

University doctoral (Ph.D.) dissertation abstract

An Analysis of Selected Regulatory Responses to the Global Financial
Crisis

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1. Introduction

In the wake of the global financial crisis (GFC), it became clear that targeted macroprudential rules are indispensable to successfully manage financial cycles. Before the crisis, banking regulation was typically limited to the capital requirement of individual financial institution, while it had little focus on systemic risk. As a result, it could not prevent banks from taking excessive risks and to preserve financial stability. Moreover, the traditional monetary policy toolkit could control asset prices only at the cost of potentially large losses in the real economy. Macroprudential regulations have thus become an equally important part of the overall economic policy framework as fiscal and monetary policy, with the aim of reducing systemic risk and strengthening the resilience of the financial system as a whole.

Based on PENIKAS (2015), the Basel Committee work on developing banking regulation can be broken into the five regulatory waves: i) the Concordat (1974-1986), ii) Basel I (1987-1998), iii) Basel II (1999-2008), iv) Basel III (2009-2011) and the v) Post Basel III (2012-).

The first wave of the regulatory work started with the publication of the Concordat, which focused primarily on the necessity of consolidated data for banks with foreign subsidiaries, participations and joint ventures (BCBS, 1979)).

In the second wave starting in 1987, the grounds of today's banking regulation were born by publishing the consultative version for Basel I. As PRAKASH (2008) summarized the Basel I framework had three main elements (BCBS, 1988). The first two describe the framework in terms of the constituents of capital and the risk weighting system. The third section deals with the minimum capital requirement. The framework provides a fair and reasonable degree of consistency in the application of capital standards in different jurisdictions, on a common definition of capital. The most important achievement of Basel I was undoubtedly the introduction of discipline through imposition of risk-based capital standards both as a measure of strength of banks and as a trigger for supervisors' intervention. However, Basel I had also many caveats. Firstly, the regulation was not able to meet one of its main objectives, i.e. to ensure level playing field for international banks. Researches carried on in this field (SCOTT et al. (1994)) showed that other factors, such as different

legislative environment (e.g. insolvency and foreclosure laws) could also play an important role in the persistent market fragmentations. Secondly, the objective of increasing the soundness and stability of the banking system did not meet either, as capital adequacy regulation could even accentuate systemic risk by coordinating one segment of the banking system, but leaving unregulated others. The one-size-fits-all approach gave incentives for banks to use securitization and off-balance sheet instruments to lower their RWAs and take as much credit risk as they can by granting loans to borrowers with the highest expected return in a risk weighted class. Lastly, the most fundamental problem of Basel I was to define and measure portfolio risk by placing different types of bank exposures into separate buckets.

The third regulatory wave started in 1999 (BCBS, 1999). The amended version of the regulation introduced *inter alia* the concept of internal models for credit risk (internal ratings based – IRB - approach) and quantifiable capital charge for operational risk. The greater risk sensitivity under Basel II is achieved by linking each bank's capital requirements to empirically based measures of credit and operational risk as determined in part by risk parameters estimated by the organization, such as a loan's probability of default (PD) and its expected loss given default (LGD). Moreover, the Pillar framework also appeared first in the Basel II rules. Pillar I stood for minimum capital requirements, Pillar II (supervisory review process - SREP) represented the supervisory review results and Pillar III is for defining the principles of information disclosures. In addition, the Basel II framework is intended to promote a more forward-looking approach to capital supervision. The most important criticism of Basel II is its pro-cyclicality, which stems from the credit risk models' short time horizon. The BCBS, however, argued that the pro-cyclicality could be addressed by the various features of risk weights.

As an immediate response to the financial crisis, the Financial Stability Forum (FSF) made a comprehensive proposal in 2008 that includes *inter alia* full and prompt disclosure of risk exposures, urgent actions by accounting standard setters (especially relating to fair value accounting), strengthening risk management practices including stress testing and strengthening capital positions. The BCBS announced in November 2008 its strategy to address the fundamental weaknesses revealed by the financial crisis. The first consultative document for Basel III was published in 2009, which brought several innovations to

banking risk regulation. First, it proposed quantitative measures for liquidity risks. Second, definition of capital has changed and capital buffers were increased. Third, unweighted capital ratio has been introduced. Last, unified rules for remuneration of risk-taking staff were proposed. The new guidelines have been finalized by 2011, which contains the revised requirements (BCBS (2011)).

