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Universidade de Lisboa

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MASTER'S FINAL WORK
DISSERTATION

REGULATION OF THE FINANCIAL SYSTEM AND BANKING CRISES – A LONG TERM PERSPECTIVE

PEDRO DUARTE GONÇALVES BELO PENICHE GALVEIAS

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SUPERVISION:
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ABSTRACT, KEYWORDS AND JEL CODES

The last decades were characterized by a significant increase in the banking sector regulation to solidify its stability and minimize possible systemic contagions across the financial system. To analyze the effectiveness of the adopted regulations in the banking system, we study Basel I and Basel II implementation effects in a set of emerging and developed economies, by employing a descriptive methodology with the focus on the Real GDP per capita, output losses, crisis duration, bank capital ratios and level of bank's non-performing loans, as explanatory variables.

Our results suggest that the impact of banking crises in the financial system appears to be controlled due to stricter capital ratios, promotion of capital buffers, adoption of more transparent banking practices, and more effective supervision. Specifically, we found that banks while complying with Basel I and II, showed strong capital ratios, even when they experienced significant deteriorations in their credit portfolios' quality due to the market and social-economics events.

KEYWORDS: Banking Crises; Basel Accords; Banking Regulation; Emergent and Advanced Economies

JEL CODES: G01; G18; G21

TABLE OF CONTENTS

TABLE OF FIGURES

ACRONYMS

DIDMCA – Depository Institutions Deregulation and Monetary Control Act

EU – European Union

Fed – Federal Reserve

FDIC – Federal Deposit Insurance Corporation

FOMC – Federal Open Market Committee

FRS – Federal Reserve System

GDP – Gross Domestic Product

GFC – Great Financial Crisis

MMMFs – Money Market Mutual Funds

OECD – Organization for Economic Cooperation and Development

PD – Probability of Default

SA – Standardized Approach

SEC – Securities and Exchange Commission

UK – United Kingdom

USA – United States of America

GLOSSARY

Banking Groups – Groups of institutions that participate mainly in banking activities

Credit Risk – Comprehends the risk of counterparty failure

Exposure at Default – Represents the amount to which the lender is exposed when a borrower default

G-10 – The Group of Ten is composed by eleven countries: Belgium, Canada, France, Germany, Italy, Japan, the Netherlands, Sweden, Switzerland, the United Kingdom, and the United States of America

Loss Given Default – Represents the proportion of the exposure that will not be covered when a borrower default (%)

Market Risk – Comprehends the risk of incurring in losses in on-and-off-balance-sheet exposures due to movement in market prices. It comprises foreign exchange risk, commodities risk, and risks associated to equities and interest rate instruments in the trading book

Operational Risk – Comprehends the risk of incurring in losses due to inadequate or failed internal processes, human behavior, system's failure, or external events. It comprises legal risk (e, g. penalties and exposures to fines). Strategic and reputational risks are not included

Probability of Default – Represents the likelihood of a borrower to default (%)

1. INTRODUCTION

The aim of regulation is to enhance the stability and efficiency of the financial activity by overcoming market failures. In terms of the banking system, the information asymmetry between borrower and lender, and the depositor and the banker, are the most important market failures (Goodhart, 2012). Therefore, regulation can avoid contagion through the financial system although, simultaneously, can imply moral hazard arising from the protection of the system.

The increase of complexity of the banking system since the nineteenth century implied new regulatory frameworks surpassing the classical liberal perspective that governments should have a minimal role in the operations of markets. Bank failures and losses to depositors justified more formal regulatory rules (Schenk and Mourlon-Druol, 2016).

The main purpose of this dissertation is to analyze whether the evolution of regulation in the banking sector has allowed to mitigate banking crises, both in terms of their impact in the financial system, as well as in the frequency and number of crises. For this, a strong research component is necessary to know the main developments in banking regulation over the years.

In this sense, the research question will be: **How effective is regulation for the banking system?**

We will be answering the previous question using a descriptive approach where, based on a sample of advanced (Denmark, France, Germany, Italy, Netherlands, Spain, United Kingdom (UK), and United States of America (USA)) and emerging economies (Argentina, Colombia, Ecuador, Hungary, Latvia, Mexico, Slovenia, and Turkey), the objective is to empirically assess whether banking crises have as major fuse the lack of regulation, or if these two are not associated. Basically, it is about evaluating the effectiveness of regulation for the banking system, which is our main question.

