of excessive risk-taking by lending of last resort and the implicit promise of a bail-out normally attached to the banking charter, as well as by the limited liability provision of incorporation.

The regulator's fundamental role then is to monitor the bank's performance in the best interest of depositors and to use a variety of tools to prevent bankers from engaging in excessive risk-taking. Since the 1980s, with deregulation, globalisation and the information-technology revolution eroding the scope and effectiveness of direct controls, a central role amongst these tools was taken up by bank capital. The main function of capital then is to reduce risk-taking by bankers and provide a buffer to

absorb losses and allow the orderly liquidation of assets (Allen & Gale, 2007; Berger et al., 1995; Santos, 2000). Capital requirements became the cornerstone of efforts to harmonise banking rules across the main financial centres, under the auspices of a newly established Basel Committee on Banking Supervision (Tarullo, 2008).

Basel I offered a pragmatic approach to raise capital requirements internationally and somewhat level a playing field that was becoming uneven, following the inroads made by Japanese banks into world capital markets: capital requirements were set at 8% of 'risk-weighted' assets. But the approach was rough. It was predicated on a traditional view of banking as the extension of credit funded from a stable deposit base. Hence, attention was concentrated on the asset side, ignoring the fact that banks worldwide had for quite some time been developing business models based on simultaneous asset and liability management, with an increasing part of their funding coming from the wholesale money market. This development made their funding more volatile and entailed new liquidity risks while massively increasing the inter-connections between banks, thus rendering the system more prone to aggregate liquidity shocks.

Basel I also excluded from consideration market (interest rate and valuation) risks, which again is a curiosity since an increasing share of banks' returns was coming from trading on own account. This obvious flaw was seemingly corrected by the 1996 revision of Basel I, but, as will be seen, capital absorption on this account remained negligible and later proved utterly insufficient to cover losses stemming from trading books. Moreover, the correction was based on banks' internal risk calculations, an approach that was later generalised in the calculation of risk weights by the Basel II Accord.

In Basel I, capital requirements were set on the basis of a small number of 'risk buckets', each entailing different capital absorption weights depending on the counterpart; government securities and interbank transactions carried respectively a zero and low weight (20%), while loans to individuals and companies carried a 100% weight. Under that system, a 30-year fixed-rate government bond was thus declared less risky, despite its potentially large market risk, than a loan to a company with a stellar credit record. Furthermore, within each risk bucket, risks were undifferentiated, creating an incentive to choose riskier assets yielding higher returns.

Banks became increasingly vocal in the 1990s and early 2000s in their criticism of the Basel I approach to risk weighting. Their real target, in an

environment of increasing competitive pressures in the deregulated global arena, was to reduce capital requirements; their main argument was that Basel I overstated 'true' risks and that regulators should accept banks' internal risk management calculations as more competent and accurate measures of potential losses, and set capital requirements accordingly. Regulators in the Basel Committee obliged. After lengthy and cumbersome negotiations, they reached agreement on the new Basel II Accord, which gradually entered into effect from 2007 (Tarullo, 2008).

As later became all too clear, the new regulatory model was based on deeply flawed reasoning, both in commission as well as omission. The drop in capital requirements that took place in the 2000s in the wake of the new regulatory philosophy bears a large responsibility for the depth and extension of the financial crisis in 2008-09.

The sin of commission basically stemmed from unclear goal identification. The main concern of regulators should be early identification of weak institutions and the adoption of prompt corrective action or, should this fail, their resolution without significant systemic spill-over effects. Under the Basel approach to capital requirements, one obtains precisely the opposite result (Calomiris & Herring, 2011; Dewatripont et al., 2010; Goodhart, 2012; Hellwig, 2010). Capital rules are utterly opaque and their outcome does not offer useful guidance to supervisors and markets in identifying weakened institutions, as will be shown. They engendered all sorts of perverse incentives for bank managers that swelled tail risks, e.g. by encouraging risk mitigation (capital savings) techniques that apparently reduced and spread out bank risks while in fact concentrating them with a few counterparties and increasing their systemic correlations (Alessandri & Haldane, 2009). The models used for estimating risk weights and capital requirements are not robust to shifting economic circumstances, since they are obtained from non-stationary time series and cannot provide reliable forecasts for changing market scenarios. And supervisors are called upon to validate banks' risk management models, thus becoming potentially accountable for their failure. This intimate relationship with bankers, out of public sight, makes them vulnerable to undue pressure to relax capital requirements to favour their national champions or help them 'gamble for resurrection' when things turn for the worse.

The sin of omission is the failure to understand the deep reasons behind banks' behaviour. In their criticism of Basel I, bankers singled out its rough risk-weighting as the main culprit of their asset substitution and risk-seeking behaviour, pushing supervisors to get ever-more involved in

banks' risk management. But the problem only got worse with Basel II, which made it possible for banks to manipulate risk weights and make extensive use of risk mitigation techniques to reduce prudential capital. In reality, their behaviour indicates moral hazard due to deposit insurance, lending of last resort and the implicit promise of a bail-out in case of failure.

Indeed, it is a fairly well-established proposition, both analytically and empirically, that when bankers' risk-return matrix is truncated by limited liability or a public guaranty against potential losses, they behave as 'risk lovers' (in the classical definition of Tobin, 1958. In such a context, the imposition of a flat capital requirement, forcing banks to limit leverage, may well lead to an increased probability of failure, as bankers adjust their portfolio to compensate for the loss of returns by selecting riskier assets.

This risk-shifting incentive can be eliminated by 'fairly priced' deposit insurance, which induces banks to become indifferent vis-à-vis their capital structure. However, the asymmetry of information on the quality of a bank's balance sheets may make the computation of fair premiums close-to-impossible; fair premiums may even be undesirable from a welfare viewpoint, since they would entail a substantial subsidy to weak banks by strong banks (see Santos, 2000; Freixas & Rochet, 1995). More importantly, the incentives to take up excessive risks may vary substantially with market conditions, as for instance when an unfolding asset-price bubble generates opportunities for extraordinary gains from trading, massively raising the shadow-cost of prudential rules.

In practice, in order to maintain some market monitoring pressures on banks, the coverage of deposit insurance was normally limited to retail depositors or to a capped amount for each deposit. This practice, however, re-opened the way to the possibility of a run, e.g. by wholesale depositors, as indeed happened in 2007 with the British mortgage bank Northern Rock. In the United States, deposit insurance fees were adjusted by the 1991 FDICIA (Federal Deposit Insurance Corporation Improvement Act) so as to penalise riskier business models, identified as such on the basis of a combination of capital strength indicators and supervisory assessments of a bank's overall risk profile, i.e. the CAMELS ratings.<sup>1</sup> On the other hand, the

---

<sup>1</sup> Based on six areas of supervisory review: Capital, Assets, Management, Earnings, Liquidity and Sensitivity to market risk, where the latter component was added in 1997 (see Eisenbeis & Kaufman, 2010).

very purpose of deposit insurance was frustrated, in the aftermath of the Lehman Brothers' bankruptcy, by repeated instances in which governments guaranteed in full junior creditors. These decisions were probably justified under the circumstances, but they certainly exacerbated moral hazard.

When solvency deteriorates, the conflict of interest between depositors, on one side, and management and shareholders, on the other, may aggravate: the latter will in all likelihood want to take larger risks and 'gamble for resurrection', while depositors would be best served by less risk-taking, since their money is at least to an extent on the line to cover emerging losses. At this stage, efficient regulation requires an increase in interference with the bank's management by the regulator, including a credible mechanism to transfer control of the bank when solvency falls below a minimum threshold. The paramount role of capital, in this context, should be to signal distress at an early stage and trigger supervisors' intervention. It may also act as a buffer cushioning losses during the time required for corrective action to be taken. One cannot see why a bank's internal risk management techniques should have any role to play in this process.

For capital requirements to be able to perform this function, the definition of capital ratios must be simple, immediately visible and robust to changing economic circumstances. Rather than a single capital ratio, inevitably bound to be seen or applied as a minimum, there should be a multiplicity of thresholds, each carrying stricter constraints and sanctions on management and shareholders. Moreover, since considerable uncertainty surrounds the 'true' value of banks' assets in case of liquidation under distress, there is a strong argument in favour of erring in excess in setting capital thresholds. This view is quite the opposite from the regulatory philosophy of recent years, which centred on the mantra of 'economising' capital, based on a 'precise' internal model of risk measurement. These considerations point to the need for a substantial increase in capital requirements. We will discuss its implications for the cost and availability of credit, notably under distressed financial conditions.

The events leading to the 2008-09 financial crisis and the eurozone debt crisis of 2010-11 show that a main concern in prudential regulation is how to bring about effective supervision, a key factor in correcting bankers' perverse incentives. In this regard, Rochet (2008) has stressed that prudential policy may be subject to time consistency problems, due to potential conflicts between the goals of micro-discipline, which require that

a mismanaged bank be closed, and macro-liquidity assistance, which may lead regulators to keep banks afloat for systemic reasons that should go under.

The quality and independence of supervisors are of paramount importance; in this regard, strong constraints on supervisors and their enhanced public accountability are necessary. Accordingly, prudential rules should include an obligation, or at least a strong presumption, that supervisors must intervene when certain relevant thresholds are surpassed – including, at the end of the road, a credible obligation to resolve the bank, where credibility basically rests on the ability to resolve the bank without major systemic repercussions (Carmassi et al., 2010). In this manner, supervisors would be fully accountable for their actions, and inactions, and bankers would be under notice that reckless gambling would meet full retribution.

This approach, pioneered in the US with the 1991 FDICIA (Benston & Kaufman, 1998), with its requirement of Prompt Corrective Action (PCA) by supervisors, was traditionally opposed by the Basel Committee, always an unyielding advocate of supervisory discretion. This stance was extensively abused by delaying corrective action and forbearing national champions. The Royal Bank of Scotland provides a prominent example where the FSA was forced by public reaction to rewrite its first complacent assessment of what went wrong and its own part in it (FSA, 2011).

The introduction in Basel III of a common equity Tier 1 conservation range and anti-cyclical buffer may be seen as an opening in the desired direction (Goodhart, 2012, but this is far from guaranteed, within the fragmented regulatory landscape of the European Union, unless the European Banking Authority (EBA) is given power to prod reluctant national supervisors into action. Special resolution procedures are now in place, besides the United States, in Belgium, Denmark, Italy and the United Kingdom, and also to an extent in France, Germany and Spain; at the time of writing, the European Commission has not yet published its proposal for a common framework at EU level.

If capital ratios provide reliable guidance to banks' health and are easy to read, then market discipline can play a supportive role in limiting excessive risk-taking by banks. In this context, the compulsory issuance of subordinated debt could provide a good instrument to discipline management. It would work directly, since the cost of new issues would rise with a bank's risk profile; and indirectly, since the market price of subordinated debt in secondary markets would provide information on

market perceptions of the risk of failure (Rochet, 2008). We will discuss a scheme recently proposed by Calomiris & Herring (2011), entailing the obligation for banks to issue debt that is convertible into equity at a highly dilutive rate, which seems to us especially effective in creating incentives for management and shareholders to maintain strong equity.

## 1.2 Systemic stability and macro-prudential regulation

A completely different perspective emphasises systemic stability and restraint of systemic risk as the main goals of banking (financial) regulation. Systemic risk includes “all events capable of imperilling the stability of the banking and financial system” (Rochet, 2010, p. 92), including macro-economic shocks affecting all financial institutions simultaneously, and situations of contagion in which the failure of one bank can rapidly spread to other banks and endanger vital functions of the financial infrastructure, e.g. the provision of liquidity to households and enterprises and the payment system.

Here, the need for (macro-)prudential regulation arises from the ‘public good’ nature of systemic stability, which entails that each individual bank may free ride on the willingness of others to pay for financial stability, and more broadly on bank managers’ inability to fully appreciate the systemic implications of their risk-taking decisions. For one thing, the social cost of a bank’s default normally exceeds the private cost, even absent any specific commitment of taxpayers’ money. For another, one individual bank may not fully appreciate the implications of counterparty risk concentration resulting from their derivatives and other hedging contracts, as it dramatically emerged in the credit default swaps (CDS) market after the failure of Lehman Brothers in 2008 (BCBS, 2009a; Hellwig, 2010).

The recent crises have once again highlighted the two main sources of systemic instability in banking systems: excessive leverage and interconnectedness through the highly volatile wholesale money market. The big game was borrowing short and cheap in the wholesale money market, notably the repo market; making leveraged bets on own account in high return-high risk assets engineered by securitisation magicians; and hedging these bets with few counterparties that massively underpriced the risk of default and kept little reserves to meet potential losses. High leverage was used to boost returns on a thinner and thinner capital basis (Alessandri & Haldane, 2009). The interbank and wholesale money markets offered a cheap and flexible source of funds, but led to a massive increase in interconnectedness between financial institutions.

The fragility of the system depends critically on the structure of interbank relations: the more deeply banks are interconnected, the more they are likely to pull each other into the abyss when confidence evaporates (Allen & Gale, 1998; Goodhart et al., 2006). Systemic instability always involves the evaporation of liquidity, with the interbank and many securities markets seizing up as mutual confidence among the banks disappears and banks scramble to roll over their sight liabilities and sell assets in increasingly illiquid markets.

Many authors have tended to read systemic instability as *cyclical* instability, to be cured by anti-cyclical brakes such as dynamic capital provisioning: the emphasis, in designing the remedies, has been on *changes* in leverage ratios, rather than their level (see Brunnermeier et al., 2009).

Much was made, in this context, of the role of accounting criteria, notably mark-to-market, in enhancing cyclical instability. As pointed out by Haldane (2012), banks were eager to mark-to-market their assets in upswings, in order to swell the value of guarantees available for borrowing, but changed tack and sought a relaxation of mark-to-market rules during the downswing. Of course, in the latter case moving away from market valuations strengthens the banks' balance sheets only on paper but cannot enhance the liquidity of assets in case of forced liquidation. The jury is still out searching for less unstable accounting rules; but it is also clear that regulators were all too willing to accommodate bankers and thus directly contributed to swelling leverage in upswings and delaying loss recognition in downswings.

Regulatory responses to the crisis have varied. The Basel Committee, under impulse from the Financial Stability Board, has concentrated on strengthening prudential regulation, and notably capital and liquidity requirements for systemically important financial institutions (SIFIs); in the United States, the Dodd-Frank legislation has forbidden banks to trade securities on own account (the 'Volcker' rule, which is now encountering serious difficulties of implementation); in the United Kingdom, following the Vickers Report (ICB, 2011), the decision was taken to 'ring-fence' domestic retail banking (while leaving 'casino' banking to continue for international operations); both measures specifically aim at combating excessive risk-taking and moral hazard. The European Union has been busy bashing credit rating agencies and private pools of capital (hedge funds and private equity funds), while its main member states have resisted stricter capital rules on behalf of their major banking groups.

The new Basel rules, as will be discussed, include strengthened liquidity and 'net funding' requirements that will restrain maturity transformation and hence go in the right direction, but will only enter into force later in the current decade. It is open to debate whether the multiplication of capital and liquidity constraints, without a clear rationale, will restore financial stability and provide an efficient solution.

The new rules also entail higher capital requirements, which however will still be based on the flawed risk-weighted approach that so far failed so remarkably with Basel Accords. The ready indicator that this solution is weak is in the new minimum capital back-stop introduced in the system, which has been set at 3% of total assets (the European Commission, by the way, has removed it as a binding requirement in its CRD IV proposal). A 3% capital ratio means that banks operating with a leverage of 33 could still be compliant with Basel prudential rules. It may be recalled, in this connection, that when the financial crisis struck, some large international banks were operating with a capital ratio over total assets below 2%. Thus, there will be an increase in the 'absolute' capital ratio, but not a very large one. Such a system remains open to a confidence crisis almost as much as before the crisis struck.

The key point, largely overlooked in the Basel policy circles, is that financial instability is a direct consequence of the aggregate, risk-unadjusted capital ratio of the banking system. This ratio determines the leveraging and deleveraging multiplier that in turn drives the expansion of credit in the upswing and its contraction when liquidity evaporates. The rapidity of implosion of a banking system struck by a confidence and liquidity crisis depends on its *average* leverage ratio; in this regard, reference to risk-weighted capital ratios is misleading.

Therefore, the primary way to reduce systemic instability is to raise the aggregate capital ratio of the banking system – equity over total assets – way above current values. If we reason in terms of multiple thresholds, the unweighted regulatory capital ratio corresponding to a 'well capitalised institution' should probably be set at around 7-10%, and the minimum capital triggering supervisory takeover of the bank should be no lower than 4-5%. Higher capital requirements may offer an efficient alternative, in order to scale down bloated banking, to structural separation or outright prohibitions of activities, which may arbitrarily cut or weaken the supply of banking services (for a discussion cf. ICB, 2011, and also Calomiris, 2009; Goldstein & Véron, 2011; Turner, 2010).

## 2. THE CHANGING BUSINESS OF BANKING

---

As early as the breakdown of the Bretton Woods' fixed exchange rate system, in the early 1970s, deregulation, globalisation and information technology unleashed a dramatic increase in financial intermediation and radical changes in the size and structure of banking in the United States and in Europe. Within little over a decade, a financial sector fragmented in functional and geographical terms was replaced by a globalised financial system dominated by large financial conglomerates active internationally in a multiplicity of financial sectors. Already in 2000, over 80% of the assets of the largest 500 banking organisations were controlled by financial conglomerates, and among the largest 50 banking organisations the proportion reached 94% (Huertas, 2006). Total assets of the top 25 banks worldwide rose from 30% in 1990 to 77% in 2009 of world GDP (Goldstein & Véron, 2011).

In the United States since the late 1980s, the Federal Reserve used its authority to relax restrictions on bank underwriting activities and started to press for the elimination of branching and consolidation limits. In the 1990s these trends found their way into the rule-book with the removal of geographical limits to nationwide banking, following the 1994 Riegle-Neal Interstate Banking and Branching Efficiency Act; while the 1999 Gramm-Leach-Bliley Financial Services Modernization Act (GLBA) repealed the 1933 Glass-Steagall Act's separation of commercial and investment banking and removed restrictions on conglomerations. In 1997 the Federal Reserve Board also eliminated many of the remaining conflict-of-interest firewalls limiting connections between bank and non-bank activities within bank-holding companies.

