

## **How much bank capital is enough: Reconciling the views of academics and regulators**

Matej Marinč,<sup>1</sup> Mojmir Mrak<sup>2</sup> and Vasja Rant<sup>3</sup>

### Abstract

The global financial crisis has further highlighted the importance of bank capital regulation for the stability of the banking system. This article aims to reconcile the views of the academics and regulators about bank capital regulation. Lightweight and procyclical bank capital regulation with ample possibilities for regulatory arbitrage has contributed to the pre-crisis lending boom and subsequent credit crunch. As a result, new capital standards have been drawn and new regulatory and supervisory frameworks have been created, particularly in the EU. The regulatory overhaul aims at establishing a well capitalized banking system that is better able to cope with economic and financial fluctuations. Yet, the path ahead is not without difficulties. We stress that capital regulation and its impact cannot be analyzed in isolation but in combination with other regulatory and supervisory environment.

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<sup>1</sup> Assist. prof. Matej Marinč, Faculty of Economics, University of Ljubljana, e-mail: [matej.marinc@ef.uni-lj.si](mailto:matej.marinc@ef.uni-lj.si), Amsterdam Center for Law & Economics (ACLE), Faculty of Economics and Business, University of Amsterdam, e-mail: [m.marinc@uva.nl](mailto:m.marinc@uva.nl).

<sup>2</sup> Prof. Mojmir Mrak, Faculty of Economics, University of Ljubljana, e-mail: [mojmir.mrak@ef.uni-lj.si](mailto:mojmir.mrak@ef.uni-lj.si).

<sup>3</sup> Assist. prof. Vasja Rant, Faculty of Economics, University of Ljubljana, e-mail: [vasja.rant@ef.uni-lj.si](mailto:vasja.rant@ef.uni-lj.si).

## Introduction

The global financial crisis has exposed serious weaknesses in the regulatory and supervisory framework for banks. Banks engaged in unhealthy practices in the credit boom leading up to the crisis. They placed large bets on investments related to asset bubbles and ill-understood risks with the hope of generating higher equity returns and hefty management bonuses. Use of excessive leverage and wholesale interbank funding was widespread, linking bank balance sheets both nationally and internationally. Banks were conserving “expensive” common equity by resorting to other, “cheaper” forms of capital, such as subordinated debt and hybrid (convertible) securities, which did not always live up to their protective buffer status. And, finally, many banks made their best efforts to appear “safe” on paper by trying to conceal their weaknesses through regulatory arbitrage and off-balance sheet activities. In the aftermath of the crisis, public debate of the deficiencies of the existing regulatory framework ensued between academia, policy makers and the financial industry. This opened the way to regulatory reforms, aimed at designing a safer, more stable financial system, which should be less prone to financial crises. The centerpiece of these reforms is the overhaul of bank capital regulation, known as Basel III.

Our objective in this article is to try to reconcile the view of the academics and regulators regarding bank capital regulation. More than five years since the onset of the crisis and almost two years since the first publication of Basel III rules it is appropriate to make a qualitative assessment of the new standards based on sound economic logic. In doing this exercise, the idea is to go back to the “drawing board” and ask some very fundamental questions. First, what economic purpose does bank capital regulation serve and how does it translate into financial stability? Second, which levels and what kind of capital standards are best suited for

stability purposes and how to implement them in regulatory practice? Third, what are the potential drawbacks of bank capital regulation? And, fourth, how should the transition from a highly leveraged to a better capitalized system be managed without unintentionally disrupting the real economy? Based on the answers to these questions, we can conclude that the core idea as well as the gradual implementation of Basel III rules is a step in the right direction. Nevertheless, many academics argue that this step is still insufficient and that more could be done both to further increase equity levels across the banking industry as well as to prevent regulatory arbitrage.

The rest of the article is structured as follows. Section 2 provides the rationale for bank capital regulation. In Section 3 we argue that both the quantity and quality of bank capital matters. Section 4 addresses potential threats of deleveraging on the path to a better capitalized banking system. In Section 5 we discuss the downside of risk-based capital regulation, including the possibility of regulatory capital arbitrage. Section 6 concludes with the overview and assessment of Basel III capital standards.

## **Rationale for bank capital regulation**

In theory, motivation for regulation stems from market failures, such as externalities, market power or information asymmetries. In the context of bank capital regulation, two explanations are usually given: negative externalities due to systemic risk and agency problems between a bank and its depositors due to information asymmetries and deposit insurance.