Banking regulation it is not a new topic, but nowadays it is extremely important to have the bases of banking regulation. Especially if someone is working in the banking sector as the link between banks, regulation, and supervisors are becoming stronger day

by day. Therefore, this dissertation serves the purpose of training and inform its readers for a subject that should be mandatory in any Finance degree.

After this introduction, the study is divided in three more sections. The section 2 will cover the theoretical framework, where we will start by analyzing the impacts of the Glass-Steagall Act (1933) in the USA – what is its content, what is its time horizon, and why it was eliminated. Second, we will study the Basel I and Basel II agreements since they aimed to move towards a uniformity of criteria in an increasingly globalized financial system. A system with a lot of differences, where the United States were trying to move apart from their strict separation between commercial and investment banking to a model of universal banking, as banks in Europe were allowed to. Also, on the opposite reality, emergent banking systems had few or no requirements when performing their activities due to lack of regulation and supervision. In section 3 (subdivided in three parts), we present and test our research hypotheses in our sample of countries, using a set of explanatory variables and different time horizons which grants for more detailed remarks. Finally, in section 4 we present our main findings and conclusions, limitations of the MFW, and suggestions for further investigations.

2. LITERATURE REVIEW

2.1. THE 1929 CRISIS AND THE TURNING POINT OF FINANCIAL REGULATION

In the USA, the period after World War I was characterized by prosperity powered by innovations in the industrial and service sectors that materialized the American dream (Szostak, 1995). The economy was booming at an unsustainable rate, supported by banks that were lending at a much faster speed than their cash inflows, raising questions about their sustainability. In fact, at that time the banking system was characterized by its lack of robustness driven by a large and excessive set of banks, sometimes very small and with scarce customers; doubtful loans that were given based on the belief that the economy would be always growing; and by the absence of supervision and monitoring by authorities and depositors, respectively (Alston et al, 1994). The stock market was also reflecting the economy's sentiment, motivated by individual and institutional investors that wanted to take advantage of companies' growth and appreciations.

In the beginning of the 1920s and the years that followed this decade, destructive conflicts of interest and perverse incentives for excessive risk-taking started to stain the financial system (Crawford, 2011). Banks, in general, were accused of massive speculation in the pre-depression era. Specifically, a large number of banks encouraged their clients, sometimes unsophisticated and poorly informed, to invest in shares and bonds of companies that they had granted loans (or invested on) (Wilmarth, 2020). In the housing market, banks were also operating as "universal banks" filling an unsustainable credit bubble by packaging risky loans into bonds, and selling those to leverage their gains (Wilmarth, 2018). A statistic from the Federal Deposit Insurance Corporation (FDIC) database, revealed that between 1921 and 1929, on average, 600 banks failed each year in the United States.

When the economy showed signs of underperformance, it was already too late to stop a crisis that was being built for several years. In October 1929, the stock market crashed driven by the enormous sell-off. The practice of buying shares on margin[1], that was very common among investors, stimulated even more the panic. When stock prices plunged, all the investors that had bought shares on margin rushed to sell their assets before an

[1] This exercise involves taking a loan to buy stocks, or other asset, and repaying that loan with the proceeds from a rising in the asset's price.

even bigger decline in prices (Taylor, 2020). The supply and demand law came into action, and the shares' prices decreased further, since there were more individuals selling than buying. At the same time, consumers and businesses were losing confidence in the economy. Consumer spending decreased, especially in consumer goods and in private sector investments. As demand warmed, manufacturers did not have consumers to move their stocks, therefore production stopped, and unemployment surged (Aliber & Kindleberger, 2011; Taylor, 2020). Another astonishing statistic from the FDIC database, disclosed that between 1930 and 1933, about 9,000 banks failed, 4,000 just in 1933, causing depositors tremendous losses. It is clear that banks became greedy, sloppy, and the fiduciary duty of protecting depositors was compromised (Kenton, 2021).