Deregulation was largely motivated by the desire to promote US banks in the face of the increasing competition, domestically from the growing securities industry and non-bank financial intermediaries (e.g. pension funds and mutual funds), and in the global arena from non-US

financial firms that were not subject to similar regulatory constraints (Calomiris, 2000). The goal of ‘competitive deregulation’ was explicit: “Unless soon repealed, the archaic statutory barriers to efficiency could undermine the competitiveness of our financial institutions, their ability to innovate and to provide the best and broadest possible services to US consumers and, ultimately, the global dominance of American finance” (Greenspan, 1999).

In Europe, the Second Banking Directive in 1989 – introducing the single banking license with consolidated home country control – generalised throughout the internal market the German-Swiss universal banking model, removing all restrictions for commercial banks to operate in non-bank financial business. During the 1990s, national authorities strived to support their national champions and encouraged their cross-border expansion, with little concern for their financial solidity, leading to the emergence of a few pan-European mega-banking groups that were very large relative to the domestic economy. Continental universal banks also made an inroad into aggressive Anglo-Saxon finance by purchasing UK and US investment and brokerage houses through an intense M&A activity (Herring & Carmassi, 2008; Di Noia & Micossi, 2009).

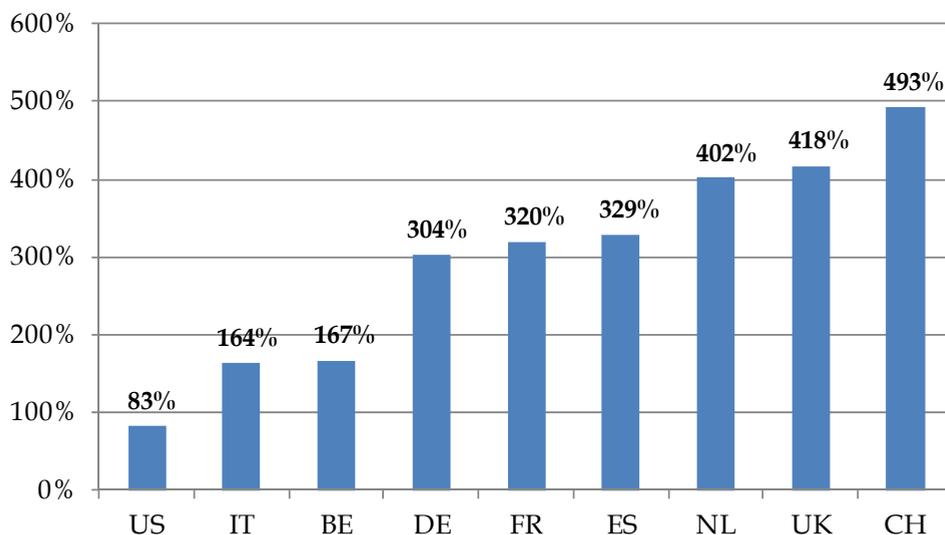
In the United States, total assets of the 10 largest commercial banks amounted to 16% of US GDP in 1988 and rose to 21% in 1997 and 56% in 2007 (DeYoung, 2010). As of year-end 2010, five US SIFIs alone had cumulative total assets amounting to almost 60% of GDP. In the United Kingdom, total assets of the 10 largest banks amounted to 90% of GDP in 1986, 130% in 1996 and 344% in 2006; in France, the same ratios were 105% in 1986, 152% in 1996 and 370% in 2006; and in Germany, 79% in 1986, 114% in 1996 and 207% in 2006 (Goddard et al., 2010).

Thus, as may be seen from Figure 1, the weight of banking over GDP has grown out of proportion, especially in Europe: in 2010, the size of the banking sector relative to GDP in the United States was just above 80%, but amounted to 274% for the eurozone, 304% for Germany, 320% for France, 418% for the United Kingdom and 493% for Switzerland (mainly due to two banks).<sup>2</sup> A large share of these assets, in some cases up to a half, was funded in the wholesale market.

---

<sup>2</sup> Swiss banks’ total assets amounted to 664% of GDP at the onset of the crisis back in 2007, while in the same year the ratio was 894% for Ireland and 876% for Iceland (up from 121% in 2001, according to IMF, 2010).

Figure 1. Total assets of banks as a share of GDP, by country (year-end 2010)\*



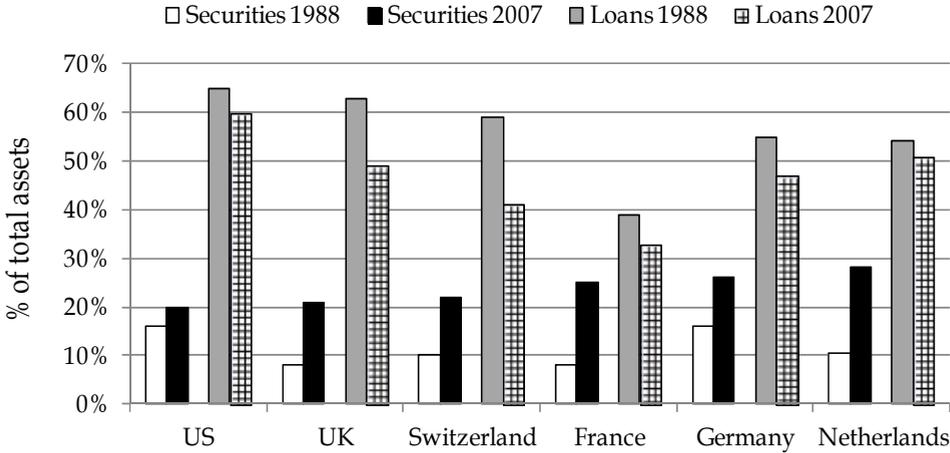
\* Swiss data include foreign banks' subsidiaries in Switzerland.

Sources: ECB, SNB, FDIC for total assets of banks; IMF WEO (September 2011) for GDP.

Thus, the concentration and globalisation of banking have made the systemic risk stemming from banking overwhelmingly relative to the national ability to withstand potential losses: financial fragility, or the probability of crisis, has gone up significantly with the rising share of funding coming from highly volatile sources, the worsening quality of assets and declining capital ratios. On all of these accounts, Europe is more exposed than the United States.

Consider first the changes in bank portfolio composition and the resulting shift in income sources. Figure 2 shows the changing composition of bank balance sheets between 1988 and 2007 in some large countries (OECD data). There was, as may be seen, a large increase in the share of securities over total assets and a corresponding fall in the share of loans to the economy. The shift is more marked for European banks, although aggregate data may underestimate the phenomenon for the United States due to the exclusion from the sample of non-bank financial intermediaries. It is also more pronounced for large cross-border banks.

Figure 2. From commercial loans to securities trading\*



\* All banks for the United States, Switzerland, France, Germany and the Netherlands; large commercial banks for the United Kingdom.

Source: OECD Bank Profitability.

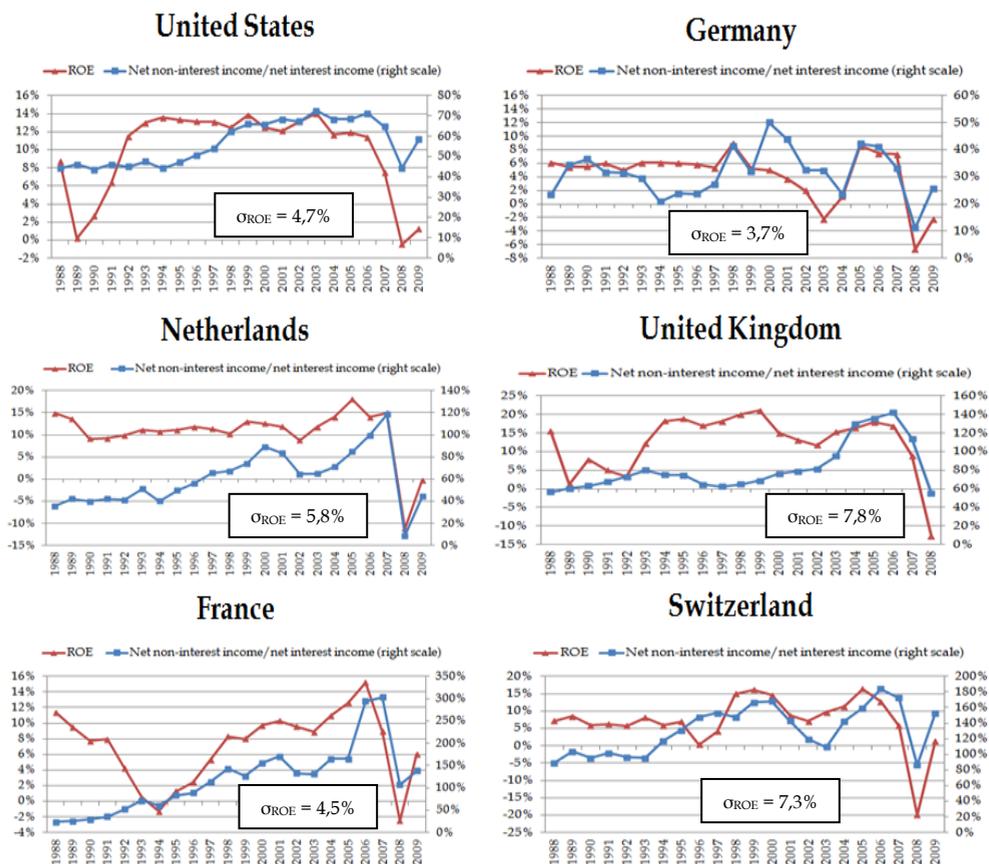
For instance, over the two decades under observation, Bank of America shows a fall in the share of loans to customers from about 60% to about 40%, with the share of securities rising to around 30%. In 2010, BNP-Paribas had in its balance sheet a 34% share of loans, 54% of securities; Deutsche Bank, respectively had 21% and 63%. Until the crisis struck, a large share of securities was held in the trading book.

In Figure 3 we have plotted, for the same national banking systems, the aggregate ratio between (net) non-interest and interest income and the rate of return on equity (ROE). As may be seen, the share of non-interest income goes up almost everywhere, but more markedly in European countries: with peaks of 300% for France, 180% for Switzerland and 140% for the United Kingdom. German banks lag behind (with a peak of 50% in 2000) and generally show lower profitability. While the different weights of large banks in national systems and the presence in the United States of a large non-banking sector may somewhat distort the comparison, the evidence is consistent with the view that emerging changes in banking structures started in Anglo-Saxon markets but later spread to European markets, where students became sometimes more aggressive than their teachers.

ROE was highest in the United Kingdom, with peaks around 20% around the turn of the first decade, and the Netherlands (some 18% around

the mid-2000s); average returns hovered between 10% and 15%, with a large increase over the previous decades (for example, the average ROE for US banks was 5.8% in the 1980s, 11.3% in the 1990s and close to 12% in 2000-07).

Figure 3. Bank profitability increasingly driven by net non-interest income (1988-2009)\*



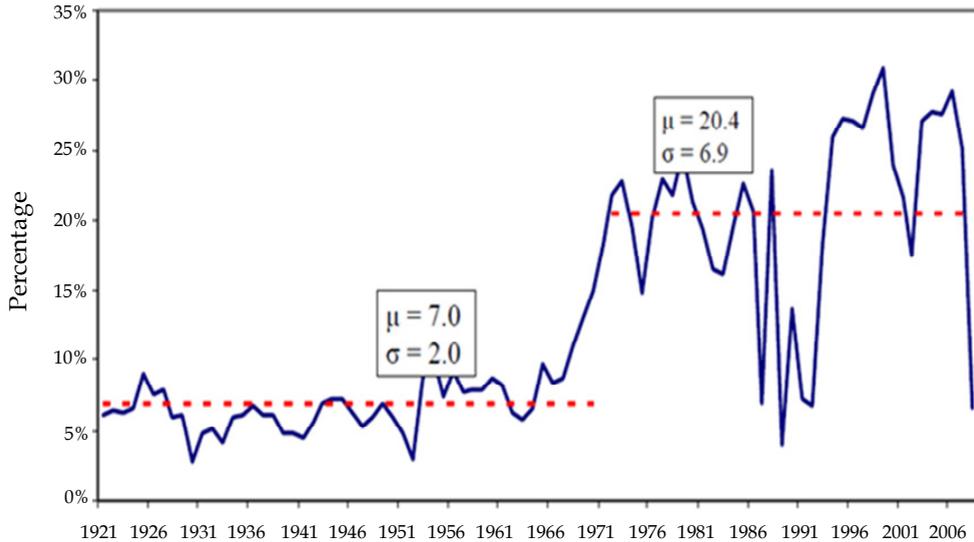
\*All banks for the United States, Switzerland, France, Germany and the Netherlands; large commercial banks for the United Kingdom (data running up only to 2008).

Source: OECD Bank Profitability.

The increase in returns was accompanied by a large increase in their variability, more markedly in the United Kingdom and Switzerland (Figure 3). In this regard, in a long-term perspective, the end of fixed-exchange rates seems to correspond to a 'regime' shift.

Figure 4, drawn from Alessandri & Haldane (2009), presents evidence on ROE and its variability for a sample of UK banks over the past nine decades, from the early 1920s to 2007. As may be seen, up to the early 1970s, the ROE moved in a range between 3% and 10%, with a mean value of 7% and a standard deviation of 2; afterwards, the average ROE jumps to over 20% and the standard deviation to almost 7, with minimum values below 5% and maximum values above 30%. The picture for the 1990s and 2000s is confirmed by aggregate OECD data for UK banks; the standard deviation is even higher, close to 8% (Figure 3), due to the inclusion in the sample of data for 2008, the first crisis year. The peaks in the ROE coincided, not surprisingly, with the two waves of rapidly accelerating asset price increases at the end of the 1990s and in the mid-2000s.

Figure 4. Return on equity for UK banks



$\mu$  = mean ROE;  $\sigma$  = ROE standard deviation.

Source: Alessandri & Haldane (2009).

As may be recalled, the breakdown of fixed exchange rates coincided with a general relaxation of monetary and financial discipline worldwide, and the UK moved earlier than other countries to free its capital market, which already in the 1970s had become host to the euro-dollar market, the ballooning, and largely lawless, market for syndicated dollar loans, operating in London as an off-shore centre. The euro-dollar market played a prominent role in the recycling of the oil imbalances, and in the process

provided reckless lending to oil-importing developing countries, leading later to a first wave of banking rescues and external adjustment programmes. Complacent lending by international banks continued in the ensuing decades, leading to waves of local and regional banking crises in the developing and emerging world in the 1980s and 1990s (Kindleberger & Aliber, 2005). It must be stressed that, during these bouts of instability, international banks were largely shielded from losses, which fell on the shoulders of the borrowing countries under the aegis of the IMF financial assistance programmes (and close guidance by the United States).

Clearly, large international banks exploited the looser monetary and regulatory environment to take much greater risks in exchange for greater returns. There is ample evidence that these developments mainly reflected their securities trading, funded from cheap but highly volatile sources. Please see Figure 5.

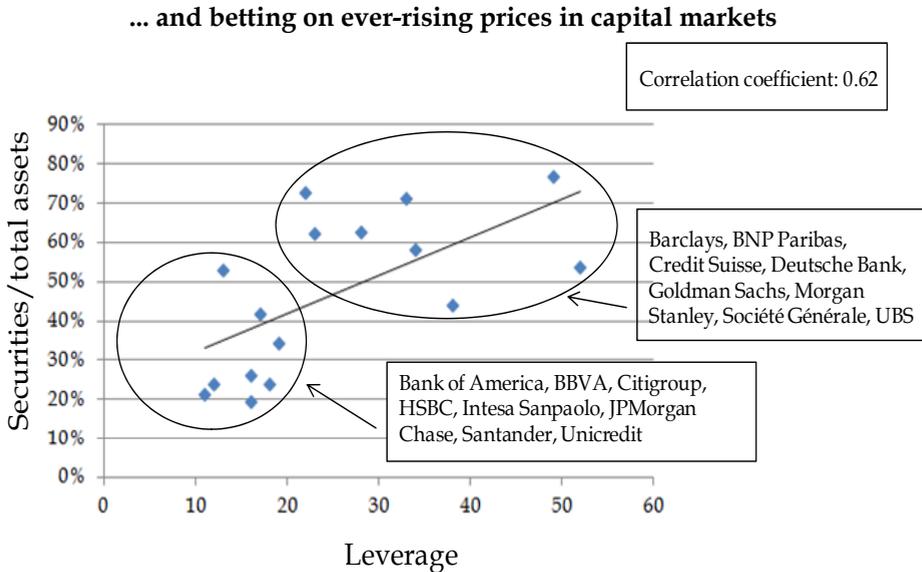
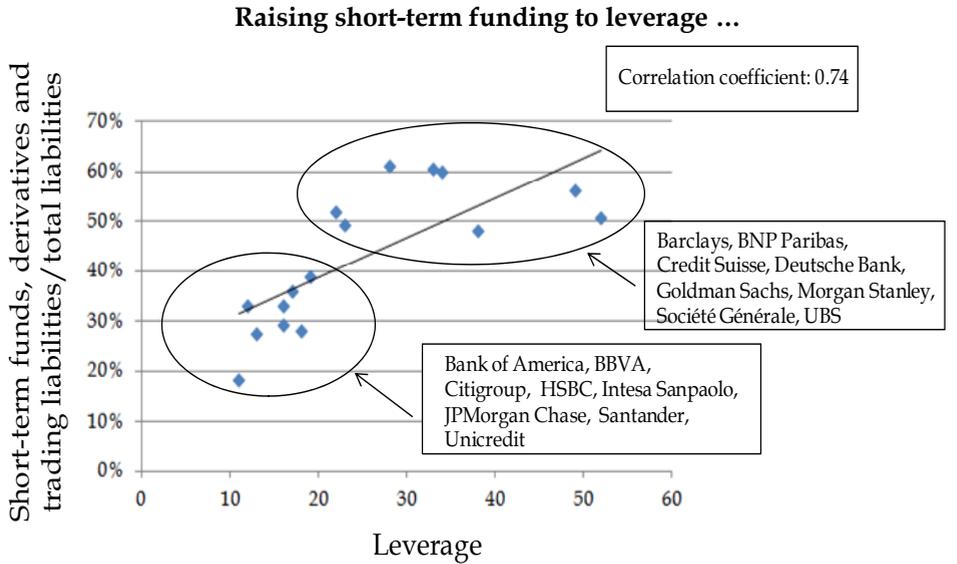
In the upper quadrant we have plotted, for a cross-section of 16 large international banking groups, the (risk-unweighted) leverage ratio (horizontal axis) against the share of funding coming from the wholesale money market, including trading liabilities and derivatives (vertical axis). As may be seen, there is a strong and significant positive correlation between the two variables, i.e. banks with a higher leverage also display a higher share of volatile funding. The banks in the sample seem to belong to two distinct clusters, one with lower leverage and share of volatile funding, and the other with higher values for both variables. A large share of financing was procured in the form of repos, very short operations backed by assets of doubtful liquidity: a prominent manifestation of shadow banking, since money market investors were performing a bank-like function by de facto transforming the maturity of bank loans.<sup>3</sup>

In the lower quadrant, leverage is plotted against the share of securities in total assets: once more, a positive correlation between the two variables is observed, weaker than before but still significant. It also appears that banks undertaking riskier capital market bets coincide with those more exposed in the wholesale money market.