From the euro area perspective, the financial crisis evolved in 2010/2011 made clear that strengthening the banking sector is not the only prerequisite of economic recovery. It has become clear that more has to be done, in particular to break the vicious circle between banks and their national public finances. The new regulatory framework with common rules within the European Union, set out in a single rulebook, is the foundation of the banking union. Common rules (in particular Capital Requirements Directive and Regulation) help prevent bank crises in the first place and, if banks do end up in difficulty, set out a common framework to manage the process, including a means to wind them down in an orderly manner (Directive on Bank Recovery and Resolution (BRRD)). Common rules also ensure that all EU savers are guaranteed that their deposits up to €100,000 (per depositor/ per bank) are protected in the EU (Directive on Deposit Guarantee Scheme –DGS). National DGS can be vulnerable to large local shocks. To this end, the Commission’s proposal for a European Deposit Insurance Scheme (EDIS) would provide a stronger and more uniform degree of insurance cover for all retail depositors in the banking union.

With respect to the new regulations two questions remain, however: i) whether these new rules will live up to expectations (forward-looking), and ii) whether these rules having been effective before the crisis would have helped avoid the problems (counterfactual). It is difficult to answer any of them, but they have an utmost importance from the regulatory authorities’ point of view. There are many different objectives according to which the effectiveness of the new rules can be evaluated. CLAESSENS et al (2016) suggests the following prerequisites for an efficient regulatory framework: think system-wide and try to explicitly address market failures and externalities, improve incentives individually and collectively, of all those involved in finance, collect more, higher quality data and conduct better analysis and improve crisis management. Despite much discussion and some tentative steps

forward, as of yet macroprudential approaches remain largely microprudential. In terms of giving right incentives, the new rules do not perform particularly well. Especially from the long-term perspective, where activities can migrate to less regulated parts of the industry thanks to higher requirements. Steps were also taken towards reducing the moral hazard stemming from the Too-Big-To-Fail (TBTF) problem. Capital surcharges have been introduced for systemically important financial institutions; however, it is not entirely clear whether these requirements provide sufficient incentives to avoid failure.

Although, substantial amount of work has been devoted to setting up criteria for efficient regulations, less has been done so far on testing the new regulations' effectiveness retroactively. In the first part of the dissertation we are looking for answers to this type of questions, i.e. what would have happened if these rules were already in place? Firstly, we would like to answer the question whether stricter capital requirement would have resulted in a less intensive raise in FX lending in Hungary. Secondly, we are looking for some evidence whether regulatory authorities could have prevented the FX lending crisis by requiring a countercyclical capital buffer (assuming they would have had the opportunity to apply such a tool). Thirdly, we try to find an answer whether tighter capital regulation would have been worth in terms of GDP sacrifice.

To answer the questions mentioned earlier, we apply a counterfactual analysis based on NOSS – TOFFANO (2014) to assess whether excessive credit growth and the build-up of FX loans could have been prevented by the use of macroprudential policies.¹ Specifically, by estimating the historical relationship between aggregate capital adequacy, lending and a set of macroeconomic variables, we calculate an alternative scenario of pre-crisis lending based on a hypothetical capital adequacy regulation.

Despite the enthralling speed of standard setting, regulatory work has not finished, further efforts has to be made in many areas. The vicious circle between sovereign and bank credit risk was the hallmark of the 2009-12 sovereign debt crisis in the periphery of the euro area. By implementing the BRRD, one angle of this vicious circle has already been broken, namely there will not be bailout costs anymore.

¹ Based on IMF (2000), aggregate capital adequacy ratio is considered to be a macroprudential indicator.

However, the contagion stemming from the banking sectors' large exposures to the domestic sovereigns still has to be addressed. There are several options currently on the regulators' table (ESRB (2015)). The proposals vary in a wide range; from introducing positive risk weights for sovereign exposures to extending the large exposure limit rules for sovereign bond holdings.