The global outlook was disturbing, and to tackle the Great Depression within the USA, the Banking Act of 1933, also known as the Glass-Stegall Act, was signed as a countercyclical policy (Friedman & Schwartz, 1963). Its main goal was to separate commercial from investment banking, working as a firewall. Decision makers believed that this separation would lead to a healthier financial system, decentralized, more stable and less vulnerable to contagion, therefore reducing systematic risk (Foster, 2020). More important, it would restore public trust in the banking system, preventing depositors from doing bank runs and protecting them by restricting the use of banks' money for speculation (Amadeo, 2020; Friedman & Schwartz, 1963; Preston, 1933).

2.1.1. PROVISIONS OF THE GLASS-STEAGALL ACT

According to the Board of Governors of the Federal Reserve System (FRS) (2017a, 2017b), the Act bounded FRS member banks, including national-chartered banks (members by definition) and state-chartered banks that have decided to be members of the FRS. These institutions had one year to choose if they wanted to perform commercial or investment banking activities (Taylor, 2020).

Commercial banks were no longer allowed to deal in non-government securities for customers or themselves (i.e., buying and selling securities for trading purposes), invest in non-investment grade securities for themselves, and affiliate or share employees with companies involved in such activities previously mentioned (Carpenter et al, 2016). They

had to focus on their main activities – collecting deposits, granting loans, and providing fiduciary services (asset management for instance) (McDonald, 2016; Wilmarth, 2018).

Investment banks had to restrict their connections to commercial banks, meaning no overlapping directorships or common ownership, and they could not accept deposits (Wallison, 2009). They had the role of dealing debt and equity securities, attracting long-term funding commitments from investors, and providing medium-and-long-term financing for businesses (Wilmarth, 2018). To better understand investment banks' role, they were and are also referred to as "broker-dealers" (McDonald, 2016).

The Act established the creation of the Federal Deposit Insurance Corporation (FDIC), and the Federal Open Market Committee (FOMC). The first, mentioned in section 8, would guarantee commercial banks' deposits, up to a certain amount, by a pool of money collected from all FRS member banks (Ruggeri, 2009). The goal behind the creation of this entity was to increase trust in banks, ending panics and bank runs (Federal Reserve History, 2013). In January 1934, a temporary fund was established to insure deposits up to $2,500. Later that year, the fund became permanent and the limit was raised to $5,000 (currently deposits are guaranteed up to $250,000). For banks that were not part of the FRS, being part of the FDIC was a voluntary decision (Federal Reserve History, 2013). The FOMC, also mentioned in section 8, would be responsible for open market operations. Its goal was to review economic and financial conditions, determine the appropriate stance of monetary policy, and assess the risks to its long-run goals of price stability and sustainable economic growth, through 8 annual meetings (Board of Governors of the Federal Reserve System, 2021).

Since their creation, FDIC and FOMC did not suffer significant changes, maintaining their initial directives and goals until now.

The last provision that we want to stress is the development of Regulation Q. It was a rule that prohibited FRS member banks from paying interests on checking accounts and that limited interest rates on other types of deposits, such as savings accounts. The goals behind this regulation were to stop banks from having to take risky positions in order to be able to pay high interest rates to depositors, and to discouraged competition between banks in terms of deposit-rates (Calomiris & Haber, 2013; Modigliani & Sutch, 1966).

2.1.2. THE ACT'S REPEAL

Technological and financial innovations were some of the main drivers behind the extinction of the Glass-Stegall Act.

The emergence of financial innovations like Money Market Mutual Funds (MMMFs) and Over the Counter derivatives, allowed investment institutions and banks to offer products to consumers and businesses that they were not supposed to, according to the Act. The spread of these instruments was leveraged by the collapse of the Bretton Woods system and the surge in inflation in the 70s, that caused an increase in market interest rates to levels above the limits imposed by Regulation Q (McDonald, 2016; Wilmarth 2018). Depositors faced a dilemma: keep their money deposited in banks earning zero or low interest while prices were rising and their purchase power was weakening; or invest it in MMMFs and other financial products that paid unrestricted interest rates in accordance with market conditions, allowing depositors to protect themselves against downward real interest rates (European Central Bank, 2021; Wilmarth, 2018). Depositors chose the second option, which led U.S. President Carter to sign into law, in 1980, the Depository Institutions Deregulation and Monetary Control Act (DIDMCA). The DIDMCA increased the Federal Deposit Insurance and removed interest rate caps previously imposed by Regulation Q (checking accounts would still not pay interest) (Friedman, 1990). The Act intended to put commercial banks in a much more competitive position against other financial institutions that developed new "quasi-depository investment vehicles" (Foster, 2020, p. 37). Two years later, was passed the Garn-St Germain Depository Institutions Act that eased even more the pressure on banks and on Savings and Loans (Lardner, 2009).