---

<sup>3</sup> In the repo market, banks pledged their securities as collateral for short-term loans from money managers and other investors. The collateral was often represented by repackaged loans used as security, which allowed higher returns for lenders but also considerable risks of illiquidity, as it later became all too clear.

Figure 5. Leverage, securities trading and short-term funding by large banks (2007)\*



\* Leverage defined as total assets on total equity. Short-term funds: deposits, loans and repos from banks, money market instruments, CDs and other deposits. Derivatives: out-of-the-money trading and hedging derivatives, less the value of netting arrangements. Trading liabilities: short positions, repos, short-term notes and other financial liabilities classified as held for trading. Total securities: trading securities + derivatives + available for sale securities + held to maturity securities + at-equity investments + other securities.

Source: Authors' own computations based on Bankscope data.

And again, the banks seem to belong to two separate clusters, with some banks showing similar shares of securities in their portfolio corresponding to 'low' and 'high' leverage ratios. The two clusters display a remarkably stable composition across the two quadrants. Thus, the combined observation of the two quadrants reveals that banks that were more exposed to the securities market were also more leveraged and more reliant on volatile funding.

Figure 6 shows the evolution of total assets (2000=100) of the largest US and EU banking groups in the Mediobanca sample (13 US and 31 EU groups in 2009), and their leverage: visibly, the expansion of activities was financed on a rising leverage. The leverage ratio of European banks always moved to a higher 'plateau', while deleveraging after the crisis began later.

A sizable share of assets and liabilities of large cross-border banking groups is represented by derivatives, normally accounted for at their 'fair value', i.e. the potential gain or loss on the contract. For instance, derivatives represent 54% of Morgan Stanley's total assets at end-2010, and between 40% and 50% for other major US bank holding companies (except in Citigroup, where the percentage ratio is 26). In Europe, the numbers are typically smaller, with the highest shares recorded by Credit Suisse (41%), Deutsche Bank (35%) and Barclays (28%), and all the others below 20% (Italian and Spanish banks below 10%). Similarly, large positions are held on the liability side.

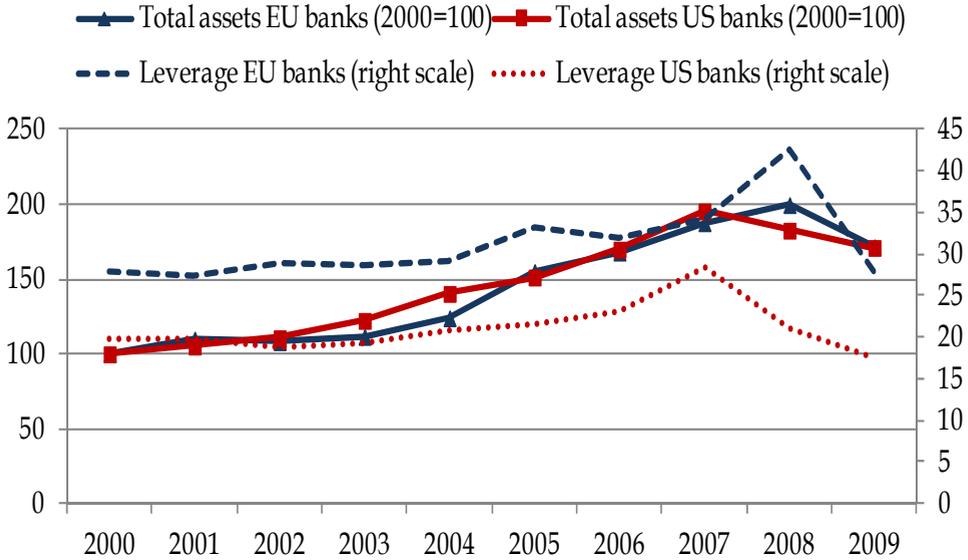
The problem is that under US GAAP (Generally Accepted Accounting Principles), banks' derivative positions are reported on a net basis,<sup>4</sup> while they are reported on a gross basis under the IFRS (International Financial Reporting Standards) accounting principles. Not surprisingly, leverage ratios are quite different, depending on the accounting treatment of derivatives: for instance, on a gross basis, the banking groups holding the largest derivatives positions see their leverage roughly double (Credit Suisse from 22 to 35, Morgan Stanley from 15 to 30, JPMorgan Chase and Goldman Sachs respectively from 12 to 20 and from 11 to 19). Even after this adjustment, only Morgan Stanley, among US banking groups, has reached leverage ratios close to those of large EU banking groups. Thus, it remains true that large EU banking groups are

---

<sup>4</sup> Gross positive values are netted with gross negative fair values under a master netting agreement; cash collateral is also computed for netting.

more leveraged than their US counterparts. We return to this issue in Chapter 4, when we discuss the role of risk-weighting in swelling leverage.

Figure 6. Banks' total assets and leverage, EU and US (2000-09)\*



\* Largest 31 EU and largest 13 US banking groups by total assets in 2009. Leverage = total assets net of intangible assets/net tangible equity.

Source: Mediobanca (2011).

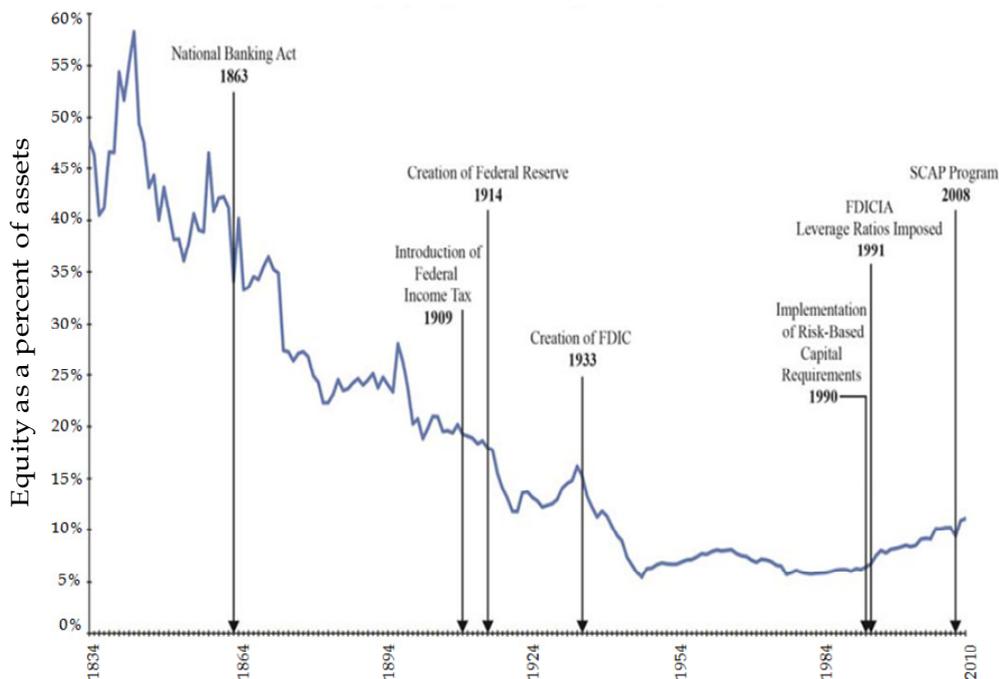
### 3. BANK CAPITAL IN HISTORICAL PERSPECTIVE

---

In the very long run - as may be seen from US time series, thanks to Kaufman (1992) and Herring (2011a) - bank capital shows a strong downward trend (Figure 7). Kaufman argued convincingly that the main force pushing it down even before the creation of deposit insurance and lending of last resort was the reduced risks of bankruptcy. Since the risk of insolvency would lead rapidly to withdrawal of liquidity and the suspension of activity, bankers were ready to raise capital fairly rapidly in response to losses, as confirmed by the rise in capital ratios after waves of insolvency. Therefore, they would push leverage only up to the point where the marginal increase in their funding risk premium, due to higher bankruptcy risk, would offset higher returns on equity from higher leverage. Kaufman also observed that, even before deposit insurance, capital in banking appeared systematically lower than in other industries (based on data dating back to 1902), and that this could be explained by depositors' losses in bank failures being generally small, between 0.10 and 0.20 on the dollar, which compared with losses of 0.90 on the dollar for bond-holders of failed non-financial firms. Thus, market discipline on individual institutions on the whole seemed to work, and capital requirements were determined by the risk of bankruptcy, fully reflected in the cost of funding.

However, microeconomic discipline was apparently not sufficient to prevent recurrent banking crises and panics (Kindleberger & Aliber, 2005). Three main explanations for panics are present in the literature: the business cycle; liquidity shocks (demand or supply driven) leading to very large changes in asset prices, as when there is an asset price bubble; and random exogenous events (Allen & Gale, 2007). They all entail systemic interactions between financial intermediaries and markets, and multiple equilibria with sudden shifts from 'good weather' to 'bad weather'.

Figure 7. The capital ratio of US banks (1834-2010)



Source: Herring (2011a).

The risk of these events is clearly underpriced by individual banks and financial intermediaries, which do not hold sufficient capital reserves against such occurrences, reflecting the divergence between the private and social costs of financial crises and the public good nature of financial stability. Widespread underpricing of the risk of systemic instability leads inevitably to excessive aggregate leverage, and hence to a higher deleveraging multiplier; when the asset price pendulum swings adversely, deleveraging magnifies the real economic costs of falling asset prices.

The high economic cost of banking crises is the reason why sooner or later all countries instituted central banks – starting with Sweden and the United Kingdom in the late 17<sup>th</sup> century – and gradually developed banking charters, lending of last resort and deposit insurance. In the United States, the National Banking Act of 1863 created the Office of the Comptroller of the Currency entrusted with chartering and supervising national banks. The Federal Reserve was established in 1914, following the 1907 panic, with some capacity to lend through the discount window; deposit insurance and full lending of last resort were set up in the 1930s as part of the banking legislation enacted after the Great Depression.

As may be seen from Figure 7, each of these developments led to a large decline in bank capital ratios: they went from 55% to 30-35% after the National Banking Act, and to a range between 5% and 10% after the 1930s legislation (Herring, 2011a). A specific incentive for banks to leverage arose with the creation of the federal corporate income tax, which allowed banks to deduct interest costs on their borrowing.<sup>5</sup> While the specific contribution of each of these factors is not easy to disentangle, there seems to be little doubt that they accentuated the declining trend in capital ratios – until eventually banks came to hold too little capital to meet a sudden liquidity and confidence crisis (Herring, 2011a).

During the ensuing four decades, the financial system was kept stable, in the United States and elsewhere in the developed world, by pervasive structural restrictions on banking activities, in a disciplined macro-financial environment prompted by fixed exchange rates. When these constraints were relaxed in the 1970s, banking crises started to appear again with increased frequency. If up until the early 20<sup>th</sup> century, too little government had been seen as the main source of instability, now the culprit was identified in faulty and internationally inconsistent macro-policies, as well as, poignantly, in moral hazard created by banking charters and the attendant promise to rescue bankers from their mistakes (Allen & Gale, 2007).

### **3.1 The first Basel Accord**

This is the context in which the Basel Committee on Banking Supervision (BCBS) negotiated the first Basel Capital Accord, adopted in July 1988. The Accord had two main goals: to reverse the global trend of weakening bank capital and foster competitive equality internationally (BCBS, 1988; Goodhart, 2011; Tarullo, 2008). A specific concern here was to respond to the ongoing international onslaught by Japanese banks, which operated on very thin capital.

The Basel Committee on Bank Supervision was established in 1974 by the central bank governors of the G-10, following the Herstatt Bank failure. The first output of the BCBS was the Basel Concordat of 1975 on

---

<sup>5</sup> As noted by Herring (2011a), the federal corporate income tax was in fact introduced in 1909, but with very low rates; it was only after World War I that rates were raised significantly and started to represent a significant incentive to leveraging.

supervision of banks' foreign establishments (BCBS 1975). The Concordat was revised in 1983 to further clarify the international allocation of supervisory responsibilities: home country authorities were assigned oversight on the solvency of banking groups on a consolidated basis, while host countries retained responsibility for the solvency of subsidiaries of foreign banking groups established in their jurisdiction, and the liquidity of their branches (BCBS, 1983). This allocation of tasks still holds today.

In the 1980s, the Basel Committee turned its attention to the level of capital. The first Basel capital framework, known as Basel I, introduced a minimum capital requirement of 8% of risk-weighted assets (RWA). These were to be calculated by applying pre-determined weights to exposures, based on the nature and geographical area of the counterparty. Four weighting areas were introduced: zero for cash, government securities of OECD countries; 20% for claims on banks incorporated in the OECD; 50% for mortgages; 100% for claims and equity stakes in private corporations.<sup>6</sup> There were also provisions for the inclusion of off-balance sheet items in the total assets: first, a conversion factor was used to obtain the balance sheet asset-equivalent of off-balance sheet items; and, second, each such 'asset' was included in its risk bucket based on the counterparty. National regulators could apply more lenient weights to claims backed by real or personal guarantees – which opened the door to a broadened use by banks of risk-mitigation techniques to reduce the absorption of capital, under the benevolent eye of their regulators.

In the Committee's view, risk-weighting had the following advantages: it would provide a fairer basis for rules applying to banking systems whose structures may differ; it would allow off-balance-sheet exposures to be incorporated more easily into the measure; and it would not deter banks from holding liquid assets, such as government securities and interbank positions, which at the time were universally seen as low risk (BCBS, 1988). With the benefit of hindsight, risk weighting did not achieve the first two goals but, on the contrary, the system encouraged aggressive risk-mitigation techniques and regulatory arbitrage; the third goal was achieved, but biased bank portfolios in favour of government and banking counterparts, which later became a source of instability.

---

<sup>6</sup> National regulators also had the option to apply weights of 0, 10, 20 or 50% to domestic public sector entities other than central governments.

The definition of regulatory capital included a wide range of eligible instruments: core (Tier 1) capital, i.e. equity and disclosed reserves; supplementary (Tier 2) capital, accepted up to 100% of Tier 1 capital and comprising other reserves and provisioning accounts, hybrid debt capital instruments and junior term-debt. Some items also had to be deducted from required capital, notably goodwill and investments in unconsolidated subsidiaries engaged in banking and financial activities and in the capital of other banks and financial institutions.<sup>7</sup> Ample room for national discretion in the definition of capital was to become a source of significant cross-country inconsistencies, hampering the key objective of levelling the playing field.

Initially designed for international banks of the G-10 area, the Basel I regime was eventually applied by over 100 countries. Its impact was significant, as it raised the overall regulatory solvency ratio of the main banks in the G-10 countries from 9.3% in 1988 to 11.2% in 1996 (BCBS, 1999a; see Figure 8), thus halting the historical downward trend in capital ratios – albeit with the important exception of the United Kingdom. In the United States, solvency ratios went up also following the 1991 FDIC Improvement Act, which established a system of unweighted capital floors to be used as a trigger for supervisory intervention under the PCA system.

In part owing to its very success, Basel I soon came under considerable criticism. The Basel framework was predicated on the traditional banking business model of raising deposits and lending to households and businesses, which explains why credit risk was accounted for, while interest rate and market risks were neglected. Moreover, risk buckets were roughly identified, giving rise to arbitrage opportunities across and within the buckets.<sup>8</sup> Banks complained loudly about the rigidity

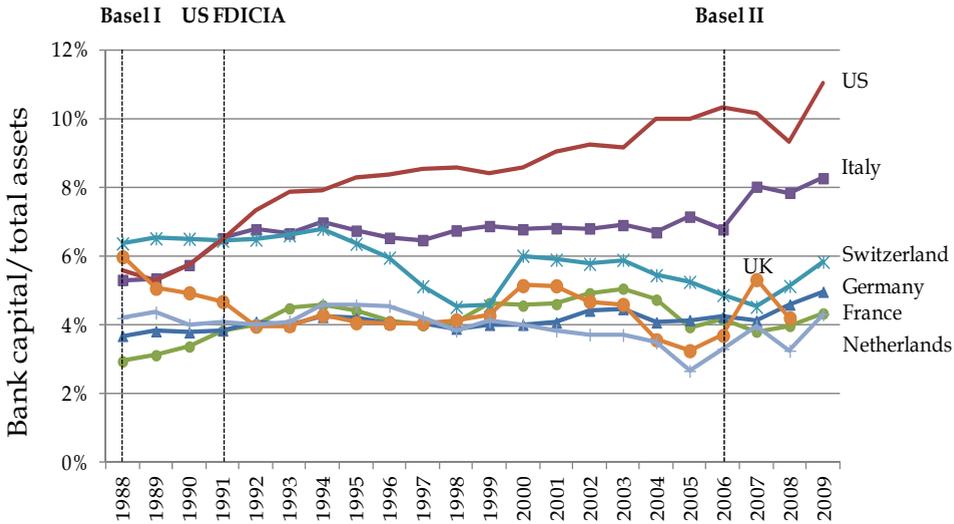
---

<sup>7</sup> This deduction was accepted in order to avoid ‘double-gearing’; the decision on deductibility was left to national authorities. The Committee was “very conscious that such double-gearing (or double-leveraging) can have systemic dangers for the banking system by making it more vulnerable to the rapid transmission of problems from one institution to another”, but was not “in favour of a general policy of deducting all holdings of other banks’ capital, on the grounds that to do so could impede certain significant and desirable changes taking place in the structure of domestic banking systems” (BCBS, 1988, p. 7).

<sup>8</sup> For instance, the same 100% weight was applied to multinational companies and small and medium enterprises (SMEs); government securities of OECD countries

of the system, as well as about the fact that neither the benefits of diversification nor the implications of loan maturity were taken into account in the determination of capital absorption.

Figure 8. The effects of the Basel Accords on bank capital\*



\* Capital and reserves in the OECD definition. For the UK, large commercial banks and data up to 2008.