The problem with systemic risk is that banks are inherently fragile due to size, maturity and risk mismatches between their assets and liabilities. This fragility is exacerbated by high levels of leverage in banking, but comes with an important social benefit – banks facilitate

qualitative asset transformation between the “end savers” and the “end borrowers,” satisfying the liquidity preferences of both and thus increasing growth opportunities in the economy. At the same time, provision of liquidity services, particularly through demand deposits, exposes banks to runs. As the global financial crisis has shown, banks that make heavy use of the interbank market can be vulnerable to an additional source of runs, triggered by the withdrawal of short-term wholesale funding. What makes systemic risk especially problematic is contagion. Contagion can propagate through the interbank market connections (balance sheet channel) or through depositor panic (expectations channel). Given the potential for widespread bank failures in the face of contagious bank runs, the social costs of a severe or even complete breakdown in financial intermediation during an unchecked systemic crisis are huge and justify the need for regulatory intervention.<sup>4</sup> One possibility to address systemic risk is through deposit insurance, which aims at preventing bank runs. Another one is through bank capital regulation. With respect to the systemic risk argument, bank capital acts as a buffer to offset any potential losses that may occur through the lending cycle and thus contributes to banking system stability.

The agency problem between a bank and its depositors arises due to the fact that the nature of bank assets and activities is often opaque and shifting. This makes monitoring particularly costly and dependant on the access to proper information, which depositors usually do not possess. To make matters worse, depositors are typically unsophisticated and hold only small amounts of deposits, which give them little incentives to monitor. Instead, they are more inclined to free ride on the monitoring of others, especially in the presence of deposit

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<sup>4</sup> A rough hint of the order of size of these costs can be seen in the UBS study of the possible effects of a hypothetical country exit from the Euro area, which would result in a complete collapse of its banking system. In the first year alone, these costs are estimated at up to 50% of the country’s GDP and 10-15% of its GDP in subsequent years (UBS, 2011).

insurance. In the absence of monitoring, the disciplining role of debt is all but lost and banks may engage in risky activities that may be detrimental to their stability. This argument again speaks in favor of a regulator who monitors the banks on behalf of depositors, either by properly pricing deposit insurance or through capital regulation. Capital regulation can be used as an instrument to this end, since it acts as an incentive device. Increased levels of equity capital reduce the equity holders' and managers' bias towards risky investment since more of their own capital is at stake. More prudent investment behavior reduces the chance of subsequent losses, thereby again contributing to banking system stability.

The common feature of both the systemic risk and agency problem arguments for bank capital regulation is that banks are not able to properly internalize the externalities of their behavior on debt holders (including depositors), other banks and the public at large, which may have to be called upon to bail them out in the case of failure. By properly accounting for risk, capital regulation can be used to better align banks' private incentives with those of the general public. By holding high enough capital buffers, negative spillovers to other stakeholders apart from the owners can be minimized.

### **What quantity and quality of bank capital?**

Although the academic literature in the past has presented divergent views about the impact of capital regulation on the overall safety and soundness of the banking system (VanHoose, 2007), academics have recently begun to reach a wide agreement that bank capital requirements should be substantially increased and the quality of capital markedly improved (Admati et al, 2010).

Theoretically, the level and composition of bank capital can be viewed as a special case of a capital structure problem. Banks, like any company, fund themselves with a combination of debt and equity. The question may then well be, how do banks determine their capital structure? And, given the observation that banks are highly leveraged institutions, what drives banks, among all companies, to choose such a capital structure? Acharya et al (2011) show that in the absence of any regulatory distortions, banks may choose a privately optimal capital structure that navigates between the disciplining role of uninsured debt, which only occurs at high levels of leverage, and risk-inducing role of high leverage (see also Diamond and Rajan, 2000). In other words, bank leverage must be high enough to allow for creditor discipline, since uninsured creditors will only monitor banks when they have enough “skin in the game,” and low enough to ensure that the banks’ risk taking is not excessive. Admati et al. (2011) point out that the notion of creditor discipline may be on shaky grounds in the case of banking due to severe informational and governance problems in monitoring. Creditor discipline breaks down completely in the presence of explicit and implicit safety nets and may in times of severe financial fragility become a disruptive rather than disciplining force, as the global financial crisis has shown.