It is clear that an anti-regulatory posture was emerging in the Federal Reserve (Fed), in the Congress, and in the White House. The most important argument was the potential loss of U.S. financial firms' competitiveness at the expense of London, Frankfurt or Shanghai as new financial capitals of the world (Crawford, 2011; History.com Editors, 2018).

In 1999, the Gramm-Leach-Bliley Act (the Financial Modernization Act) was signed by the United States President Bill Clinton, that officially repealed the Glass-Steagall Act (White, 2010). It is easy to comment about something when it happened, but I want to

leave you with a passage of Senator Byron Dorgan's statement in congress in 1999, who did not agree with the Act's repeal.

"I think we will look back in 10 years' time and say we should not have done this, but we did it because we forgot the lessons of the past… We have now decided in the name of modernization to forget the lessons… of safety and soundness."

Senator Byron Dorgan (Cited in Crawford, 2011, p. 129)

2.1.3. GLASS-STEAGALL ACT'S REVIEW – AN ASSESSMENT

One of the characteristics that apply to effective policies, is its effectiveness in solving a problem for which it was designed (Giunipero et al, 2015). The Act was signed to strengthen USA's financial system, eliminating inappropriate behaviors and distinguishing distinct businesses. Between 1947 and 1973, was a period of macroeconomic stability in which no major financial crises and bank failures occurred. When they occurred, it was possible to take targeted responses that did not involve massive bailouts due to the less risk of contagion. Additionally, depositors could escape largely unscathed thanks to the existence of the FDIC (Wilmarth, 2018). It simplified regulatory supervision since banking regulators ensured the stability of commercial banks by monitoring risks and banks' lending operations, and the Securities and Exchange Commission (SEC) protected investors by enforcing the federal securities laws as stated in Fed and SEC missions. Also, trust in the stock and bond market grew, and for the world, USA set a higher standard of transparency and reliability. In this sense, it fulfilled its goals.

Another characteristic of effective policies is the fact of being unambiguous, without space for different interpretations (Giunipero et al, 2015). The Act had several loopholes that were explored by market players to ease its restrictions and to generate doubts regarding its scope (Crawford, 2011). From this perspective, the countercyclical policy was not effective. In addition, authors identify two other negative aspects. First, the Act did not regulate real-estate lending, not imposing limits to constrain credit expansion. Although it had been proved in the years prior the Great Depression that this type of loan was risky, this measure was tactical by who designed the bill. By not restricting loans collateralized by land, rural banks with state-chartered would maintain their incentives to

remain in the FRS, since their main activity (lending to local farmers) would not be compromised (Calomiris & Haber, 2013). Second, it only restricted FRS member banks. Thrifts, state-chartered banks that did not join the FRS, and other depository institutions could pursue with their normal activity which narrowed the scope of the Act (Committee on Capital Markets Regulation, 2017).