Source: OECD Bank Profitability.

As a partial response to these deficiencies, Basel I was amended in 1996 to include an explicit capital requirement for market risk (BCBS, 1996),<sup>9</sup> calculated with reference to the risks of “interest rate-related instruments” (e.g. debt securities, interest rate derivatives) and equities in the trading book, and foreign exchange and commodities risk “throughout the bank” (i.e. in the banking and trading books). Capital requirements were to be calculated at least partly from banks’ internal Value-at-Risk

were granted a 0% weight, regardless of the fact that some sovereigns were clearly more risky (and as a consequence offered higher returns) than others.

<sup>9</sup> The first Basel Committee proposal to extend capital regulation to market risk dates back to 1993 (BCBS, 1993).

(VaR) models, conditional on their validation by supervisors:<sup>10</sup> a momentous precedent, later to be extended to credit and operational risk with the Basel II Accord. As it turned out, the new capital requirement did not add much to capital ratios and failed to create an adequate cushion against banks' actual losses on their market risks.

### 3.2 From Basel I to Basel II

Already towards the end of the 1990s, regulators and the banks themselves became vocal critics of Basel I, principally on two grounds (Tarullo, 2008). First, the rapid increase in securitisation of mortgages and other loans offered to the more sophisticated banks effective instruments for reducing the absorption of capital, thus opening an increasing divergence between capital requirements and actual credit risks. Second, significant advances in the risk management techniques of large banks amplified the divergences between banks' best estimates of credit risks and regulatory risk coefficients. Regulators were stung by the implicit accusation of incompetence in confronting the rapid pace of innovation and banks' improved capacity to manage risk. Soon, the banks coalesced around the goal of placing their internal risk management models as the basis of a revised regulatory framework – under the so-called 'internal ratings-based' (IRB) approach – with strong support by the Federal Reserve.

---

<sup>10</sup> The capital requirement for market risk was to be calculated as the sum of: i) a capital charge based on a standardised method (for banks not using internal models) covering general and specific interest rate risk and equity position risk, as well as foreign exchange and commodities risk; ii) a capital charge based on an internal models approach, being the higher of a) the previous day's Value-at-Risk (VaR) number and b) an average of the daily VaR measures of each of the preceding 60 business days multiplied by a factor. Internal models were in principle allowed to measure general risk (related to aggregate market movements) and also specific risk (related to specific counterparties/issuers or instruments). However, with regard to specific risk, the modelling of some key variables such as event risk (sudden and relevant price change) or default risk (sudden failure of issuer) turned out to be too complex and burdensome in terms of additional conditions imposed (e.g. ability of the model to explain *ex-ante* changes in portfolios value, capture concentration and remain reliable in stress conditions). As a consequence, a fallback option was preferred, consisting of applying a risk surcharge, a multiplier of 4 (rather than 3) to the specific VaR measure.

By June 2000, the BCBS agreed to a far-reaching shift to the IRB approach. From the start, the new system proved very complex: negotiations opened on the basis of a 450-plus-page consultation document and went on for almost six years. The new system was formally agreed upon in June 2006 and was phased in during 2007-08.<sup>11</sup> Two aspects are worth stressing: unlike the previous exercise leading to Basel I, the prudential purposes of the new IRB approach were not clearly specified (Dewatripont et al., 2010; Goodhart, 2012; Hellwig, 2010). And despite a number of quantitative impact studies, the committee never came to a reliable assessment of its effects on required capital ratios (Tarullo, 2008).

In practice, while formally maintaining the 8% required capital ratio over risk-weighted assets, the Basel II Accord introduced two main changes. It substituted the fixed-weight risk buckets of Basel I with a new system for fine-tuning risk-weight calculations on the basis of external ratings and internal models (Pillar 1); and it complemented capital ratios with principles for enhanced supervisory review (Pillar 2) and transparency to strengthen market discipline (Pillar 3).

Already in the original text of the 1988 Accord, the BCBS had recognised certain weaknesses in the system, including the narrow focus on credit risk and the fact that “capital adequacy is one of a number of factors to be taken into account when assessing the strength of banks”, and “capital ratios, judged in isolation, may provide a misleading guide to relative strength”. Pillars 2 and 3 were the belated response to those concerns, expressing the aspiration to a broader approach in evaluating banks’ risk profile.

As to the calculation of risk weights under Pillar 1, the system is ludicrously complex. There are separate formulas for credit risk, market risk and a new risk category, operational risk.

Three possible methods can be used for credit risk: standardised, foundation internal rating based (FIRB) and advanced internal rating based (AIRB). Under the standardised approach, the weights are calculated based on the counterparty (i.e. banks, corporations, sovereigns), as under Basel I, and the (external) rating assigned to each counterparty by rating agencies.

With IRB methods, the weights of individual exposures are calculated from a common mathematical formula – the asymptotic single risk factor

---

<sup>11</sup> For a detailed analysis of the implementation of Basel II in the midst of turbulence, see Ayadi (2008).

(ASRF) model, developed by Gordy (2003)<sup>12</sup> – where banks provide the key variables in the calculation: the probability of default (PD), the loss given default (LGD), the maturity (M), the exposure at default (EAD) and the correlation to the single macroeconomic factor. With FIRB, the bank estimates the PD and the other parameters are estimated by regulators; with AIRB, all parameters are estimated by the bank with internal models. Internal models are validated by supervisors.

Operational risk is defined as “the risk of loss resulting from inadequate or failed internal processes, people and systems or from external events. This definition includes legal risk, but excludes strategic and reputational risk” (BCBS, 2006a). Here too, various methods may be used at the bank’s discretion in the calculation, entailing quite different results.<sup>13</sup>

As noted above, the new Accord had two new Pillars dedicated to supervisory review and market discipline. Under Pillar 2, supervisors must have extensive powers to review the effectiveness of banks’ risk management systems and adequacy of capital ratios, and intervene promptly to prevent capital from falling below regulatory requirements.<sup>14</sup>

---

<sup>12</sup> The model assumes normally distributed probabilities of default and a unique factor of macroeconomic risks, admittedly two heroic assumptions.

<sup>13</sup> Three methods may be used: i) the basic indicator approach, where the capital requirement equals the average of 15% of positive annual gross income over the previous three years; ii) the standardised approach, where gross income is divided into eight business lines and multiplied by a factor specific for each line to obtain capital charges for each business line, which then are added to determine the total capital requirement; and iii) the advanced measurement approach, where capital requirements are calculated by the bank’s internal operational risk measurement system based on quantitative and qualitative criteria.

<sup>14</sup> Pillar 2 comprised four principles of supervisory review: i) banks should have a process for assessing their overall capital adequacy in relation to their risk profile and a strategy for maintaining their capital levels; ii) supervisors should review and evaluate banks’ internal capital adequacy assessments and strategies, as well as their ability to monitor and ensure their compliance with regulatory capital ratios; supervisors should take appropriate supervisory action if they are not satisfied with the result of this process; iii) supervisors should expect banks to operate above the minimum regulatory capital ratios and should have the ability to require banks to hold capital in excess of the minimum; and iv) supervisors should seek to intervene at an early stage to prevent capital from falling below the

The official text stresses the importance of taking account of other components, along with capital, in ensuring a bank's soundness, including a strong risk management system, a sufficient level of reserves and provisions and effective internal controls. Under Pillar 2, supervisors were also required to handle risks "not fully" taken into account under Pillar 1 (e.g. credit concentration risk), factors "not included at all" within Pillar 1 (e.g. interest rate risk in the banking book), and factors "external to the bank" (e.g. the business cycle), as well as compliance with minimum standards and disclosure requirements regarding internal models for credit risk and the advanced approach for operational risk. It is worth recalling that the Basel Committee recognised from the very beginning that cross-country differences in supervisory practices would entail difficulties in the implementation of Pillar 2 (see BCBS, 1999b).

Finally, Pillar 3 was introduced to promote transparency and enhance market discipline by providing the public with ample information on the bank's risk profile. Data for disclosure comprise a set of quantitative and qualitative indicators, applying to consolidated banking groups, of risk management systems, credit, market and operational risk, securitisation and equity positions, interest rate risks. In addition, banking groups are also required to disclose detailed information on regulatory capital, including its amount and composition, the regulatory deductions, and the breakdown of capital covering credit, market and operational risk, with separate data for capital determined under the different methods (e.g. standardised or IRB approach for credit risk). Under Basel II, banks are required to publish their 'Pillar 3 document' every year. The BCBS (2006a) emphasised the importance of making this information public, especially for banks calculating capital requirements with internal methods.

Altogether, the Basel II system strikes the observer as ludicrously complex, making capital calculations difficult to read and interpret. As noted by Haldane (2011), in order to arrive at the capital requirements, large banks using advanced internal methods typically identify some 200,000 risk buckets and 200 million computations to perform. And yet, while this is supposed to reflect precisely banks' own risk assessment methods, in reality the result is arrived at on the basis of a uniform formula chosen by regulators, thereby necessarily deviating somewhat from

---

minimum levels required to support the risk characteristics of a particular bank and should require rapid remedial action if capital is not maintained or restored.

individual banks' own risk assessment (Rochet, 2010). The problem is compounded by powers given to supervisors to 'correct' the outcome of bank models and impose different capital requirements. The latter is explicitly motivated by recognition of "the substantial impact that errors in the methodology or assumptions of formal analyses can have on resulting capital requirements" (BCBS, 2006a, Pillar 2, Internal Control Review).

Not surprisingly, a main criticism levelled at the system concerned its opacity, regarding both the adequacy of capital ratios, in relation to a bank's risk profile, and the room left to national supervisors, out of public sight, to stand by their regulated entities when their capital weakens, thus delaying the day of reckoning but raising its eventual costs. Opacity also inevitably belittles the role of market discipline under Pillar 3, since regulatory capital ratios do not provide a reliable indicator of banks' strength, as will be shown. In general, one is struck by the apparent lower relevance assigned by the Accord text to Pillars 2 and 3, which occupy altogether about one tenth of the full text of the Accord.

## 4. FUNDAMENTAL FLAWS IN BASEL CAPITAL RULES

---

Prudential capital rules should possess three features (Haldane, 2011):

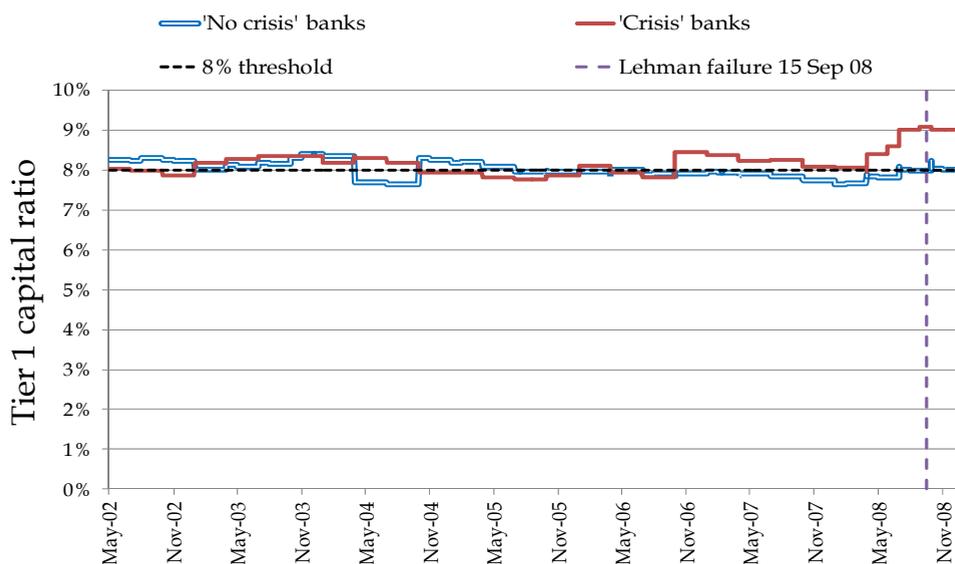
- i) the measure of the adequacy of capital should be clearly defined and simple to read by markets and supervisors, in full public light;
- ii) it should be robust to sudden shifts of market sentiment from ‘good weather’ to ‘bad weather’ and systemic shocks; and
- iii) it should provide timely recognition of emerging bank weakness so as to open the way to early corrective action by supervisors.

Unfortunately, as we will show, the Basel solvency ratios do not possess any one of these properties: they are not easy to read and fail to identify weak banks; not only do they move pro-cyclically with market sentiment, but they completely fail to take account of systemic risks; and they leave ample room for delayed loss recognition, partly as a result of the possibilities created by accounting principles to manipulate accounts, partly due to the perverse incentives created by the system for national supervisors to connive with ‘their’ weak banks and ‘gamble for resurrection’ by their side.

Already in their April 2009 Global Financial Stability Report, the IMF (2009) published evidence showing that risk-weighted capital ratios seemed unable to distinguish in the financial crisis of 2008-09 between banks that failed or were rescued with public money and banks that could stand on their own. Haldane (2011) goes one step further and shows that banks that failed or had to be rescued actually displayed higher and *improving* solvency ratios in the months preceding their collapse. In Figure 9, covering the period May 2002-December 2008, the single (red) line aggregates Tier 1 solvency ratios for banks that failed or had to be rescued, and the double (blue) line aggregates the Tier 1 ratios of those banks that survived on their own in the post-Lehman turmoil (see the note below the

figure for a complete list of the banks included in the sample). The horizontal bold-dotted line corresponds to the total 8% solvency requirement and the vertical dotted line corresponds to the collapse of Lehman Brothers, 15 September 2008.

Figure 9. Basel solvency ratios cannot detect the 'crisis' banks



Note: 'Crisis' banks are defined as major financial institutions which in autumn 2008 either failed, required government capital or were taken over in distressed circumstances. They include: Alliance & Leicester, Bradford & Bingley, Citigroup, Commerzbank, Dexia, Fannie Mae, Freddie Mac, Goldman Sachs, HBOS, ING Group, Lloyds TSB, Merrill Lynch, RBS, Wachovia and Washington Mutual. 'No crisis' banks include: ANZ Banking Group, Banca Popolare di Milano, Banco Popular, Banco Sabadell, Barclays, BBVA, BNP Paribas, Commonwealth Bank of Australia, Crédit Agricole, Deutsche Bank, HSBC, JP Morgan Chase, National Australia Bank, Royal Bank of Canada, Santander, Société Générale, Unicredit and Wells Fargo.

Source: Haldane (2011).

This evidence is indeed striking. First, as may be seen, both groups of banks most of the time had Tier 1 capital ratios around 8% – a level double the minimum required by Basel rules (4%), indicating a very comfortable solvency position based on regulatory criteria. Second, the Tier 1 ratios of the two groups are broadly indistinguishable up until 2006. Subsequently, solvency ratios distinctly improve for 'crisis' banks, but fall below 8% for

'no crisis' banks. In 2008, the ratio of crisis banks shows an increase in steps up to around 9%. It is difficult to avoid the conclusion that Tier 1 ratios do not provide a good indicator either of absolute capital strength or of banks' relative positions. The observed increase in 'crisis' banks' solvency ratios reflects new share issues but also accounting gimmicks. This brings to light the fact that some of them were manipulating their measured risks, before and after their capital increases, to show a stronger capital position than they had in reality.

Further evidence on the reliability of banks' rating models is provided by simulations run by the FSA, the UK financial regulatory authority, to evaluate banks' estimates of the probability of default of wholesale assets for a sample of 13 UK banks (FSA, 2010). Once again, the results are striking: the application of internal models to identical wholesale credit portfolios produced capital requirements differing by a factor of over 100% for exposures to banks, 150% for corporate exposures and 280% for sovereign exposures.

Moreover, Haldane (2011) reports that, based on end-2007 capital data for the four largest British banks, internal models largely underestimated losses from trading books in the ensuing three semesters (up to June 2009), which were up to six times larger than estimated with internal models based on the pre-crisis experience. Capital ratios higher by up to 2.5% of risk-weighted assets would have been needed to correct for this model error for market risk.

More broadly, in the upswing up to 2007, banks moved assets to the trading book and made aggressive use of mark-to-market accounting to maximise their leveraging room, thus amplifying cyclical instability; and in the downswing put enormous pressure on regulators and standard setters, especially in Europe, to let them move assets back to the held-to-maturity category, which is valued at historical cost (Haldane, 2012; Herring, 2011b). Huge losses were thus buried in balance sheets and were obscured by opaque provisioning practices - an important factor in the ensuing uncertainty and mistrust on the actual capital position of banks, which has played a prominent role in the confidence crisis in the eurozone since 2010.

In sum, there is strong evidence that banks' solvency ratios do not provide reliable guidance in identifying undercapitalised banks, nor do they permit supervisors and the market to exercise their disciplinary action. We will argue that this result is not surprising, and indeed reveals fundamental flaws in the Basel prudential machinery, by examining four features of the system: the definition of capital, the calculation of risk-

weighted assets, ill-specified supervisory goals and the inability of the system to handle systemic risks.

#### 4.1 Regulatory capital

The definition of capital was the most contentious issue in the negotiations leading to Basel I, but was left broadly unchanged with Basel II. The problem was how to accommodate national accounting and supervisory differences while coming to similar substantive results.<sup>15</sup> The solution was the tiered approach to the measurement of capital. While Tier 1 capital comprised universally recognised elements, i.e. common equity and disclosed reserves, Tier 2 capital included a variety of instruments with lower loss-absorbency to reflect and accommodate national differences, i.e. undisclosed reserves, revaluation reserves, general provisions and loan-loss reserves, hybrid debt capital instruments and subordinated term debt. Similar problems emerged with regulatory deductions from required capital, on which national authorities were given broad discretion, including for instance double counting of capital of banks' insurance subsidiaries and deferred tax assets (Tarullo, 2008).

The Basel negotiations became an arena where national supervisors were trying to obtain the best deal for their own banking systems. It is interesting to remember that only German supervisors took the position that only paid-in shareholder funds and retained profits should be allowed to count as regulatory capital (BCBS, 1988). The final compromise reflected all such negotiations, accepting Tier 2 elements up to a maximum of 100% of Tier 1 capital; subordinated debt up to a maximum of 50% of Tier 1 elements; loan-loss reserves up to a maximum of 1.25% of risk assets; asset-revaluation reserves taking the form of latent gains on unrealised securities up to 45%. Each of these allowances accommodated specific requests by one or another country.