In the actual world, bank capital structure is heavily tilted towards high leverage due to a favorable tax treatment of debt and the presence of explicit and implicit regulatory safety nets (i.e., deposit insurance, liquidity provision of the lender of last resort and government bailouts). The consequence of safety nets is that the risk premium on insured debt becomes low and relatively insensitive to the levels of leverage. This in turn makes leverage appear “cheap” to the banks, relative to equity, inducing them to further increase their debt levels, which leads to moral hazard. Moreover, implicit government guarantees due to bailouts may expose banks to a special type of moral hazard: since the probability of bank bailouts increases with the likelihood of a systemic crisis, banks may choose correlated risks, for

example by herding on similar types of assets for lending or investments, increasing the danger of system-wide shocks (Acharya and Yorulmazer, 2008).

Under the impression of the global financial crisis, a convergence of opinion has recently emerged between academia and the regulators that the disciplining role of debt, which is all but lost due to safety nets and agency problems, should be replaced by an adequately powerful disciplining potential of equity. This, in turn, speaks in favor of substantially higher bank capital requirements. In support of this, an impressive letter of twenty heavy-weight academics (including one Nobel laureate) in Financial Times advocates using 15% or higher equity to total assets ratios in banking on an unweighted basis, in order to prevent future crises (Admati et al, 2010). More examples include Hellwig (2010), who suggests that bank capital ratios relative to unweighted assets should be increased to well above 10% and closer to 20%; Miles et al (2012), who model the socially optimal regulatory capital in the range between 16% to 20% of risk-weighted assets; Goodhart (2012), who points to capital ratios of roughly 20% of risk-weighted assets, or, alternatively, 12-13% of unweighted assets and proposes a minimum ratio as a trigger for regulatory intervention and an upper ratio that would represent the socially desirable level of capital.

Another aspect of higher capital requirements concerns the quality of additional capital. Since the disciplining role of equity is the greatest for those forms of equity that stand first to lose in the case of capital impairments, increased bank capital requirements should focus predominantly on requirements to hold more common equity. In this respect, contingent capital, such as hybrid securities that convert to common equity and subordinate debt may be inferior to common equity, particularly in the case of a systemic crisis. Recent events have shown that some governments, when faced with imminent bank failures, may extend bailout guarantees to contingent capital as well (Ireland is a prime example). Ex-ante anticipation of

implicit government guarantees may render contingent capital and subordinate debt ineffective with respect to market discipline, which is its purported *raison d'être*. Instead, its true motivation may well be in banks' desire to reap the tax-based government subsidy.

Support of higher and better capital standards is often in stark contrast with the arguments of the banking industry that substantially higher capital requirements are costly and may be detrimental to financial intermediation and growth. Such arguments, however, are often misleading and wrong. In particular, the relative costs of equity and debt are not fixed in the long run and depend on the risks that are borne by both forms of capital. When relatively more equity is used across the banking industry, its cost should go down, since the same risk is spread over a thicker layer of capital. Additionally, higher equity levels should also contribute to reduced risk appetite. The cost of debt may go down as well, since it is now protected by larger capital buffers and since equity holders are starting to behave more prudently. In the absence of any frictions and government induced distortions, Modigliani-Miller irrelevance theorem applies and the weighted average cost of capital remains the same. In reality, however, weighted average cost of capital will tend to be somewhat higher, depending on the balance between the positive effects of risk reduction (that results in lower costs of capital) and the negative effects of lost tax shields and changes in capital structure (that results in higher costs of capital). The estimates are that the costs associated with higher bank capital, if anything, are not substantial and that the impact on loan rates and financial intermediation is minimal, except perhaps for high-risk borrowers. Moreover, it should also be realized that these are private and not social costs and only the latter are relevant for designing regulation.

When social costs are taken into account, having higher equity is actually less negative, since lost tax shields by the banks are offset by increased tax revenue by the government. Some of



the practitioners may argue that social costs then relate to the lost growth opportunities since some of the banks' riskier borrowers, possibly including SMEs, may arguably not be well served in a world of higher capital requirements. Empirical evidence starting with Bernanke and Lown (1991) refutes such views and finds a positive relationship between bank lending and bank capital. Lending to SMEs can be further encouraged by appropriately designing the risk weights to which capital requirements are tied, or, alternatively, by relying on a more simple, but high enough, leverage ratio.<sup>5</sup> Opposite to these social costs stand large social benefits of a safer and more stable banking system, justifying the whole exercise.