2.2. A NEW STANCE OF INTERNATIONAL REGULATION & COOPERATION: BASEL AGREEMENTS

2.2.1. THE INTERNATIONAL BACKGROUND

As the world became more globalized, especially the surge of the international payments system, concerns about international regulation and supervision emerged. Specifically, doubts about who should regulate and supervise institutions that operated in different geographies – should be the local authorities where the subsidiaries are located, or the authorities where the parent is based (Mourlon-Druol, 2015; Schenk, 2011; 2014)? In 1974, there were at least two events in which this lack of definition led to unbearable losses: (a) In Switzerland, a trader from Lloyds Lugano, a branch of Lloyds Bank International, lost several millions in what is considered the biggest loss of a British Bank by a single trader (Schenk, 2017). The loss was not immediately identified because it was masked using foreign exchange derivatives, and since it was a subsidiary, it was not clear which entity was responsible for its supervision – the Bank of England once it was a British Bank, or the Swiss authorities (since it happened in Switzerland) (Mourlon-Druol, 2015); (b) In Germany, the Herstatt Bank, the 80th largest bank in the country at that time, incurred in severe losses leading to its liquidation. The rumors of excessive risky trading started in 1973, undermining the bank's reputation in the global markets. Even so, the bank did not stop its operations as market players and regulators still trusted in the German bank, regardless of the gossips. Although the bank was considered small, Herstatt was deeply present in international markets due to its derivatives activities (Mourlon-Druol, 2015). In June 1974, numerous losses were uncovered, and even more would arise from international operations in different time zones. Regrettably, several counterparties were hit by Herstatt's inability to meet its liabilities. According to Emmanuel Mourlon-Druol (2015), this situation was the result of ineffective regulation and supervision from the German authorities; lack of international cooperation between authorities; false belief

of market self-regulation; and the practice of fraud and unethical behaviors by high ranked bank members.

The Lloyds Lugano crisis and the Herstatt Bank failure were two incidents, among others, that reinforced even more the need to effectively prevent banking crises that destroy the confidence in the banking system (contagion effect), and to improve international cooperation on supervision and regulation. For the previous reasons, at the end of 1974 was created the Basel Committee on Banking Supervision (BCBS). Initially under the denomination of Committee on Banking Regulations and Supervisory Practices, it was established by the G-10 central bank Governors to promote financial stability by strengthening countries' cooperation on banking supervision affairs. Currently, the Basel Committee counts with more than 40 members across 28 jurisdictions and keeps focusing its efforts on improving the capital adequacy framework. This framework has been upgraded through different agreements, the Basel Accords (I, II, and III[2]), which goals lay on the intercontinental convergence of banks' capital needs, and on the stability of the international banking system (Bank for International Settlements, 2021).

The first two Accords were powered by different drivers. Regarding to the first, the Latin American debt crisis in the early 1980s (post Bretton Woods) amplified the Committee's fears about the resilience of international banks, as their capital ratios were weakening while international risks were rising. Taking into consideration the aspects that powered the Lloyds Lugano crisis and the Herstatt Bank failure, similar situations were probable to happen in emergent countries' banking systems since they were poorly regulated and supervised, unstable and mistrusted due to frequent liquidations, mergers, recapitalizations, and they did not protect depositors as there was no deposit insurance (Stallings & Studart, 2002). Numerous foreign institutions (from developed countries) that operated globally were at risk due to their presence in volatile markets (including high-yielding emergent countries, with softer regulation that could boost banks' profits). Thus, this was not just a single geography issue, but a global banking system problem.

To mitigate increasing global financial risks, the Committee decided to work towards a global solution that would enhance banks' stability and eliminate some source of

[2] Basel III will not be analyzed because it has not yet been implemented.

leverage from differences in national minimum capital requirements. Therefore, in 1988 was implemented the Basel I, also known as the *Basel Capital Accord* (Basel Committee on Banking Supervision, 1988) that was mandatory for G-10 countries (should be fully implemented by 1992) and optional for others. Years after the lunch of Basel I, the Committee recognized that the Framework was too simple and narrow to fulfill its goals, and that it could not accommodate effectively financial innovations. So, in 2004 it was released the *International Convergence of Capital Measurement and Capital Standards: A Revised Framework,* commonly known as the Basel II, with the purpose of eliminating deficiencies in the previous work and to ensure stability in the international financial system (G-10 countries should be fully complying with it by 2008).

More than a hundred countries adopted Basel I throughout the years, including developed (e, g. USA, France, Germany, Italy) and developing (e, g. Argentina, Colombia, and Turkey) economies. When the second Accord was released, its worldwide implementation would take time due to the numerous changes that it represented for Banks. Even though, dozens of nations adopted the revised Framework, but at different speeds (Balthazar, 2006; Bergess, 2012; Comisión par el Mercado Financiero, 2020; Cornford, 2006).