---

<sup>15</sup> For example, the meaning of loan loss reserves/provisions was different across Basel countries: French banks pushed to count as regulatory capital 'country risk' provisions (made for loans to a particular country even without the identification of loan-specific risks); Japan claimed that unrealised capital gains on bank assets should be counted as capital, and the United States advocated the inclusion of certain types of preferred stocks in regulatory capital.

The financial crisis highlighted the role of hybrid instruments in sweetening banks' capital positions beyond prudence and their weak loss-absorbing capacity when they were needed.

The problem is compounded by accounting differences since measures of equity rely on accounting principles that vary from country to country and combine book values, fair values and market values. Banks' agility in regulatory and accounting arbitrage makes it difficult for supervisors to keep up, as highlighted by the use and abuse of the so-called 'Repo 105' and 'Repo 108', which were used by Lehman Brothers in the run-up to bankruptcy to reduce reported leverage (Valukas, 2010).

More in general, the crisis has highlighted that accounting measures of capital are subject not only to manipulation but also to lengthy lags in loss recognition (Calomiris & Herring, 2011; Goodhart, 2012). The crisis has also shown that these lags are not only a technical problem but also reflect supervisory forbearance. For one thing, large losses were caused by off-balance sheet vehicles that were not consolidated in the sponsoring institution's balance sheet, but were *de jure* or *de facto* guaranteed by the sponsor. Moreover, when large losses start to emerge in a major financial institution, supervisors are slow to recognise them and, once they become aware of them, they prefer to 'play for time' and collaborate in hiding the information from the public. The data in Figure 9 showing a strong and improving capital position of banks that soon afterwards had to be bailed out must at least to an extent reflect this loss recognition problem.

## 4.2 Risk-weighted assets

Table 1 reports data for year-end 2010 drawn from the annual reports and Pillar 3 documents of 16 large banking groups. The first column shows the ratio of risk-weighted assets (RWA) on total assets; the second, the total Basel solvency ratio; the third, the 'true' leverage, that is, the ratio between total assets and Basel regulatory capital. Banks are listed in decreasing order on the basis of their leverage ratios. A note on methodology is required here: US banks and Credit Suisse report their derivative positions in balance sheets on a net basis, following US GAAP, while EU banks report them on a gross basis under IFRS. For the sake of comparability, we have converted the derivatives data for US banks and Credit Suisse to a gross basis; hence data for these banks do not reflect published accounts.

As may be seen, regulatory solvency ratios show in all cases very comfortable positions, ranging from 12 to 22% of RWA, with a mean of 16% and a standard deviation of 3%. However, RWA represent widely varying

proportions of total assets, from a minimum of 13% to a maximum of 57%. The lowest ratios are recorded by Swiss and German banks, while Spanish and Italian banks show the highest values.

*Table 1. RWA, Basel capital ratios and leverage of selected banking groups, 2010\**

	<b>RWA/total assets (%)</b>	<b>Regulatory capital ratio (%)</b>	<b>Leverage</b>
<b>Deutsche Bank</b>	18	14	39
<b>Credit Suisse</b>	13	22	35
<b>UBS</b>	15	20	32
<b>Morgan Stanley</b>	20	17	30
<b>Société Générale</b>	30	12	28
<b>BNP Paribas</b>	30	15	23
<b>Barclays</b>	27	17	22
<b>JPMorgan Chase</b>	33	16	20
<b>Goldman Sachs</b>	27	19	19
<b>Citigroup</b>	39	17	16
<b>Bank of America</b>	39	16	16
<b>Unicredit</b>	49	13	16
<b>Santander</b>	50	13	15
<b>Intesa Sanpaolo</b>	50	13	15
<b>HSBC</b>	45	15	15
<b>BBVA</b>	57	14	13
<b>Average</b>	34	16	22
<b>Standard deviation</b>	13	3	8

\* Total assets of US banking groups and Credit Suisse include gross derivatives positions. Therefore, data for these banks do not reflect those published in their balance sheets, which under US GAAP report net positions in derivatives. The leverage ratio is defined as total assets/regulatory capital. The average and standard deviation are calculated on un-weighted data.

*Sources:* Annual reports and Basel II Pillar 3 documents.

Such large variations reveal the enormous leeway in the evaluations of banks' risk positions with internal models, which is difficult to attribute solely or mainly to the quality of risk management by the banks.<sup>16</sup> They also reflect the fact that prudential rules are a source of significant differences in banks' 'true' cost of capital: those with lower RWA ratios need less capital and therefore may price their services more aggressively.<sup>17</sup> It is no surprise, therefore, that Basel rules are becoming the source of increasingly acrimonious disputes between banks, with some of them arguing that the system unfairly favours their competitors.<sup>18</sup>

As a result of wide variations in RWA, leverage ratios depict quite a different situation than the comfortable picture emerging from regulatory solvency ratios: with values ranging from 13 to 40 and seven banks with ratios above 20 – or total capital amounting to well less than 5% of total assets. Some of the highest leverage ratios are recorded by banks displaying some of the highest solvency ratios. In general, the situation of some banking groups is only slightly better than that prevailing at the end of 2007, before the crisis struck.

More detailed information on the composition of RWA is provided in Table 2, where RWA at end 2010 have been decomposed into the three main categories contributing to their calculation, for six very large European banking groups. These data fully reflect application of the Basel II Accord (operational risks did not exist in Basel I, and market risks have since been further refined, as will be described).

---

<sup>16</sup> Daniel Tarullo, member of the Board of Governors of the Federal Reserve, noted that “these large disparities cannot be easily explained away through differences in risk profiles” and that it is difficult to understand the reasons “precisely because of the opacity of bank balance sheets and their internal risk models” (Tarullo, 2011).

<sup>17</sup> Ayadi et al. (2011) find a relationship between RWA and banking business models, with retail banks having higher RWA as a percent of total assets than investment and wholesale banks.

<sup>18</sup> In December 2011, the stress tests run by the European Banking Authority specified that “banks using advanced measurement approaches for credit and operational risk (IRB and AMA) have been asked to apply the Basel I floors (80%). There are a variety of ways in which the floors have been applied nationally and banks have followed different approaches depending on the existing national guidance”. The variance of RWA ratios in fact dominated the results of the stress tests, leading the EBA to concentrate the requests for capital increases on banks from the periphery of the eurozone – something that is now being vigorously challenged by Italian banks (ABI, 2011).

As may be seen, credit risk still takes the largest share, above 80% for four of the six banks. The market risk component represents 10% or less of total risks: reflecting in some cases a low weight of securities ‘available for sale’, in others the filtering effect of internal model calculations. Finally, the weight of operational risks – the risk of losses resulting from “inadequate or failed internal processes, people and systems, or from external events”, and thus a fairly heterogeneous category – ranges between 10% and 30%. This constitutes another important source of differences in RWA calculations, which may not be easy to read by outside observers.

*Table 2. Low RWA (and low capital set aside) for speculative bets, 2010*

	<b>BNP Paribas</b>	<b>Credit Suisse</b>	<b>Deutsche Bank</b>	<b>HSBC</b>	<b>UBS</b>	<b>Unicredit</b>
<b>Risk weighted assets - Credit risk</b>	84%	73%	82%	85%	60%	87%
<b>Risk weighted assets - Market risk</b>	3%	9%	7%	4%	10%	2%
<b>Risk weighted assets - Operational and other risks</b>	13%	18%	11%	11%	30%	11%

*Sources:* Annual reports and Bankscope.

In general, the range of variation of RWA ratios makes regulatory capital ratios rather meaningless indicators of capital strength.

It is by now widely accepted that internal models have enabled large banking groups to economise capital, which ex-post may be recognised as the real goal behind Basel II. It may be noted, in this regard, that the Quantitative Impact Studies (QIS) preceding the adoption of the Basel II rules had predicted the decline in capital requirements made possible by internal advanced models (BCBS, 2006b).<sup>19</sup>

While in all likelihood the main reason for the large variance of estimated RWA is ample discretion left to regulated entities and collusion with their regulators, it is worth noting that the models used for estimating

---

<sup>19</sup> For example, the BCBS document on QIS 5 recognised that in the move from Basel I to Basel II, large, diversified and internationally active banks of G-10 countries would see their minimum required capital increase by 1.7% under the standardised approach, but decrease by 1.3% under the FIRB (foundation internal ratings-based) approach and by 7.1% under the AIRB (advanced internal ratings-based) approach. The Committee concluded therefore that “capital requirements provide an incentive for banks on average to move to the more advanced approaches” (BCBS, 2006b, p. 2).

RWA also suffer from fundamental technical flaws that engender scorn by reputed analysts (for all these weaknesses, see Dewatripont et al., 2010) and yet continue to be ignored by regulators.

First, these models are based on restrictive assumptions, notably a normal distribution of default risks, scarce or no correlations between assets classes, and stationarity of data series used for the estimation. Unfortunately, in the multiple equilibria environment typical of financial markets, these assumptions tend to break down when the system is hit by large shocks, and agents' expectations converge in a new direction. This implies that the models perform poorly as predictive tools in general and at all events are not robust to regime shifts.

Another flawed assumption of the Basel risk-weighting approach is portfolio invariance: the capital charge on a given exposure depends only on its own characteristics, and not on the characteristics of the portfolio in which it is held. In VaR models, in particular, the marginal contribution of a single exposure to portfolio VaR depends on the overall composition of the portfolio, but the contribution can be portfolio invariant if three conditions are met: i) the portfolio is asymptotically fine-grained (no exposure in a portfolio accounts for more than an infinitesimal share of total exposure), ii) a single risk factor is the only source of systemic risk and iii) the realisations of the systemic risk factor are monotonically related with the conditional expected losses associated with most risk exposures (see Gordy, 2003; Gordy & Heitfield, 2010; Rochet, 2010).

Of these three conditions, the single risk factor assumption is the most critical since, as repeatedly confirmed by experience, credit losses relative to exposures to the same industry are more correlated among them than losses for exposures to different sectors. Hence, VaR models tend to underestimate risks when portfolios are highly concentrated by sector and, for this reason, may also provide an incentive to choose precisely those highly concentrated portfolios.

This leads us to a third crucial pitfall of the Basel approach: its failure to recognise the endogeneity of tail risks. Alessandri & Haldane (2009) pointed out that in the run-up to the crisis of 2008-09, banks adopted ever more similar investment strategies, while deluding themselves that they were reaping the fruit of their special wisdom ( $\alpha$  returns), and that in the process their trading position had become more strongly correlated (they were harvesting  $\beta$  returns). Other authors (e.g. Calomiris & Herring, 2011; Hellwig, 2010) have called attention to the specific role of prudential rules, and notably VaR models, in encouraging banks to shift risks to the tail of

the risk distribution – with risk mitigation techniques that concentrated risks with few counterparties – in order to reduce the absorption of capital. In doing this, banks behaved as if systemic risk was exogenous; however, as they all converged to the same investment and hedging strategies, they were increasing the risk and return correlation of their portfolios, thus endogenously swelling systemic risk.

Last but not least, models have to cope with serious problems with data, because they are backward-looking, and data are often available for too short a period of time, which can lead to significant errors, e.g. when a long period of stability results in an underestimation of tail risks.

### **4.3 Misguided goals and supervisory capture**

As pointed out by Goodhart (2012), Hellwig (2010) and Rochet (2010), a main problem with Basel prudential rules is that they have unclear goals.

First, the role of capital is insufficiently specified, frustrating its effectiveness in preventing excessive risk-taking by individual banks. If capital is meant to reduce risk-taking incentives, by increasing the stake of shareholders ('skin in the game'), then there should be little room for hybrid capital instruments with doubtful loss-absorbing capacity. Nor should there be an implicit guaranty of a bail-out. If capital is required to provide a buffer to absorb losses and gain time for corrective action, then capital should not be a regulatory minimum, since it must be possible to use it when losses materialise without breaking supervisory rules. And, finally, the lack of a system to ensure early corrective action when capital falls short of statutory thresholds makes prudential capital requirements unsuitable for protecting creditors in case of default, as was repeatedly demonstrated by losses largely exceeding capital set asides. The problem is aggravated by accounting gimmicks and delayed loss recognition, as has been described above.

Furthermore, the opacity of the system facilitated collusion between banks and their supervisors, tilting the balance of interest against depositors and investors and facilitating the tendency of supervisors to stand by their national champions in international competition.

One should never overlook the fact that banks are powerful players in the domestic political arena, all the more so in European countries where banks play a central role in financing the economy and the public sector. The enormous increase in their size relative to GDP during the past two decades has only compounded the problem. As already stated, the main task of supervisors, in the most widely accepted justification of prudential

rules, is to protect depositors and investors in the presence of strong asymmetries of information as to the quality of banks' assets and their overall risk position. Effective performance of this task requires strong and independent supervisors, and adequate scrutiny of their behaviour in full public light. These conditions are not easy to bring about since the subject matter is very complex, and supervisors are not only appointed by the government, but also often subject to their instructions. When a bank comes under pressure, it is natural for it to seek political support and place undue political pressure on supervisors to hide its difficulties and postpone corrective action.

In this context, capital rules can play a useful role in fostering public scrutiny of banks' actual strength and keep supervisors accountable to their true 'principals', i.e. depositors and investors. The opacity of Basel rules, with their unwieldy complexity, has achieved precisely the opposite effect: supervisors are left to the mercy of bankers and politicians out of public sight. At the same time, Basel rules require supervisors to validate banks' internal models and give them ample discretion to correct model results.

By becoming closely involved with bankers' risk management, supervisors have lost their way and their soul. They have lost their way since their task should rather be to identify weak banks and concentrate their scarce supervisory resources to sort out their problems. They have lost their soul because, once they validate internal models, they inevitably become co-responsible for their errors, and may therefore be more prepared to collaborate with management in delaying loss recognition and gambling for resurrection. This is a most fertile feeding ground for supervisory forbearance.

Opacity also facilitates collusion by supervisors with their regulated banks to pursue their national competitive advantage by tilting capital rules in their favour, thus distorting market structures and the allocation of resources. As Tarullo (2008, p. 213) lucidly observed, "the extent of national discretion and the opaque quality of the IRB calculations breed countless opportunities for the exercise of regulatory discretion in pursuit of national competitive advantage".

#### **4.4 Systemic risk**

The Basel framework proved incapable of anticipating and containing systemic risk: the systemic and macro-financial stability dimension was neglected not just in capital rules but in the overall approach to financial regulation.

Systemic risk in financial systems basically arises from widespread excessive leverage by banks and their interconnectedness – and more in general, interconnectedness in the financial system – through the wholesale money market and derivatives markets. Rather than a run on an individual bank, a systemic shock entails a run on the banking system, as mutual confidence between banks evaporates, the interbank market dries up and banks are forced to deleverage and sell assets in increasingly illiquid markets. When this happens, the distinction between liquidity and solvency vanishes fairly quickly, as liabilities in banks' balance sheets cannot be rolled over and asset prices dip precipitously. The abundant provision of liquidity through lending of last resort facilities may mitigate the problem when (most) financial institutions would be solvent in normal circumstances, but it may aggravate moral hazard by encouraging excessive risk-taking.

The specific point of interest here is the role that microeconomic incentives and constraints created by prudential rules can play in reducing the risk of macro-financial instability. The problem arises, as anticipated in Chapter 1, from the nature of financial stability as a public good. This situation may entail that some banks free ride on the willingness of other banks to pay for stability, and more broadly that each individual bank may not be able to fully appreciate the systemic implications of its funding and investment strategies. In the run-up to the subprime crisis, for example, the correlation of credit risks from mortgages and mortgage-backed securities was largely overlooked by financial institutions, despite being closely connected to underlying macroeconomic factors that had been observed in many previous crises (e.g. a real estate boom and bust cycle). The concentration of counterparty credit risk in CDS markets was equally underestimated.

In this regard, the Basel modelling approach overlooks the fact that risk is not an invariant property of assets but depends on banks' business models and the interaction between banks when they come under stress as a result of a macro-shock. In other words, risk does not arise exogenously, but rather, is endogenously determined by the joint behaviour of market agents, implying that low-risk or risk-free assets simply do not exist. At the same time, as already indicated, models may have contributed to the build-up of systemic risk by giving banks incentives to engage in derivatives activities in order to shift and conceal risks, in the process also increasing interconnectedness. And the low weight assigned to market risk by capital requirement formulas encouraged banks to move assets from the banking

book to the trading book, in this way making banks excessively exposed to fluctuations in asset prices.

However, this is only one aspect in the failure to recognise systemic risk. Another, and more important aspect concerns the direct role of capital in braking or fuelling systemic instability. As was mentioned, many analysts and policy-makers have read systemic instability as cyclical instability, since large cyclical swings in banks' balance sheets and asset prices are the typical manifestation of systemic shocks (see Brunnermeier et al., 2009), and have accordingly advocated anti-cyclical brakes in prudential rules. This approach is reflected in the new capital rules under the Basel III revision, which include a countercyclical capital buffer, to be decided at national level, that would be activated when credit accelerates sharply (BCBS, 2011a; European Commission, 2011a).

This interpretation, however, overlooks the fact that the dynamics of financial instability at aggregate level is a direct function of i) the amount of capital available to absorb incipient losses; and ii) its ratio to total assets – the arithmetic inverse of *aggregate* leverage – that determines the speed of deleveraging for the banking system as a whole, through the credit multiplier, when banks are forced to replete their capital by emerging losses. Forced deleveraging could of course be avoided by individual banks by raising new equity from capital markets, but this is often too expensive or outright impossible when the banking system as a whole is struck by a confidence crisis.

Capital here is important in three ways. A strong overall capital position will make a run on the banking system less likely by laying a more solid foundation for confidence. It will provide a large cushion to absorb incipient losses, thus gaining time and reducing the need to liquidate assets at fire-sale prices. And, finally, it will limit the amount of assets to be sold when deleveraging takes place, thus reducing the downfall in asset prices and bank losses.

The Basel approach to capital regulation was structurally flawed not only for its misguided approach to risk assessment and the resulting perverse incentives, but also because in practice it made it possible for the banking system to operate on a very small aggregate capital cushion and a very high leverage. It was like charging a catapult for a much stronger shot when the crisis struck.

To repeat: when the system switches from 'good weather' to 'bad weather', the main systemic risk for an individual bank is illiquidity, with (wholesale) funding drying up and prices of securities plunging due to

asset fire sales. In short, the banking system as a whole tries to retrench and deleverage. When this happens, the aggregate capital ratio determines the leveraging and deleveraging multiplier - which is the principal systemic dimension of capital requirements.