The notion that a better capitalized banking system need not be more socially costly is also supported by historical evidence. Miles et al (2012) document that prior to deregulation and liberalization of the financial sector in recent decades, leverage in the UK and the US banking sector was substantially lower. Nevertheless, they find no systematic changes in growth rates or loan rates over the whole period.

In spite of the banking industry resistance to higher capital requirements, recent research has shown that having high capital levels may even be in the best private interest of the banks themselves. Bank capital improves banks' survival probability and increases their market share (Berger and Bouwman, 2012). For medium and large banks this relationship holds primarily during banking crises. There is also substantial evidence that highly capitalized

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<sup>5</sup> Leverage generally refers to a total-asset-to-equity ratio, whereas a leverage ratio as defined by Basel III is calculated as Tier 1 capital over total assets (i.e., as an unweighted capital requirement, which is the inverse of leverage). This means that when regulating leverage, a maximum should be used when referring to leverage in the classical sense, and a minimum should be used, when referring to the leverage ratio as defined by the Basel III standards.

banks weathered the global financial crisis better than their weakly capitalized competitors. During the global financial crisis stock prices declined the least for well capitalized banks (Demirgüç-Kunt, Detragiache and Merrouche, 2010). Mehran and Thakor (2011) demonstrate theoretically that higher capital stimulates banks towards higher monitoring of their borrowers (see also Allen, Carletti and Marquez, 2011). Mehran and Thakor (2011) predict and empirically confirm that bank values are positively correlated with bank equity capital in a cross-section. Despite the documented positive effect of bank capital for the banks themselves, not all banks internalized a positive attitude towards bank capital. Instead, they rather opted for socially and perhaps even privately suboptimal levels of capital.

### **How to safely deleverage the banking system?**

So far, we have limited our discussion to a situation when bank capital is already at high levels. We now consider possible adjustment dynamics when increased capital requirements are imposed in a highly leveraged banking environment.

As Admati et al (2012) point out, transition to a better capitalized banking system may be problematic in the presence of debt overhang. In such situations, deleveraging benefits existing creditors (by making debt safer) and taxpayers (by reducing the probability of a bailout), at the expense of the incumbent shareholders and bank managers. This can lead to an “addiction” to leverage where shareholders would not voluntarily reduce leverage, even when this would increase the total value of the firm and may in fact even want to increase leverage further, if they can legally do so.

Resistance to leverage reduction in the presence of debt overhang may lead to perverse and socially unwanted effects once capital requirements are raised. Faced with increased capital

requirements, banks can essentially choose three ways to reduce their leverage. First, they can opt for a pure recapitalization through debt buyback. This leaves the overall size of their balance sheets unchanged while changing the structure of their liabilities. As a result, this option leaves the level of lending unchanged. Second, banks may choose deleveraging through asset sales or by limiting their lending activity. This reduces the size of their balance sheets in order to reach the target capital ratio and may result in a credit crunch. Third, banks may choose to issue new equity and acquire new assets. This option means that banks may reach their target capital ratio and expand credit at the same time. The important lesson is that in the presence of debt overhang, banks may find it privately optimal to reduce leverage through asset sales or decreased lending activity. This can involve substantial social costs, especially when all banks are faced with the need to increase their capital levels at the same time, which may lead to a system-wide credit crunch.

Risk-based capital requirements, such as the ones prescribed by the Basel Accords, may further aggravate the credit crunch. In this case, banks have another option of reaching the target capital ratio in addition to the ones mentioned above – through minimization of their risk-weighted assets. Because certain types of securities, especially high-rated bonds (including government bonds) carry low or zero risk weights in the Basel framework, they may be preferred relative to loans that carry higher risk weights. This can lead to an intensification of the credit crunch.

In order to prevent these socially costly effects of higher capital requirements in the transition to a better capitalized system, Admati et al (2012) propose mandatory freeze in dividend payouts and management bonuses until banks reach their target capital ratios. To deal with the resistance to a new equity issuance due to debt overhang, they also suggest that a mandatory schedule of regular periodic recapitalizations could be prescribed by the regulators. Since all

banks are recapitalizing at the same time this may cause a bottleneck on the capital market, which suggests that an adequate transitory period should be given to the banks. An open question remains what to do with the banks that have more limited market access and might have to resort to government recapitalizations, especially since the eurozone debt crisis has shown that reinforcing the sovereign-banking link may be a dangerous path for stability. One possible solution to this problem, which has now become operational, are recapitalizations through the European Stability Mechanism.