2.2.2. A COMPARATIVE APPROACH

Basel I was based on a single pillar, which required internationally active banks to operate above a minimum standard ratio of capital to risk-weighted assets of 8% to face credit risk (and market risk, only included in 1996) (Balthazar, 2006). The second Accord, also applied to internationally active banks, was based on three interconnected pillars where the first pillar worked very similarly as on Basel I, but this time covering also operational and market risks; the second pillar required a stronger role of supervisors; and the third pillar was based on the promotion of better and more ethical market practices (surge on compliance requirements). Basel II not only covered more risks, but it also gave banks the opportunity to use their internal models to assess those. Even if they were not able to use their internal models, the standard methods displayed in this Framework used more risk-sensitive parameters, compared to those in Basel I, that could capture the particular characteristics of each institution, therefore protecting banks better. In addition,

to monitor and promote consistency in the adoption of Basel II it was created the Accord Implementation Group. In the Appendix we summarized Basel I and Basel II's pillars.

Regarding to the scope of application, there were at least two differences between both Frameworks: (1) when the Basel I was released, although it only bounded G-10 countries, it was shared with supervisory authorities worldwide to encourage them to adopt it in their countries. As done for Basel I, the Committee shared the second Accord with supervisory authorities worldwide for them to reflect on the adoption of it. This time, the Committee stressed that the implementation of Basel II should not be a priority for all non-G-10 supervisory authorities, and that the pros and cons of this decision should be assessed by each party taking into consideration their domestic banking system's nature; (2) Basel I and Basel II bounded the same type of institutions, but the latter was applicable on a consolidated basis. Meaning that Basel II could detect the risk of internationally active banks that operated autonomously (not as a group) and the risk of banking groups that contained an internationally active bank (Basel Committee on Banking Supervision, 1988; Basel Committee on Banking Supervision, 2005).

Regardless of the version of the Accord, national authorities could always add features to the package, preserving the originals, in accordance with their local reality.

2.2.3. POSITIVE AND NEGATIVE DIMENSIONS

In terms of Basel I and according to Jablecki (2009), based on data collected from the Nederlandsche Bank, a group of 29 Organization for Economic Cooperation and Development (OECD) countries increased their capital-to-asset ratios from 8,5% to 12% between 1990 and 2001. Bondt & Prast (1999) also reported that between 1990 and 1997 the UK, USA, France, Italy, Germany, and Netherlands' capital ratios increased from 9% to 11%. In addition, Balthazar (2006) refers that the number of bank failures per year in the USA slowed down between 1988 and 2000. Based on the previous data, seems that the Basel Capital Accord delivered what it promised. However, it is important to mention that the authors cannot be certain if banks' capital improvements were merely a result of the Accord, or if other variables as economic conditions were also a key factor.

On the other hand, different sources point out aspects that question the effectiveness of the Agreement. Balin (2008), Jablecki (2009), and the Board of Governors of the

Federal Reserve System (2003) indicate a common critic – banks were exposed to different risks in their daily activity besides credit risk, so it was crucial to consider other variables, as operational risk, when assessing capital adequacy. Zaher (2019), stressed that a capital ratio of 8% did not reflect the changing nature of default risk, therefore it was insufficient to protect banks against counterparty failure; also stated that the capital assessment tool did not change in accordance with banks' risk profile or the geography where they operated for instance. In addition, the Corporate Finance Institute (2021) claims that the framework should have focused more on assets' market value instead of their book value, as it was the case of considering assets' nominal principal amounts when determining on-and-off-balance-sheet exposures. A final critic is related with the loopholes presented in the Framework that allowed the practice of regulatory capital arbitrage by banks. More precisely, banks took advantage of the possibility of being exposed to assets with different risks that had the same risk-weights when assessing the capital ratio. This was done in two ways: First, through the securitization of assets. Banks could securitize their best loans (least risky, therefore more valuable) and selling those to another entity in exchange of cash (to a Special Purpose Vehicle that then resells them as bonds to investors). With more cash, banks could lend more money, therefore taking more risk[3]. Second, it was done by swapping long-term instruments of high-yielding entities by short-term ones, e.g. – long-term non-OECD bank debt was weighted at 100%, while the same instrument with short-term maturity was weighted at 20%. This comprehended an incentive for banks to hold short-term emerging market debt, which increased emerging market currencies' volatility and exposed banks to volatile returns (Balin, 2008; Board of Governors of the Federal Reserve System, 2003; Jablecki, 2009; Jackson, 1999).