## 5. FAILED REPAIRS WITH BASEL III

---

In the aftermath of the financial crisis, financial regulation was deeply modified on both sides of the Atlantic by a flood of legislation – on the whole responding to the main goals set in 2008 by the Financial Stability Forum (FSF 2008) – addressing financial intermediaries, market structures and infrastructures, regulatory and supervisory architectures, credit rating agencies and, last but not least, prudential rules for banking. In December 2010, the Basel Committee adopted the new prudential framework for banking, the so-called Basel III framework.<sup>20</sup> The so-called CRD IV package transposing Basel III into EU law is currently under discussion in the European Parliament and Council.

Basel III contains some significant improvements in prudential rules. The minimum level of high-quality capital, i.e. common shares and retained earnings – named Common Equity Tier 1 (CET1) – has been raised from 2 to 4.5% of risk-weighted assets.<sup>21</sup> Minimum Tier 1 capital, that is all capital to absorb losses on a going-concern basis, comprising CET1 and other Tier 1 instruments,<sup>22</sup> has been raised from 4% to 6%. There is a

---

<sup>20</sup> See BCBS, 2010a; BCBS, 2010b. The final version on capital rules was published in June 2011 (BCBS, 2011a). Masera (2011) provides a detailed review of the Basel III framework.

<sup>21</sup> Detailed criteria for eligibility as common shares in regulatory capital are specified, including the requirement that instruments must be the most subordinated claim in the liquidation of the bank and have a perpetual principal that can never be repaid outside of liquidation.

<sup>22</sup> The Basel III document sets out a number of criteria that capital instruments must meet in order to be counted as Additional Tier 1 capital. These criteria include the requirement that such instruments are: issued and paid-in, subordinated to depositors, general creditors and subordinated debt; neither secured nor covered by a guarantee that legally or economically enhances the

commitment to harmonise Tier 2 capital instruments, designed to absorb losses on a gone-concern basis (but ensuing negotiations have raised doubts on the willingness of Committee members to renounce national leeway). Innovative capital instruments, previously accepted up to 15% of Tier 1 capital, and Tier 3 subordinated capital instruments, under Basel II assigned to cover market risk, will be phased out.

Overall, total regulatory capital, i.e. the sum of Tier 1 and Tier 2 capital, must stay at least at 8% of RWA (Table 3). Therefore, the minimum overall requirement is unchanged, relative to present arrangements, but the share of Tier 1 capital has been raised from one-half to three-quarters of the total.

*Table 3. Basel III new minimum capital requirements (as % of RWA)*

	<b>Common equity Tier 1 capital</b>	<b>Tier 1 capital</b>	<b>Total capital</b>
<b>Minimum</b>	4.5%	6%	8%
<b>Conservation buffer</b>	2.5%		
<b>Minimum plus conservation buffer</b>	7%	8.5%	10.5%
<b>Countercyclical buffer range</b>	0-2.5%		

*Source:* BCBS (2011a).

In addition, two capital buffers have been added on top of the CET1 minimum: i) a micro-prudential 2.5% 'capital conservation buffer', designed to cushion capital in phases of stress, thus raising the minimum CET1 to 7%; when this buffer falls below its statutory minimum, supervisors are expected to impose dividend restrictions; and ii) a macro-prudential countercyclical buffer, to be applied by national authorities in a 0-2.5% range to smooth cyclical swings, whose precise measure will be based on indicators of aggregate credit supply such as the bank

---

seniority of the claim vis-à-vis bank creditors; perpetual (no maturity date and no step-ups or other incentives to redeem); callable by the issuer only after a minimum of five years, with prior supervisory approval and on the condition of replacing the called instrument with capital of the same or better quality; repayable only with prior supervisory approval; with full discretion of the issuer in the cancellation of dividends/coupon, without any features that hinder recapitalisation (e.g. an obligation for the issuer to compensate investors if a new instrument is issued at a lower price during a specified time frame).

credit/GDP ratio. Thus, total required capital will rise to 10.5% of RWA, when the 2.5% conservation buffer is fully respected, and may rise further when the countercyclical buffer is imposed by national authorities.

Moreover, a further CET1 capital requirement will be imposed on systemically important financial institutions (SIFIs), ranging from 1 to 2.5% of RWA depending on systemic relevance, measured on a number of parameters (size, interconnectedness, lack of readily available substitutes, global activity and complexity; BCBS, 2011b). The US Dodd-Frank Act has defined SIFIs as banking groups with at least \$50 billion in consolidated assets and has given the power to identify non-bank SIFIs to the Financial Stability Oversight Council (FSOC). A decision has yet to be taken in the European Union. The Basel Committee has also introduced a contingent capital requirement under Basel III, requiring that non-common Tier 1 and Tier 2 capital instruments issued by internationally active banks contain mechanisms for 'write-off' or conversion into common equity, to be triggered by a decision of competent authorities (BCBS, 2011c).

The Basel Committee strived hard to harmonise regulatory deductions, which turned out to be an important source of cross-country inconsistencies.<sup>23</sup> However, national interests are prevailing once again,

---

<sup>23</sup> Under Basel III, prudential filters will be applied mostly to common equity (under Basel II, a significant amount of regulatory adjustments referred to Tier 2 capital). Compulsory deductions include goodwill and all other intangibles, even though some room for national discretion remains (banks reporting under local GAAP may use the IFRS definition of intangible assets to determine which assets must be deducted, subject to supervisory approval). Deferred tax assets imputed to future profits must also be deducted, as well as all investments in own common shares and other components of regulatory capital (to avoid double counting of capital), and mutual cross-holdings of capital that may artificially inflate capital. Defined benefit pension fund assets should be deducted from CET1 (while liabilities cannot be counted in CET1) since they may not be used to protect depositors and creditors. Investments in the capital of financial institutions outside the scope of regulatory consolidation where the bank does not own more than 10% of their common share can be recognised up to 10% of the bank's CET1; for entities where the bank owns more than 10% of common shares, all capital instruments other than common shares must be fully deducted. Net losses due to changes in the fair value of liabilities related to own credit risk must be fully deducted from CET1, as well as any shortfall in provisions for expected losses. Minority participations issued by fully consolidated subsidiaries may be recognised in CET1

with countries pressing hard to retain tailored deductions according to the specific needs of their banks. A prominent example is double counting of capital ('gearing') in banking groups comprising insurance subsidiaries.

The Committee also decided to set an 'absolute' back-stop to Tier 1 capital, which as a ratio to total (unweighted) assets<sup>24</sup> will not be allowed to fall below 3%; this requirement will formally become part of the new Pillar 1 capital requirements in 2018, after a monitoring period. Once in force, the 'absolute' capital requirement will cap maximum leverage in the banking system and, in the words of the Basel Committee, "introduce additional safeguards against model risk and measurement errors by supplementing the risk-based measure with a simple, transparent, independent measure of risk" (BCBS, 2011a, p. 4). The leverage ratio will be calculated in a comparable manner across jurisdictions, which brings back to the fore the objective of competitive equality, substantially lost with Basel II. Unfortunately, the new rule seems weak, as it allows the aggregate leverage of regulated banks to rise to as much as 33: a level close to the aggregate leverage at end-2007, when the crisis struck. Moreover, many years will pass before this ceiling will become binding. A similar device was already present in the US Prompt Corrective Action rules, which require a minimum Tier 1 leverage ratio higher than 4% to classify banks as 'adequately capitalised'.

Moreover, in order to tackle imprudent maturity transformation and illiquidity, the Basel Committee has introduced two new liquidity ratios: one for the short term, the Liquidity Coverage Ratio (LCR), requiring banks to have sufficient funds to meet severe liquidity stress over 30 days; the other one for the long term, the Net Stable Funding Ratio (NSFR), requiring banks to dispose of a minimum of stable funding over a 1-year time horizon.<sup>25</sup> Many details regarding the two ratios are yet to be defined -

---

(or Additional Tier 1 and Tier 2) only if the instruments meet all eligibility criteria if issued by the bank, and the issuing subsidiary is itself a bank.

<sup>24</sup> The measure of exposure also takes into account off-balance sheet items, deemed to be source of potentially significant leverage.

<sup>25</sup> The LCR is defined as "stock of high-quality liquid assets/total net cash outflows over the next 30 calendar days", which must be equal or higher than 100%. Stress scenarios include a significant downgrade of the institution's public credit rating; a partial loss of deposits; a loss of unsecured wholesale funding; a significant increase in secured funding haircuts; increases in derivative collateral calls and substantial calls on contractual and non-contractual off-balance sheet exposures,

notably including the definition of liquid assets, given that the sovereign debt crisis has raised questions on the possibility of treating government securities as safe assets under all circumstances. In order to mitigate the potentially negative effects of the new capital and liquidity requirements on the supply of credit, fairly long transition periods have been envisaged (Table 4).

Table 4. Basel III phase-in arrangements

	2011	2012	2013	2014	2015	2016	2017	2018	As of 1 Jan 2019
Leverage ratio	Supervisory monitoring		Parallel run 1 Jan 2013 – 1 Jan 2017 Disclosure starts 1 Jan 2015					Migration to Pillar 1	
Minimum common equity capital ratio (%)			3.5	4.0	4.5	4.5	4.5	4.5	4.5
Capital conservation buffer (%)						0.625	1.25	1.875	2.50
Minimum common equity plus capital conservation buffer (%)			3.5	4.0	4.5	5.125	5.75	6.375	7.0
Phase-in of deductions from CET1 (including amounts exceeding the limit for DTAs, MSRs and financials) (%)				20	40	60	80	100	100
Minimum Tier 1 capital (%)			4.5	5.5	6.0	6.0	6.0	6.0	6.0
Minimum total capital (%)			8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum total capital plus conservation buffer (%)			8.0	8.0	8.0	8.625	9.25	9.875	10.5
Capital instruments that no longer qualify as non-core Tier 1 capital or Tier 2 capital			Phased out over 10 year horizon beginning 2013						
Liquidity coverage ratio	Observation period begins				Introduce minimum standard				
Net stable funding ratio	Observation period begins							Introduce minimum standard	

Notes: Shading indicates transition periods. All dates are as of 1 January.

Source: BCBS (2011a).

including committed credit and liquidity facilities. The NSFR is defined as the ratio between the available amount of stable funding and the required amount of stable funding (as determined by supervisors), which must be higher than 100%. Stable funding includes equity and liabilities expected to be reliable sources of funds over a one-year time horizon under conditions of extended stress (BCBS, 2010b).

Further capital surcharges have been introduced for market and counterparty risk – including incentives for banks to use central counterparties for OTC derivatives, higher capital requirements for trading and derivative activities, securitisations and off-balance sheet exposures.<sup>26</sup>

Pillar 2 requirements have also been strengthened (after the amendments already adopted in July 2009) with new requirements on corporate governance, risk aggregation and stress testing; and there has been a significant strengthening of disclosure requirements under Pillar 3, which include a detailed description of capital instruments, the components of regulatory capital and their calculation, and separate disclosure of all regulatory adjustments and items not deducted from CET 1.

Overall, the Basel III rules involve a significant improvement in the quality and quantity of capital requirements and contain important new provisions for counterparty risk and market infrastructure.

The BCBS Quantitative Impact Study (BCBS, 2010c) has estimated that the increase in capital required for a sample of 94 large, diversified and internationally active banking groups, will be about €165 billion for the CET1 minimum requirement of 4.5%, and €577 billion for a CET1 target level of 7.0%. The changes in the definition of capital entail a reduction in current CET1 capital held for regulatory purposes by some 40%; actual Tier 1 capital ratios would on average decline from 10.5 to 6.3% of RWA, and total capital ratios would decline from 14.0 to 8.4%. Risk-weighted assets

---

<sup>26</sup> Banks are required to determine their regulatory capital for counterparty credit risk using stressed inputs, to prevent capital charges from being too low in good times and address pro-cyclicality. They will also be subject to a capital charge for potential mark-to-market losses (Credit Valuation Adjustment, CVA) related to deteriorating credit worthiness of a counterparty, and to strengthened standards for collateral management and initial margining. Basel III also supports the establishment of standards for financial markets infrastructures (e.g. central counterparties, CCPs; low risk weights for exposures to central counterparties and higher capital requirements for bilateral OTC exposures should create incentives for banks to migrate to CCPs); raises risk weights on exposures within the financial sector, to contain systemic risk; and encourages banks to reduce reliance on external ratings, e.g. through the requirement to develop internal evaluation of externally rated securitisation exposures, as a part of the ongoing review of the securitisation framework.

are projected to increase by 23%, largely driven by higher requirements for market and counterparty risk.<sup>27</sup>

And yet, Basel III has not tackled the fundamental flaws in the capital framework, while support among bankers is being undermined by increasing awareness of the competitive distortions created by the RWA calculations under national supervisory implementation.

The fundamental drawbacks of the IRB approach have not been corrected. The system still looks at the riskiness of single assets or classes of assets. Logical and technical flaws stemming from the non-stationarity of time series used for internal estimates and their weak predictive power when confronted with shifts in market sentiment, are still there, as are the flawed assumptions on risk distribution, portfolio invariance and the exogenous nature of systemic risk. The weighting of market risk has been increased but still cannot account – almost by definition – for systemic risk: what matters for this type of risk is the correlation of individual portfolios with market developments when market sentiment shifts adversely and confidence is shaken.<sup>28</sup> The systemic stability problems posed by low unweighted capital ratios has not been recognised, let alone coped with. Strengthening capital requirements for counterparty risk and interconnections will not resolve this problem. And risk weights for the largest banks remain the output of highly heterogeneous internal models

---

<sup>27</sup> The Quantitative Impact Study also calculated that the impact of the Basel III package on a sample of 169 smaller banks will be less pronounced, with a CET1 shortfall of €8 bn to reach the CET1 minimum of 4.5%, and €25 billion to reach the 7% target level. The changes in the definition of capital are expected to produce a decline of 24.7% in CET1 capital, Tier 1 capital ratios would decline from 9.8% to 8.1% and total capital ratios would decline from 12.8% to 10.3%. RWA would increase on average only by 4% (reflecting the lower exposure of smaller banks to market and counterparty risks).

<sup>28</sup> For market risk, the 1996 system was modified with the so-called Basel 2.5 framework, adopted in July 2009 (BCBS, 2009b) and transposed into the EU legislation by the CRD III, leading to a significant increase in the capital charge for market risks. Its aims included clarifying the exposures to be included in trading books, providing guidance for their prudent valuation, strengthening modelling standards, and covering types of market risk previously neglected. A 'stressed-VaR' measure was added, based on a 10-day, 99th percentile, one-tailed confidence interval VaR measure of the portfolio, with model inputs calibrated to historical data from a continuous 12-month period of significant financial stress (the period used must be approved and regularly reviewed by supervisors).

leading to an unacceptable variety in the RWA ratios to total assets – resulting in vast differences in capital requirements that undermine the international legitimacy of the entire prudential framework.

Other weaknesses include the zero risk-weighting of sovereign debt, which, incidentally, seems inconsistent with the EBA's stress test methodology and the bias towards real estate, which continues to benefit from favourable risk-weighted treatment.

Another pitfall of the Basel framework, which has not been eliminated under Basel III, are the perverse incentives to delay loss recognition and the replacement of lost capital. This requires a change in the incentives confronting bank managers as well as supervisors. In this regard, Pillar 2 was, and still is, inadequately designed, first and foremost because it does not provide a simple, robust and timely measure of banks' strength.

Most important of all, the Basel Committee has failed to address the main defect of the system, which is faulty goal specification. This cannot be resolved without rethinking the whole approach to bank capital regulation. Otherwise, the same failures that beset Basel I and Basel II are bound to reappear and the risk of systemic instability will stay high.

Rather than tackle its deep-rooted problems, Basel III has proceeded by adding 'patches' to the pre-existing system, trying to fix the visible shortcomings of the system. It is akin to a doctor treating the symptoms of an illness but steering well clear of the disease underlying them. The result has been to further complicate a system that was already overly complex, without any serious analysis of the costs and incentive effects of the new patchwork of capital and liquidity requirements.<sup>29</sup>

And, as long as the RWA approach is not abandoned, there will be no certainty that the new capital and liquidity requirements will prevent a repetition of acute financial instability. Suffice it to recall, in this regard, that a total solvency ratio of 12% under the Basel rules may only entail an

---

<sup>29</sup> A notable example of this 'patchwork' approach is the proposed capital surcharge on SIFIs, which was developed within the Financial Stability Board, and is based on the assumption that it is possible to calculate the systemic risk of individual financial institutions and make them internalise such risk by means of capital surcharges or other constraints on their operations. The logic of this surcharge is unclear; but what is clear is that, being based as it is on the RWA approach, it is open to manipulation and circumvention.

absolute capital ratio of 3%, if the RWA to total asset ratio is 25%, corresponding to a leverage of 33. Furthermore, the new system's multiple layers of capital compound the uncertainty on the resulting capital requirements.

The European Commission has reacted, in its CRD IV proposal (European Commission 2011b), by trying to impose a ceiling on the minimum capital ratio. They argue that this is necessary to achieve a truly single rule book and that uncoordinated stricter requirements in individual member states would induce banks to shift activities to another member state or shadow banking. At the same time, they have dropped from their proposal the requirement of a back-stop 'absolute' minimum capital requirement (the main differences between Basel III and CRD IV are summarised in Box 1).<sup>30</sup>

*Box 1. Basel III versus CRD IV*

The CRD IV proposal largely incorporates the Basel III provisions but in a number of respects it departs from them. On balance, the overall effect of these departures from Basel III is to weaken the banking rules.

Starting from weaker provisions, first, the definition of Common Equity Tier 1 (CET1) is softened by CRD IV by referring to 'capital instruments' rather than 'shares', based on the consideration that the definition of 'ordinary share' varies according to national company law. To counter the risk of excessive differentiations, there is a further provision mandating full transparency of instruments accepted by national supervisors, and the EBA will be required to compile, maintain and publish a list of these instruments. The CRD IV also makes eligible for inclusion in CET1 the 'funds for general banking risk' (Art. 24 of proposed Regulation, European Commission, 2011b), while in Basel III CET1, only common shares and retained earnings may be included. Moreover, under CRD IV, ineligible CET1 instruments are subject to a grandfathering of 10 years, starting in 2013, while under Basel III ineligible instruments must be removed from CET1 in 2013.

<sup>30</sup> The ratio will not be binding but will only act as an instrument of supervisory review under Pillar 2. Under Basel III it was meant to migrate to Pillar 1 in 2018. Article 482 of the proposed Regulation (European Commission, 2011b) envisages that a possible conversion of the leverage ratio into a binding measure could be possible after 2018, based on a new Commission proposal.