The impact of such regulatory change would be manifold but it will certainly be the most substantial among the pending regulatory proposals. It would most likely trigger substantial adjustment both for the banking sectors and the sovereigns. As such, the topic has received particularly high publicity and has been discussed in many forums. To contribute to the international debate, in the second part of the dissertation, we try to find answers to the following questions. Firstly, whether introducing positive risk weights and limits on sovereign exposures could reduce the impact of a potential crisis. Secondly, whether banks' ability to accommodate temporary large swings in financing needs of the sovereigns would be constrained by either of the two policy options. Lastly, whether banks would lower their demand for sovereign debt and if so, what would be the implications for the sovereigns.

By looking at some stylized facts and analyzing how the banks would adjust in the transition to this new regulatory regime, we attempt to give an idea of the magnitude of the transition effects. In addition, we provide a qualitative assessment of what the two basic options for regulatory treatment of sovereign exposures could achieve and what their broader macroeconomic and market consequences would be.

2. Structure of the Dissertation

Chapter 1 lays down the importance of the topic and describes the structure of the remainder of the dissertation.

In Chapter 2, we have reviewed the evolution of the financial regulations both in the international context and in Hungary. We provide some overview of the Basel framework and the way it has changed over time and most importantly, due to the financial crisis. Our focus is to analyze the measures introduced after the onset of the financial crisis that could have been game changers if they had been in effect beforehand. We also highlight the areas where there are still ongoing regulatory works and we try to identify those that could have ambiguous impacts on the banking sector as well as the broader macro economy.

In Chapter 3, we conduct a counterfactual analysis to answer our first question. To this end, we first aim to estimate the effect of the tightening of regulatory capital requirements on the real economy during a credit upswing. Second, we intend to show whether applying a countercyclical capital buffer measure, as per the Basel III rules, could have helped decelerate FX lending growth in Hungary, mitigating the build-up of vulnerabilities in the run-up to the global financial crisis. To answer these questions, we use a Vector Autoregression-based approach to understand how shocks affected to capital adequacy in the pre-crisis period.

Chapter 4 discusses the two widely discussed basic options to address a regulatory gap, namely the favorable treatment of sovereign exposures in the banks' balance sheet. The first proposal would be to apply non-zero risk weights to sovereign exposures, and put limits on exposures to sovereigns, akin to those in place for other exposures. Although we analyze each option in isolation, the two complement one another as they target different facets of risk. Positive risk weights address counterparty credit risk, whereas large exposure limits address concentration risk.

Chapter 5 summarizes the main findings of the dissertation.

3. Results

Thesis 1. Keeping the capital adequacy ratio requirement at its 2005 Q1 level, would have resulted in a moderate decline in cumulative real lending growth.

Both our Vector Autoregression (VAR) and Structural Vector Autoregression (SVAR) estimations suggest that an increase of 13 basis points in aggregate capital adequacy ratio, i.e. keeping the ratio at its 2005 Q1 level, is associated with a decline of 0-14 percentage points in cumulative real lending growth compared to actual growth after 10 quarters. Given that actual cumulative growth was 100 per cent between 2004Q1 and 2007Q3, our estimation results thus indicate only a modest slowdown to 86 per cent.

Thesis 2. The modest impact of a change in capital requirement on lending suggests that regulatory authorities could not have avoided the upswing in FX lending by requiring countercyclical capital buffers even if such a tool had been available and they had reacted quickly to accelerating credit growth.

Our estimation results suggest that authorities could only have slowed the increase in lending temporarily, it would have regained its momentum after 4 quarters. The results support the post-crisis conventional wisdom about the inadequacy of pre-crisis regulatory frameworks. Therefore, it points toward providing the authorities responsible for financial stability with more power and flexibility so that they can identify systemic risks and respond to them quickly and efficiently.

Thesis 3. A more pronounced tightening might have eliminated FX lending, but at the expense of real GDP growth.

Macroeconomic fundamentals were fragile when FX lending started, with the significant fiscal vulnerabilities requiring the central bank to keep the policy rate at elevated levels. Due to the high differential between HUF and FX interest rates and households' low risk awareness regarding exchange-rate volatility, FX lending became very popular and contributed significantly to real GDP growth in the pre-crisis period. The bottom line is that an unsustainable fiscal policy

led to a trade-off between economic growth and the build-up of new vulnerabilities in the form of FX lending.