### **Possible drawbacks of risk-based capital regulation**

The main drawbacks of risk-based bank capital standards often put forward in relation to Basel I and Basel II frameworks are regulatory arbitrage and procyclicality. They arise because of the practical problem of how to properly account for the underlying risks in bank assets in real time due to recognition and implementation lags as well as granularity of risk weights in the regulatory framework.

The problem with regulatory arbitrage is that bank capital standards are more or less static, or, at best, subject to ex-post periodic adjustments, once the underlying risks are recognized. In contrast, the actual nature of risk is dynamic and constantly shifting. Until Basel III, capital standards were measured exclusively on a risk-weighted basis, which means that banks could try to raise their equity returns by loading up on underpriced risks that did not carry adequate risk weights in the regulatory framework. Additionally, they were able to hide these risks in various off-balance sheet conduits in the shadow banking system. At the same time, definitions of regulatory capital were vague, especially in the case of higher quality “Tier 1” capital. This allowed banks to circumvent common equity as the highest quality (but privately expensive) form of capital and replace it with lower quality (and privately cheaper) forms of

capital, such as hybrids and subordinated debt. Hence, despite being subject to a formal 8% capital adequacy ratio, some banks managed to get away with holding as little as 1-2% core (common equity) capital relative to total assets. It is not hard to realize that such low levels of capital make banks extremely vulnerable to any fall in asset values.

With Basel II, the drawbacks of the rudimentary Basel I approach, where assets were placed in broad risk-weight “buckets,” were recognized. The attempt was made to better map the risk profile of bank assets onto corresponding risk weights as well as to recognize the dynamic nature of risk by tying it to external and internal credit ratings. Unfortunately, this opened ample new avenues for regulatory arbitrage. Banks that used the internal models approach could attempt to manipulate the weighting system and adjust the risk profile of their assets to their own advantage. As the crisis has shown, both banks’ internal and credit rating agencies’ external ratings and the underlying risk assessment models failed, particularly in the case of new financial instruments with shorter histories, meaning that actual risks were not properly and timely recognized in the weighting system.

Tying capital standards to credit ratings, coupled with recognition and implementation lags also increased procyclicality of capital regulation. Hence, just as banks were excessively loading up on underpriced risks in the credit boom preceding the crisis, they were equally eager to liquidate risky assets, once these risks were recognized at the outbreak of the crisis, in order to conform to the capital adequacy ratio. This in turn amplified both the positive and negative phases of the credit cycle and raised systemic risk concerns.

Problems with risk-based capital requirements have prompted several researchers to propose a simple leverage ratio as a basis for capital regulation. In their view, a simple and sufficiently high capital requirement on an unweighted basis might actually do a better job at containing

risks and keeping the banking system well capitalized and safe than an intricate network of risk-weighted requirements and calculation methods. At the same time, it may also prevent some of the perverse effects of regulatory arbitrage, such as investments in highly rated bonds of possibly questionable quality at the expense of bank loans (Hellwig, 2010; Goodhart, 2012).<sup>6</sup>

## **Concluding remarks and the Basel III framework**

Based on discussion above it is possible to draw some concluding remarks about the Basel III framework and thus, bring together the view of the academics and regulators.

The Basel III framework represents a significant improvement in bank capital standards that goes along the path of “increasing the quantity and quality” of bank capital, as advocated by the preceding public debate. Relative to the Basel I/Basel II framework the increase in capital levels and quality appears to be quite substantial. While the overall minimum capital ratio has remained unchanged at 8% of risk-weighted assets (RWAs), the new framework adds a mandatory capital conservation buffer of 2,5% RWAs and a special countercyclical buffer of up to 2,5% RWAs.<sup>7</sup> This may bring capital ratios up to 13% of RWAs. Banks that are deemed to be systemically important are subject to even higher capital requirements. While this presents a substantial increase in capital levels relative to the existing arrangements, it is still less than the high levels of capital suggested by many academics.

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<sup>6</sup> Regulatory arbitrage has been made more likely also due to developments in information technology that has made banking a more easily changeable industry (see Marinč, 2013).

<sup>7</sup> See BCBS (2011) and the CDR IV package in the EU; that is, COM(2011)452 and 453 of 20 July 2011.