Second, in addition to de facto removing the back stop leverage ratio, as was mentioned, CRD IV leaves banks free to choose how to disclose their Tier 1 'absolute' leverage, which they can report gross or net of exemptions and 'national discretions' permitted by the Regulation. Also, during the 'parallel run' period, under CRD IV, regulators may permit banks to report end-of-the-quarter leverage ratios while the Basel III leverage ratio is calculated on the basis of monthly averages over a quarter.

Third, Basel III is also stricter with rules on regulatory deductions from capital: for example, it requires banks to deduct investment in insurance subsidiaries, while the CRD IV permits the application of accounting consolidation as an alternative to deduction, subject to regulatory approval (Art. 46). Under Basel III, unrealised gains and losses will be adjusted in CET1 from 2013, while the CRD IV leaves national regulators the flexibility to set a 5-year grandfathering from 2013. The deductions with regard to deferred tax assets and holdings in financial institutions above the 10% limit will begin in 2014 under Basel III, with a phase-in period until 2018, while CRD IV requires such deductions only starting from 2017. Basel III is also stricter on the eligibility of minority-interest capital (allowing only full consolidation), while the CRD IV indirectly removes the restrictions on minority-interest (through the allowance of 'proportional consolidation' method).

On the other hand, CRD IV leaves open the possibility for national regulators to anticipate (by two years) the full application of the new CET1 ratio and certain deductions (by one year), and has stricter rules on securitisation documentation. It also envisages a minimum threshold for the conversion or write-down of additional Tier 1 instruments when the CET1/RWA ratio falls under 5.125%.

In order to limit the total effects of these departures from Basel III, CRD IV introduces a floor on total prudential capital, calculated on the basis of Basel I rules, which cannot fall below 6.4%.

These departures from the Basel Accord unfortunately seem to reflect more the desire to protect undercapitalised universal banks at the core of the Union's financial system than to establish a more level playing field. In any event, maximum harmonisation of minimum capital ratios is at odd with the traditional internal market philosophy of providing a minimum platform of protection but letting the member states adopt more demanding standards when they so wish, provided access remains open to all competitors under the minimal protection. More importantly, pressures for higher capital requirements in global financial markets are more the

expression of investors' demands than the whims of national regulators. By trying to force on all banks the low capital of some continental banks, the Commission is opening another fault line in the prudential system.<sup>31</sup>

Other contentious provisions in the CRD IV proposal include the fact that ratings continue to play a central role in the determination of risk-weights, despite the stated intention by the Commission to reduce over-reliance on external ratings, as reflected elsewhere in their amendments to the Credit Rating Agencies Regulation (in November 2011); and the expanded room for national supervisory discretion in the determination of capital requirements of individual institutions<sup>32</sup> and risk weights on exposures backed by mortgages, which is in sharp contrast with the maximum harmonisation approach (see Lannoo, 2012).

---

<sup>31</sup> The Vickers Report (ICB, 2011) is adamant that this provision makes no sense; see. pp. 96-97.

<sup>32</sup> This includes the capital requirements for anti-cyclical purposes and additional capital requirements "where justified by specific circumstances under the so-called Pillar 2" (European Commission 2011b, Introduction).

## 6. RESTORING SOUND PRUDENTIAL REGULATION

---

The goals of a sound system of prudential regulation are already implicit in the preceding analysis; it is time to make them explicit. Our proposals apply to all banks, including large international banking groups; we see no need for special treatment of large banks, provided capital rules are applied on a fully consolidated basis. There is also no need for specific liquidity or funding ratios: liquidity and maturity transformation should be a central part of the supervisory review of banks and banking groups under Pillar 2. Finally, while each of these measures has merits in combating moral hazard, there is no need to forbid specific operations by banking groups (e.g. the Volcker rule) or ring fence certain activities (as under the Vickers Report proposals); instead, the antidote to excessive risk-taking should come from the elimination of banking charter subsidies, thus taming moral hazard at its root, and strengthened incentives to preserve capital for shareholders and management. Under our approach, the size and risks of banking are likely to recede substantially, with limited real economic costs.

There are essentially three main weaknesses in the current approach:

- *capital ratios* based on RWA and calculated on the basis on banks' internal models, which should be scrapped and replaced by strong, clear and simple capital rules;
- *supervisory forbearance*, the elimination of which requires an overhaul of Pillar 2, basically through the adoption of a PCA regime à la FDIC; and
- *weak market discipline*, which can be remedied by capital metrics that are easy to read and understand for all market participants, supplemented by banks issuing junior debentures that are convertible into equity.

In trying to correct for these weaknesses, it would be important to limit the costs and distortions associated with regulation, basically by setting simple and clear rules and avoiding the multiplication of instruments. We will examine each of these three prescriptive proposals in more detail below, while always keeping the fourth one in mind.

## **6.1 Capital requirements: what for and how much?**

The first question to address is what task bank capital should usefully perform. Until the recent crisis, the main goal of capital rules in the Basel Accords had been solely the micro-prudential stability of individual banks. Experience has shown that micro-prudential stability does not ensure macro-financial stability (fallacy of composition). The regulatory response has been to set up machinery for macro-prudential regulation that in the main boils down to monetary authorities paying more attention to credit and asset market dynamics, and the excessive accumulation of debt by the public and private sector alike, rather than price stability alone. However, this is not sufficient to eradicate from the system excessive risk-taking by bankers free-riding on the implicit subsidies of the banking charter, nor does it provide a reasonable assurance that free-riding doesn't become so widespread as to endanger systemic stability.

In the simplest possible version of prudential rules, bank capital can effectively serve two purposes: i) to provide a simple and readable indicator of banks' strength to the markets and supervisors, fostering market discipline and triggering supervisory action and ii) to preserve systemic stability by containing aggregate leverage, hence the deleveraging credit multiplier.

As to the first, risk-weighted capital ratios are unable to sort out weak banks and therefore they make the market discipline pillar of Basel rules largely ineffective, while leaving supervisors open to political pressure to rescue their banks out of public sight. The ready solution is to scrap risk-weighting, which has no informational value, and switch to an 'absolute' capital ratio: the relevant measure of banks' capital strength should be the ratio between common equity Tier 1 capital, in the new simple definition already agreed under Basel III, and total assets. Goodwill and future tax credits, and similar items, should be deducted from capital unless they correspond to certain and readily usable reserves in case of need.

One question to be addressed here concerns reliance of the capital indicator on book-value measures of equity, which may weaken its signalling value since book values are lagging indicators - mainly owing to

the fact that losses are recorded with significant delays. A better alternative would be to use the market value of equity. Calomiris & Herring (2011) and Haldane (2011) have shown that market-based capital indicators may provide a reliable and, more important, forward-looking indicator of a bank's capital position.

Calomiris & Herring (2011) use a 90-day moving average of the ratio of the market value of equity over the sum of the market value of equity plus the face value of debt, which they call the Quasi-Market-Value-of-Equity Ratio (QMVER).<sup>33</sup> Their QMVER displays excellent signalling properties, unaffected by extreme market conditions: with data for 2006-10, it sorts out reliably the banks that fell during the storm (with QMVER below a 4% threshold) and those that stood up on their own (displaying QMVER above 4%). For banks that failed or had to be bailed out, the ratio fell below the critical threshold well in advance of insolvency. Haldane (2011) shows three different market-based indicators that perform equally well for a sample of 33 large banking groups: market-value capitalisation to i) book value of total assets, ii) book value of debt and iii) book value of equity (this last ratio being Tobin's 'q'). All three prove able to discriminate successfully between 'crisis' and 'no-crisis' banks, and signal impending distress well in advance. An alternative market-based indicator that has been proposed is the Credit Default Swaps (CDS) spreads: however, they are unlikely to be robust, because CDS markets are thin and subject to manipulation, and the pricing of risk is not a stationary variable.

Thus, our first conclusion is that the market value of common equity can provide a reliable indicator of strength or weakness, and therefore may be used by supervisors as a reference in sorting out weak banks to be placed under enhanced supervision. It may also provide a useful reference for strengthened market discipline under Pillar 3.

---

<sup>33</sup> The indicator is built to smooth fluctuations in share prices and dampen the noise in market signals. QMVER has the desirable properties of accuracy (using a 90-day moving average allows one to identify sufficiently persistent and severe weaknesses), comprehensiveness (market capitalisation is a measure of a bank's overall value), timeliness (market values of shares are continuously observable), predictability (markets should generally be able to forecast variance and potential movements in the neighbourhood of the trigger). Regarding timeliness, there is a trade-off between the ability of the indicator to rapidly signal distress and the need to smooth short-term volatility: the authors argue that 90-days averaging provides an effective solution, also in order to give the bank sufficient time to recapitalise.

A problem that may arise in this connection – on which we do not dwell too much here – is how to make sure that the indicator is not manipulated by banks undertaking covert support operations on behalf of their own shares. Suffice it to say that solutions are available, ranging from specific transparency obligations to special restrictions on purchases of own stock in certain circumstances.

We must now decide how much capital. Following Hellwig (2010), we maintain that this question can be answered properly only in a systemic stability perspective. Capital performs the fundamental function of capping risk-taking for individual banks as well as for the banking system as a whole: thus, it strengthens confidence and reduces the risk of bank runs (complemented, in this task, by retail deposit insurance); and it lowers the credit deleveraging multiplier, and hence the eventual real economic cost of a bank crisis, should one nonetheless happen.

A main conclusion from the preceding analysis is that capital requirements should be based on a criterion of prudence. This is an obvious consequence of the high real economic costs of banking crises, and the fact that they are typically driven by sudden shifts of expectations that become self-fulfilling. This last feature makes any precise calculation of capital requirements impossible: by necessity then, one must err on the side of caution. An upper limit to leverage between 10 and 14 times capital – corresponding to an absolute capital ratio in the range of 7 to 10% – may be adequate. Two pieces of evidence point to the need of such an increase in capital requirements. The first one is empirical studies of the net marginal social benefit of raising capital ratios (Miles et al., 2011); the second, is the observed explosion in the size of banking in the 2000s, making banks too large to fail, with unclear benefits in the quality and efficiency of banking services to the economy (e.g. Turner, 2010; Philippon, 2011). Similar conclusions are arrived at by Admati et al. (2011) and the Vickers Report (ICB, 2011).

It is interesting to note, in this regard, that some large international banks (e.g. Bank of America and Citigroup) have already moved to a common equity capital ratio around 9%. But of course, for most banks there would be a substantial increase in capital requirements: large international banks typically hold (common equity) capital equivalent to between 3% and 8% of total assets.

The capital requirement above should be the upper bound of a ladder, above which the capital position would be seen as ‘comfortable’ by supervisors, below which supervisors would require banks to undertake

corrective action and, at some point, oust management and intervene and take control of the bank. Thus, capital would be available to meet emerging losses, albeit falling capital ratios would produce consequences for the bank. It should also be mentioned that the steps in the ladder defining supervisory responses should refer to the book value of capital. To these issues we will come back shortly.

A desirable feature of prudential rules in a globalised world is that the definition of capital should leave little room for national discretion to favour 'own' banks, pointing to the need to harmonise the definition of capital cross-country. Scrapping internal models and RWA, and moving to unweighted capital ratios, would offer clear advantages in this regard. Once regulatory capital is simply and consistently defined, the room for manipulation would be much reduced. Other factors, e.g. accounting differences on derivatives netting, might still complicate the uniform application of capital rules, but the issue would then become more visible and easier to handle.

Two objections to this approach that require an answer concern i) the incentive effects of an absolute capital requirement and ii) the costs to the banking system and the economy.

The first objection basically is that an unweighted capital ratio doesn't properly price risk, leading bank managers always to skew their portfolios in favour of riskier assets in order to maximise returns (like Tobin's 'plungers'). However, as we have argued, bankers will only behave as plungers when they are not liable for the costs of their mistakes. Once any explicit or implicit promise of a bail-out is removed from the system, there is a legitimate expectation that they would carefully ponder the risk profile of their portfolios. A further tool to prevent excessive risk-taking by making bankers pay the full price of their risks is deposit insurance, by means of risk-based fees paid ex-ante.<sup>34</sup> We do not dwell here on this issue, which we have discussed elsewhere (Carmassi et al., 2010).

---

<sup>34</sup> The reference here is to the FDIC system, where supervisors assess the overall riskiness of banks based on a number of factors not limited to capital, but including liquidity, interconnectedness, complexity, quality of management and other factors. In order to avoid moral hazard, deposit insurance should be strictly limited to retail deposits and exclude other deposits as well as other classes of creditors; and under no circumstances should its accumulated fund be used to rescue the bank as a whole.

The second objection is that raising substantially capital requirements will entail high costs for banks and the economy. This view points to the empirical observation that the cost of equity in capital markets seems to exceed significantly the cost of debt, and that the proposition of invariance of the cost of capital to the composition of funding, as in Modigliani & Miller (1958), isn't valid due to the favourable tax treatment of debt, asymmetric information and transaction costs (Berger et al., 1995). A recent IMF study by Keen & De Mooij (2012) finds a significant positive effect of tax deductions on leverage.

However, the 'equity is expensive' hypothesis is controversial. Admati et al. (2011) claim that the main reason why equity is more expensive than debt is the presence of distortions created by public subsidies implicit in the banking charter. Roger & Vitek (2012) have estimated the macroeconomic costs of a synchronised global increase in bank capital adequacy requirements under Basel III with a multi-country model, and have found fairly modest effects, especially if monetary policy is eased in response to widening bank interest rate spreads. The opposite conclusion, not surprisingly, was reached by the Institute of International Finance, a well funded and vocal bank lobbying organisation in Washington: according to their study (IIF, 2011) Basel III rules, which are much weaker than ours, would reduce GDP by 3.2% by 2015.

In any event, the total cost of capital to a bank must in the end reflect risk-adjusted returns on total assets (ICB, 2011) and the risk of bankruptcy (Berger et al., 1995; Kaufman, 1992); the first component is in all likelihood independent of the composition of the funding, and the second decreases with increasing equity funding. Moreover, in assessing the impact of higher capital requirements, one needs to look at the full costs and benefits, also including the reduced risks of systemic crises. Miles et al. (2011), for instance, claim that on the one hand the impact on GDP is at least uncertain, because it is very difficult to determine the distribution of potential shocks to banks' asset values and GDP growth; and that, on the other hand, the benefits of significantly higher capital requirements are substantial in terms of increased financial stability.

## **6.2 Combating supervisory forbearance**

Supervisory forbearance clearly emerged as a main problem in the run-up to the recent financial crisis, but it has been completely overlooked in the rectification of banking prudential rules. This is not surprising, given that

the task of correcting past mistakes was assigned to those responsible for making them: the supervisors and central bankers in the BCBS.

Many large international banks were allowed to operate on a very thin layer of capital and to display at the same time a comfortable capital position. Suffice it to mention that a few months before their collapse, the risk-weighted capital ratio of Lehman was 16.1% (end of May 2008), while Dexia displayed a risk-weighted capital ratio of 14.7% (year-end 2010). In a number of cases of failing banks, after the collapse, it has become obvious that supervisors looked complacently at excessive leverage by these institutions while they engaged in imprudent acquisitions, and gladly collaborated in postponing loss recognition or making them up opaquely with disguised public rescues (e.g. in Belgian, French and German recapitalisation operations).

In the same way as the decision to go to war is too delicate to be left in the hands of generals, the design of bank supervision is too important for systemic stability to be left solely in the hands of banking supervisors. As long as supervision of large cross-border banking groups is organised on a national basis, while competition is global, and capital metrics do not provide clear signals on banks' strength, the risk that supervisors will continue to collude with their banks remains very high.

The adoption of indicators of capital strength based on the market value of equity resolves the problem of providing supervisors and the public with the information needed to act. The complementary step is to oblige supervisors to act when the capital indicators show that a bank is seriously weakening, by placing the bank under enhanced supervisory review and linking corrective action of increasing intensity to a ladder of capital thresholds. The US prompt corrective action provides a useful model for the design of such a system of mandated supervisory intervention.

Accordingly, a number of 'capital strength zones' should be identified, as for instance in the PCA zones of well capitalised, adequately capitalised, undercapitalised, significantly undercapitalised and critically undercapitalised banks. When a bank enters the undercapitalisation area, supervisors would be required to intervene, with increasing intrusiveness as the bank falls in the lower zones - e.g. from the request to recapitalise, to the suspension of bonuses for management and dividends, down to the obligatory disposal of assets or business lines, the ousting of management, and eventually the bank's resolution.

As in the PCA model, falling below the capital thresholds would invoke an obligation to act but by no means would it automatically trigger specific actions. For each capital zone, a menu of instruments would be available to supervisors, some of which would always be required (e.g. a capital restoration plan or the suspension of dividends), while others would be left to the discretion of supervisors (e.g. the restriction of certain activities or of interest paid on deposits). But supervisors should in all cases be required to explain publicly what they have done and not done, with adequate motivation. When capital falls below a minimum, say 2% of total assets, the banks should be resolved by the supervisors under an administrative resolution procedure. A credible and effective resolution regime is the essential ingredient to remove from the system any implicit promise of a bail-out. Again we don't need to dwell much longer on this, since we have dealt with the issue extensively elsewhere (Carmassi et al., 2010; see also BCBS, 2010d).

Transparency with the new capital indicators and the presumption to act under a system of pre-announced capital zones would protect supervisors from lobbying and regulatory capture by banks and reduce the temptation for supervisors to connive with regulated entities. This would also help significantly to minimise eventual losses of bank insolvency.

### **6.3 Market discipline with contingent capital**

The system that has been described already goes a long way towards reducing the risk of systemic instability, by strengthening bank capital and supervisors' responsibility and independence. And transparency and disclosure obligations have already been strengthened by the Basel III Accord, and would be made effective by a readable capital indicator.

A final component is needed, however, to create stronger incentives for management and shareholders to avoid excessive risk-taking and free-riding on the system's safeguards. This is the obligation for banks to issue substantial amounts of junior debt convertible into equity, with conversion based on the market value capital indicator used for supervisory purposes. In this regard, many authors, including ICB (2011), stress the perverse incentives preventing shareholders from raising new equity for fear of dilution and adverse reactions by investors.

Contingent capital (CoCo) is debt that automatically converts into capital when certain pre-determined events occur or specified triggers are hit. In this way, it produces an increase of bank capital in adverse states of the world: directly, through contractual convertibility, and indirectly,

through incentives to voluntarily raise new equity capital. If properly designed, CoCos offer a number of advantages including the tax shield related to interest deductibility (unlike equity) and their appeal to institutional investors, to the extent that the incentive to avoid conversion implies that they are likely to trade more like fixed-income instruments. Market discipline would be strengthened if there were a significant take-up of these instruments by institutional investors.