Thesis 4. Both introducing positive risk weights and limits on sovereign exposures could reduce the impact of a potential crisis due to higher ability of banks for loss absorption, more diversified portfolio, better risk transparency and reduced systemic risk.

In our dissertation, we analyzed the two widely discussed basic options to address this regulatory gap: applying non-zero risk weights to sovereign exposures, and putting limits on exposures to sovereigns, akin to those in place for other exposures. Although this paper analyses each option in isolation, the two complement one another as they target different facets of risk. Positive risk weights address counterparty credit risk, whereas large exposure limits address concentration risk.

Both policy options would, according to our analysis, lead to improved bank risk management and render banks more resilient. They would equip them to better absorb losses: positive risk weights would require higher capital buffers and exposure limits would lead to greater diversification. Positive risk weights would also improve risk transparency and correct distorted incentives for investing in sovereign bonds. At the systemic level, leverage would decrease and losses in the event of default would be more spread out. On the downside, both regulatory proposals would lower bank profitability in the short run. In the longer run, positive risk-weights could permanently reduce bank profits by increasing their funding costs, while exposure limits would lead to a more diversified portfolio and lower funding costs.

Moreover, they could also lower the potential for twin crises – sovereign and banking – due to weaker ties between the balance sheets of these two sectors. At the same time, they could aggravate future economic crises by limiting the funding options for sovereigns.

Thesis 5. Since banks' ability to accommodate temporary large swings in financing needs of the sovereigns would be constrained by either of the two policy options, this could call for an improved fiscal framework at the European level.

A credible backstop should be in place to signal to investors that sovereigns have access to sufficient funds in case of need and ward off any short-term market fluctuations.

The effect of the new regulations on sovereigns depends on the modality and timing of the introduction. A gradual increase in the risk weights and a relatively long phasing-in period could alleviate the pressure on sovereign debt markets and help avoid strained fiscal adjustments, thereby lowering the macroeconomic costs of the new regulations. Nevertheless, based on recent experience with banks' adjustments in response to regulatory changes, the possibility of the new regulation being frontloaded is high. The extent of frontloading would depend on the price elasticity of sovereign debt and the share of sovereign exposure that the banks are able to value at book value.

Thesis 6. As banks would lower their demand for sovereign debt, sovereigns would need to find new investors that could prove difficult for some countries.

The benefits in terms of increased resilience in the banking sector would come at a cost for some sovereigns. Sovereign bond holdings would become more costly in terms of capital if positive risk weights were applied or the exposures were capped by a hard limit. In both cases, banks would try to deal with excess sovereign bonds on their balance sheets by injecting fresh capital or reducing their portfolio of sovereign bonds. An increased supply of sovereign paper, or a lack of demand for new issues, would raise funding costs for the sovereign and consequently for the whole economy. Furthermore, both policy options would lower liquidity in the sovereign debt markets, as they add to the cost and hinder the ability of banks to provide market-making services. Exposure limits in particular would have significant repercussions on markets in the short run, as banks traditionally have large exposures to domestic sovereigns that they would have to shed. Other market participants would need to absorb this additional supply. Sovereigns would need to re-arrange their financing sources, which could prove challenging. As the demand of local investors for sovereign debt tends to be more reliable and stable, sovereigns would have to adjust to the new market, potentially having to deal with more volatility, currency risk or new requirements regarding sustainability.

4. Summary

In the dissertation, we analyzed the potential impact of selected regulatory responses to the GFC in two geographical regions.

First, we estimated the effect of changes in capital adequacy regulations on the Hungarian banking sector. Specifically, we aimed to show whether the pre-GFC introduction of a countercyclical capital buffer as per the Basel III rules could have helped decelerate FX lending growth in Hungary. Since the relationship between regulatory capital and lending growth is ambiguous, we estimated two VAR models. The unconstrained version aimed to provide the upper bound for the effect of macroprudential tightening on the real economy, as it does not require the increase in capital requirement to be a supply shock. At the same time, the SVAR model serves as the lower bound since sign restrictions on lending and alternative funding growth ensure that the increase in capital requirement is considered a supply shock.

Second, we analyzed the potential impact of regulatory options on the treatment of banks' sovereign holdings. Specifically, we demonstrated potential costs and trade-offs associated with the introduction of non-zero risk weights and large exposure limits to sovereign exposures.

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List of other publications

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