With respect to capital quality, the new framework demands that at least 75% of the minimum capital ratio is to come in the form of higher quality Tier 1 capital (6% RWAs), out of which at least 75% (4,5% RWAs) has to be in the form of the highest quality Common Equity Tier 1 (CT1). Additionally, capital conservation buffer also has to be in the form of CT1, while countercyclical buffer may come in the form of Tier 1. This brings the highest quality capital, CT1 to 7% RWAs and higher quality Tier 1 up to 11% RWAs. In the past, only 50% of the minimum capital ratio (4% RWAs) had to be in the form of higher quality Tier 1 capital and the definition of Tier 1 was vague. Note also that the additional requirements of Basel III (including liquidity regulation) will be phased in gradually through the period 2013-2018. The long phasing in period should facilitate a safe transition towards a better capitalized banking system and, in this way, mitigate concerns related to the dynamic response of banks to more stringent capital regulation.

Basel III proposed requirements will also include a non-risk based leverage ratio. This ratio, calculated as Tier 1 capital over total assets with a minimum required level of 3%, will be tested by the Basel Committee on Banking Supervision in the period from 2013 to 2017. Subsequently, and based on appropriate review and calibration by the Basel Committee, the minimum Tier 1 leverage ratio will be imposed on banks through the first pillar. Implementation of the leverage ratio may raise levels of bank capital in the industry. In particular, undercapitalized banks may find it more difficult to engage in regulatory capital arbitrage with the sole purpose of lowering risk-weighted assets.<sup>8</sup>

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<sup>8</sup> Banks in Switzerland will have to comply with even tougher capital requirements than proposed by the Basel III regulatory framework. They will have to hold a leverage ratio of 4.56% of the total balance sheet and selected off-balance sheet items. Their systemically important banks will have to hold capital in the level of 13% of risk-

The minimum leverage ratio would also act as a back stop to the risk-weighted capital requirements. Its breach would present a clear trigger for putting a weak bank under bank insolvency procedures. This, together with the recently proposed EU framework for bank recovery and resolution (COM(2012) 280/3), may improve the legal and regulatory approach towards the bank restructuring process in the EU.

We see the leverage ratio, together with the increased risk-based capital requirements, as an important step forward of the Basel III framework. However, the question remains whether this is enough. Banks are involved in a multitude of activities with different inherent risks. Involvement in proprietary trading in particular has exposed some banks to extremely large tail risks, predominantly due to model and operational risk. Whereas the Basel III framework has partially acknowledged additional risks on the banks' trading books by modifications in the treatment of trading and derivatives exposures, several substantial shortcomings remain. The Basel Committee continues to focus on idiosyncratic risks and under-addresses systemic risks that stem from trading and derivatives positions. With this respect, further focus should be put on setting a sufficiently high minimum leverage ratio which is why many academics view the currently proposed low level of 3% with skepticism.

We concur with the view of the recent Liikanen's report (Liikanen, 2012) that some more drastic, structural changes may be needed as well. The inherent risk profile of highly complex market activities differs substantially from the risk profile of traditional lending activities. This makes a coherent implementation of a unified capital regulatory framework increasingly

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weighted assets plus an additional progressive component that will depend on the size and market share of the bank in question.

<http://www.efd.admin.ch/dokumentation/medieninformationen/00467/index.html?lang=en&msg-id=44781>



difficult. Trying to prevent banks from taking on excessive risks by subjecting them to risk-based capital charges may only work up to a certain extent. For substantial differences in risks, risk-based capital regulation becomes overly complex and prone to regulatory arbitrage, which may actually undermine financial stability. Structural changes may then be needed. In particular, and in line with the Volcker rule in the US and the Vicker's proposal in the UK, certain riskier activities such as proprietary trading may have to be separated from traditional commercial banking activities.

In the end, the lessons are that bank capital regulation is beneficial but needs to be considered carefully and possibly in combination with other regulatory tools within a regulatory perimeter that encompasses all risks affecting the banking industry. Regulators need to have a constant view of the overall social costs and benefits of bank capital regulation. At the same time, regulators have to be acutely aware that they tend to lag one step behind the risks they are trying to regulate and that sometimes it may be easier to regulate a system in parts than a complex whole. Bank capital regulation can only be a positive force if it contributes to a safer financial system, without creating too many distortions of its own that could undermine the very stability that capital standards are designed to protect.

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