A number of proposals have been tabled in this regard, e.g. Calomiris & Herring (2011); Coffee (2011); D'Souza et al. (2009); Flannery (2010). Moreover, the Basel Committee on Banking Supervision has made room for the inclusion of contingent capital instruments in eligible capital, provided certain conditions are respected (BCBS, 2011c). After the 2008-09 financial crisis, some banks have spontaneously issued contingent capital instruments: Lloyds in 2009, Rabobank in 2010 and Credit Suisse in 2011.

The rationale of these proposals and, accordingly, the capital instruments that have been proposed vary a great deal, but they all share the common objective of strengthening market discipline on bank managers and shareholders and complementing the role of supervisors (Coffee, 2011).

Contingent capital may serve three alternative goals, namely: i) providing a cushion of common equity ('bail-in' objective, for orderly liquidation); ii) providing a signal of default risk, i.e. in the form of the observed yield spread on convertible debt prior to any conversion ('signalling' objective); and iii) encouraging voluntary, pre-emptive and timely issuance of new equity ('equity-issuance' objective). It seems to us that the latter goal should be privileged since it is the one that minimises the need for supervisory intervention and forced recapitalisation of the banks. While the bail-in approach would create an additional capital buffer to cover realised losses *ex-post*, but leave incentives unaffected, we do not need an extra signal of default risk beyond that provided by market-value capital indicators. Indeed, such a signal may prove redundant or even contradictory. Reference to a moving average indicator of capital strength, as has been discussed, would have the additional merit of making it more difficult for speculators to force the conversion of CoCos through a coordinated run on a stock.

To make sure that CoCos can effectively perform their function, the threat of conversion must be credible and effective in encouraging prompt recapitalisation (Calomiris & Herring, 2011). To this end, the amount of issuance should be large, e.g. 100% of capital or 10% of total assets; and the

conversion rate should be sufficiently penalising for shareholders. The combination of the size of issuance and the conversion rate can produce stronger dilutive effects on shareholders than a pre-emptive equity issuance, so that they would have a strong incentive to recapitalise before the trigger for converting CoCos is hit. Finally, as has been mentioned, the trigger for conversion should be the market indicator of capital strength used by supervisors to sort out weak banks, so as to ensure consistency with prudential rules.

## 7. CONCLUSIONS

---

The Basel prudential framework played an important role in generating the financial crisis of 2008-09 and aggravating its consequences. The main indictment is that it permitted leverage ratios of 40, and even 50. In part this was due to gaps in the application of banking rules, in part to risk mitigation techniques that made it possible for banks to reduce massively the need for regulatory capital. Aided by the stunning opacity of solvency ratios, which made weak banks look even better than strong banks, supervisors closed both eyes to excessive risk-taking by their regulated entities and sided with them in the drive for international expansion. The increasing variance of actual capital ratios indicates a dramatic distortion of the international playing field, as more and more competitive conditions in banking markets have come to depend on discretion in the application of the rules by national regulators. At the same time, market discipline was made futile by the opacity of capital indicators.

The new Basel III Accord has strengthened the definition of capital and has raised capital requirements, but has not resolved the fundamental problems posed by RWA calculations based on internal models, whereby basically large banks have ample scope to decide their capital requirements. It has left ample discretion to national supervisors in the determination of capital coefficients for anti-cyclical purposes and surcharges for SIFIs. It has not addressed the perverse incentives confronting supervisors, which remain exposed to capture by their regulated entities due to the opacity of the system. For the same reason, market discipline is unlikely to act as an effective complement to Pillars 1 (solvency rules) and 2 (supervisory review).

In order to overcome these shortcomings, we have proposed three remedies:

- i) To scrap internal models and RWA, in Pillar 1, and set capital requirements on the basis of a straight ratio between common equity and total assets. The new capital ratio should be raised to between 7% and 10%, based on systemic stability considerations; and a new market-based indicator of capital strength should be published and used as a reference in both Pillar 2 and Pillar 3.
- ii) To use the market-based indicator, in Pillar 2, to trigger enhanced supervisory review; and then to bind supervisors to a set of pre-determined corrective actions of increasing severity, triggered by multiple capital thresholds below the main statutory requirement. In order to eradicate moral hazard, the system must be 'closed' by a mandatory procedure for bank resolution when the minimum capital threshold is not achieved.
- iii) To complement solvency rules with the obligation, under Pillar 3, for banks to issue a substantial amount of debentures that convertible into equity. The features of these securities should be designed so as to create strong incentives for bank managers and shareholders to issue equity at an early stage, when capital weakens, in order to preempt conversion.

This set of rules should apply to all banks. There would be no need for special rules on liquidity or funding, which would remain open to supervisory review but not binding constraints. There would also be no need for special restrictions on banking activities and operations.

The most remarkable feature of the policy deliberations on prudential rules for banking so far has been that they have been delegated to the Basel Committee of Banking Supervisors and the banks themselves, both of which have a strong vested interest in preserving the pre-existing system. Not surprisingly, the BCBS came up with a proposal that somewhat 'patches up' the Basel framework but doesn't question its most blatant failures.

It is high time that governments and parliaments take the issue in their own hands and decide to launch a thorough review of Basel capital rules that promises to be more responsive to the public interest.

# REFERENCES

---

- Admati, A.R., P.M. DeMarzo, M.F. Hellwig and P. Pfleiderer (2011), "Fallacies, Irrelevant Facts, and Myths in the Discussion of Capital Regulation: Why Bank Equity is Not Expensive", Stanford GSB Research Paper No. 2063, Stanford University, Stanford, CA.
- Alessandri, P. and A.G. Haldane (2009), *Banking on the State*, Bank of England, London, November.
- Allen, F. and D. Gale (1998), "Optimal Financial Crises", *Journal of Finance*, 53, 1245-1284.
- Allen, F. and D. Gale (2007), *Understanding Financial Crisis*, Oxford: Oxford University Press, New York, NY.
- Associazione Bancaria Italiana (ABI) (2011), "ABI: giudizio negativo sulle decisioni dell'EBA", Press Release, 9 December.
- Ayadi, R. (2008), *Basel II Implementation in the Midst of Turbulence*, CEPS Task Force Report, CEPS, Brussels, June.
- Ayadi, R., E. Arbak and W.P. De Groen (2011), *Business Models in European Banking: A pre-and post-crisis screening*, CEPS, Brussels, September.
- Basel Committee on Banking Supervision (BCBS) (1975), "Report to the Governors on the supervision of banks' foreign establishments", Basel, September.
- (1983), "Principles for the supervision of banks' foreign establishments", Basel, May.
- (1988), "International convergence of capital measurement and capital standards", Basel, July.
- (1993), "The supervisory treatment of market risks", Consultative proposal by the Basel Committee on Banking Supervision, Basel, April.
- (1996), "Amendment to the Capital Accord to incorporate market risks", Basel, January.
- (1999a), "Capital requirements and bank behaviour: The impact of the Basel Accord", Working Paper No. 1, Basel, April.
- (1999b), "A new capital adequacy framework", Consultative Paper, Basel, June.
- (2006a), "International Convergence of Capital Measurement and Capital Standards", Basel, June.

- (2006b), “Results of the fifth Quantitative Impact Study (QIS 5)”, Basel, 16 June.
- (2009a), “Strengthening the resilience of the banking sector”, consultative document, Basel, December.
- (2009b), “Revisions to the Basel II market risk framework”, Basel, July.
- (2010a), “Basel III: A global regulatory framework for more resilient banks and banking systems”, Basel, December.
- (2010b), “Basel III: International framework for liquidity risk measurement, standards and monitoring”, Basel, December.
- (2010c), “Results of the comprehensive quantitative impact study”, Basel, December.
- (2010d), “Report and Recommendations of the Cross-border Bank Resolution Group”, Bank for International Settlements, Basel, March.
- (2011a), “Basel III: A global regulatory framework for more resilient banks and banking systems - revised”, Basel, June.
- (2011b), “Global systemically important banks: Assessment methodology and the additional loss absorbency requirement”, Basel, November.
- (2011c), “Final elements of the reforms to raise the quality of regulatory capital issued by the Basel Committee”, Press Release, Basel, 13 January.
- Benston, G.J. and G.G. Kaufman (1998), “Deposit insurance reform in the FDIC Improvement Act: The experience to date”, *Federal Reserve Bank of Chicago Economic Perspectives*, Vol. 22, June.
- Berger, A.N., R.J. Herring and G.P. Szego (1995), “The role of capital in financial institutions”, *Journal of Banking and Finance*, Elsevier, Vol. 19 (3-4), pp. 393-430, June.
- Brunnermeier, M., A. Crockett, C. Goodhart, A. Persaud and H. Shin (2009), *The fundamental principles of financial regulation*, Geneva report on the World Economy No. 11, ICMB (International Center for Monetary and Banking Studies) and CEPR (Centre for Economic Policy Research), January.
- Calomiris, C. (2000), *U.S. Bank Deregulation in Historical Perspective*, Cambridge: Cambridge University Press.
- Calomiris, C. (2009), “In the World of Banks, Bigger Can Be Better”, *Wall Street Journal*, 19 October.

- Calomiris, C. (2011), "An Incentive-Robust Program for Financial Reform", February.
- Calomiris, C. and R.J. Herring (2011), "Why and How to Design a Contingent Convertible Debt Requirement", Working Paper No. 11-41, Wharton Financial Institutions Center, April.
- Carmassi, J., E. Luchetti and S. Micossi (2010), *Overcoming too-big-to-fail. A regulatory framework to limit moral hazard and free riding in the financial sector*, Brussels, CEPS, March.
- Coffee, J.C. Jr. (2011), "Systemic Risk After Dodd-Frank: Contingent Capital and the Need for Regulatory Strategies Beyond Oversight", *Columbia Law Review*, Vol. 111, No. 4, May.
- D'Souza, A., B. Foran, G.E. Hafez, C. Himmelberg, Q. Mai, J. Mannoia, R. Ramsden and S. Romanoff (2009), *Ending "Too Big To Fail"*, Goldman Sachs Global Markets Institute, December.
- DeYoung, R. (2010), "Banking in the United States", in A.N. Berger, P. Molyneux and J.O.S. Wilson (eds), *Oxford Handbook of Banking*, Oxford: Oxford University Press, January.
- Dewatripont, M. and J. Tirole (1994), *The Prudential Regulation of Banks*, Cambridge, MA: MIT Press.
- Dewatripont, M., J.C. Rochet and J. Tirole (2010), *Balancing the banks: global lessons from the financial crisis*, Princeton, NJ: Princeton University Press.
- Di Noia, C. and S. Micossi, with J. Carmassi and F. Peirce (2009), *Keep It Simple – Policy Responses to the Financial Crisis*, Brussels and Rome, CEPS and Assonime, March.
- Eisenbeis, R.A. and G.G Kaufman (2010), "Deposit insurance", in A.N. Berger, P. Molyneux and J.O.S. Wilson (eds), *Oxford Handbook of Banking*, Oxford:, Oxford University Press, January.
- European Commission (2011a), "Proposal for a Directive of the European Parliament and of the Council on the access to the activity of credit institutions and the prudential supervision of credit institutions and investment", Brussels, 20 July.
- European Commission (2011b), "Proposal for a Regulation of the European Parliament and of the Council on prudential requirements for credit institutions and investment firms", Brussels, 20 July.
- Financial Services Authority (2010), "Results of 2009 hypothetical portfolio exercise for sovereigns, banks and large corporations", March.
- Financial Services Authority (2011), "The failure of the Royal Bank of Scotland", Financial Services Authority Board Report, London, December.

- Financial Stability Forum (FSF) (2008), "Report of the Financial Stability Forum on Enhancing Market and Institutional Resilience", Basel, 7 April.
- Flannery, M.J. (2010), "Stabilizing Large Financial Institutions with Contingent Capital Certificates", Carefin working paper n. 4, Università Bocconi, Milan.
- Freixas, X. and J.C. Rochet (1995), "Fair pricing of deposit insurance. Is it possible? Yes. Is it desirable? No", Economics Working Papers 130, Department of Economics and Business, Universitat Pompeu Fabra, Barcelona, June.
- Goddard, J., P. Molyneux and J.O.S. Wilson (2010), "Banking in the European Union", in A.N. Berger, P. Molyneux and J.O.S. Wilson (eds), *Oxford Handbook of Banking*, Oxford: Oxford University Press, January.
- Goldstein, M. and N. Véron (2011), "Too Big To Fail: The Transatlantic Debate", Peterson Institute for International Economics Working Paper 11-2, Washington, D.C., January.
- Goodhart, C.A.E. (2011), *The Basel Committee on Banking Supervision - A History of the Early Years 1974-1997*, Cambridge University Press, Cambridge, UK.
- Goodhart, C.A.E. (2012), "Ratio Controls need Reconsideration", mimeo.
- Goodhart, C.A.E., P. Sunirand and D.P. Tsomocos (2006), "A model to analyse financial fragility", *Economic Theory*, 27, pp. 107-142.
- Gordy, M. (2003), "A risk-factor model foundation for ratings-based bank capital rules", *Journal of Financial Intermediation*, 12(3), pp. 199-232.
- Gordy, M.B. and E.A. Heitfield (2010), "Risk-based Regulatory Capital and Basel II", in A.N. Berger, P. Molyneux and J.O.S. Wilson (eds), *Oxford Handbook of Banking*, Oxford: Oxford University Press, January.
- Greenspan, A. (1999), Testimony before the Committee on Banking and Financial Services, US House of Representatives, Washington, D.C., 11 February.
- Haldane, A.G. (2011), "Capital discipline", speech to the American Economic Association, Denver, CO, 9 January.
- Haldane, A.G. (2012), "Accounting for bank uncertainty", speech given at the Information for Better Markets Conference, Institute of Chartered Accountants in England and Wales, London, 19 December 2011 (published 19 January 2012).
- Hellwig, M. (2010), "Capital Regulation after the Crisis: Business as Usual?", Max Planck Institute for Research on Collective Goods, 2010/31, Munich, July.

- Herring, R. (2011a), "The Capital Conundrum", Wharton Financial Institutions Center, Working Paper No. 11-70, Philadelphia, PA, September.
- Herring, R. (2011b), "Fair Value Accounting, Disclosure and Financial Stability: Does How We Keep Score Influence How the Game is Played?", Wharton Financial Institutions Center, Working Paper No. 11-72, Philadelphia, PA, September.
- Herring, R. and J. Carmassi (2008), "The Structure of Cross-Sector Financial Supervision", *Financial Markets, Institutions and Instruments*, Vol. 17, No. 1, pp. 51-76, February.
- Huertas, T.F. (2006), "Dealing with Distress in Financial Conglomerates", paper presented to the conference "Prompt Corrective Action and Cross-Border Supervisory Issues in Europe" hosted by the Financial Markets Group of London School of Economics, 20 November.
- Independent Commission on Banking (ICB) (2011), "Final Report - Recommendations", London, September.
- Institute of International Finance (IIF) (2011), *The Cumulative Impact on the Global Economy of Changes in the Financial Regulatory Framework*, Washington DC, September.
- International Monetary Fund (IMF) (2009), *Detecting Systemic Risk*, Global Financial Stability Report, Washington, D.C., April.
- (2010), *Cross-Cutting Themes in Economies with Large Banking Systems*, Washington, D.C., April.
- Kaufman, G.G. (1992), "Capital in Banking: Past, Present and Future", *Journal of Financial Services Research*, 5, pp. 385-402.
- Keen, M. and R. de Mooij (2012), *Debt, Taxes, and Banks*, IMF Working Paper 12/48, February.
- Kindleberger, C.P. and R. Aliber (2005), *Manias, Panics, and Crashes. A history of financial crises*, Hoboken, NJ: John Wiley and sons.
- Lannoo, K. (2012), *The Commission's CRD IV requires a deeper reading*, CEPS Commentary, 31 January.
- Masera, R. (2011), "The Basel III global regulatory framework: a critical review", *Rivista Trimestrale di Diritto dell'Economia*, No.3, pp. 199-256.
- Mediobanca (2011), *Major International Banks: Financial Aggregates*, R&S.
- Miles, D.K., G. Marcheggiano and J. Yang (2011), "Optimal Bank Capital", External MPC Unit, Discussion Paper No. 31, Bank of England, London, April.

- Modigliani, F. and M.H. Miller (1958), "The Cost of Capital, Corporation Finance and the Theory of Investment", *The American Economic Review*, Vol. 48, No. 3, June, pp. 261-297.
- Philippon, T. (2011), "Has the U.S. Finance Industry Become Less Efficient?", NYU Working Paper No. FIN-11-037, New York University, NY, NY, November.
- Rajan, R.G (2010), *Fault Lines: How Hidden Fractures Still Threaten the World Economy*, Princeton, NJ: Princeton University Press.
- Rochet, J.C. (2008), *Why Are There So Many Banking Crises? The Politics and Policy of Bank Regulation*, Princeton, Princeton University Press.
- Rochet, J.C. (2010), "The Future of Banking Regulation", in Dewatripont, M., Rochet J.C. and J. Tirole, *Balancing the Banks: Global Lessons from the Financial Crisis*, Princeton, Princeton University Press.
- Roger, S. and F. Vitek (2012), *The Global Macroeconomic Costs of Raising Bank Capital Adequacy Requirements*, IMF Working Paper 12/44, February.
- Santos, J.A.C. (2000), "Bank capital regulation in contemporary banking theory: a review of the literature", BIS Working Paper No. 90, Bank for International Settlements, Basel, September.
- Tarullo, D.K. (2008), *Banking On Basel – The Future of International Financial Regulation*, Peterson Institute for International Economics, Washington, D.C.
- (2011), *Capital and liquidity standards*, Testimony before the Committee on Financial Services, US House of Representatives, Washington, D.C., 16 June.
- Tobin, J. (1958), "Liquidity Preference as Behavior Towards Risk", *Review of Economic Studies*, Vol. 25, No. 2, February.
- Turner, A. (2010), "What do banks do, what should they do and what public policies are needed to ensure best results for the real economy?", speech at CASS Business School, London, 27 March.
- Valukas, A. (2010), "Report of Anton R. Valukas", Examiner, on Lehman Brothers Holdings Inc., United States Bankruptcy Court, Southern District of New York, Volume 3, March.