To adjust and enhance the first Accord, the Committee elaborated Basel II, a far more complex Framework that tried to respond to the negative aspects of Basel I outlined above. It introduced more risks in the capital adequacy ratio, new approaches to determine the capital charge of the latter, and more risk sensitive parameters that comprehended improvements in the public's eye (Danila, 2012). It addressed securitization exposures separately, displaying guidelines on how banks should assess those (Danila, 2012). It recognized credit mitigation effects to reduce banks' exposures, since these instruments

[3] Banks were not penalized by removing their best assets from their balance sheet, as for example mortgage loan were weighted at 50% regardless of their quality.

serve the purpose of mitigating credit risk (Kamp, 2006). It encouraged banks to improve their risk management systems, promoting more efficient financial markets (Ozun, 2007). In addition, Basel II reinforced the monitoring of banks and promoted transparency in the banking system, through the second and third pillars respectively (Ozun, 2007).

From a different angle, some authors considered Basel II too complex and highlighted critics to it. Danila (2012) and Ozun (2007), considered that the adoption of the most advanced approaches created competitive inequality among banks, since the ones using the standardized approaches had higher capital requirements than the ones using their internal models[4]. In addition, they argued that this adoption was not available to all banks since it required them to invest a lot of capital in developing business models, systems, and to hire and qualify human resources. The new Accord demanded a lot from banks, but it also required a strong role and responsibility from supervisors due to the great amount of regulatory variability allowed. Balin (2008) and Kamp (2006), defended that not all supervisory agencies had financial means to develop and manage supervisory systems, and to hire high-skilled human resources, which limited the implementation and efficacy of the Agreement.

In terms of the Standardized Approaches, Balin (2008) and Danila (2012) pointed out that the Framework relied too much on the assessment of rating agencies, that comprehend a negative aspect because they were known to be too optimistic. Also, both authors referred that the fact that banks' exposures had to be rated one rating lower than their sovereign (usually low rated) impacted negatively emerging market banks. Banks that invested in such institutions were required higher capital requirements, what caused an increase in interest rates and fewer lending operations in such markets (to offset the additional regulatory capital cost). According to Ozun (2007) this would undermine the integration of emerging markets in the international financial system.

Lastly, Basel II did not solve the critic presented in the first Accord regarding to short-term lending to emerging markets. Under the Standardized Approach (SA) (for credit risk), short-term lending was still weighted lower than long-term. In addition, the Committee changed the definition of short-term debt from one year to three months, which would not contribute to emerging economies' currency stability (Kamp, 2006).

[4] This happened because the standardized methods did not perfectly reflect banks' profile.

3. METHODOLOGY AND DATA ANALYSIS

Cross-sectional to all theoretical aspects, the concept of "regulation effectiveness", a key concept in this study, will be analyzed. Having elaborated the theoretical part, which gives the bases for the investigation, the following research hypotheses were placed:

Hypothesis 1: Comparing the regulation of banking systems in advanced economies and emerging economies, greater regulation does not mean less crises.

Hypothesis 2: Comparing the regulation of banking systems in advanced economies and emerging economies, greater regulation does not mean crises with less intensity.

Hypothesis 3: The effectiveness of regulation does not depend on the development of the banking system, as regulation is no longer effective in advanced economies, that is, in economies with more developed banking systems.

Throughout this section, our analysis will focus on testing the latter hypotheses over our sample of banking systems.

By employing a descriptive methodology, we will study first the evolution of the banking system, between 1976 and 2007, in five non-European Union (EU) emerging economies that adopted Basel I between crises. The countries chosen were Argentina, Colombia, Ecuador, Mexico, and Turkey. The fact that they had a crisis before adopting the Basel Capital Accord and after it, comprehended the major selection criteria in the sense that it allowed us to make comparisons and to study the changes in the respective banking structures during that time. In addition, the period in analysis is 1976-2007 because it covers the collapse of Bretton Woods and the Great Recession. In these countries, the crises occurred in the 80's, 90's, and early 2000's right before the Great Financial Crisis (GFC).

After, using the same methodology, the focus will be on the 2008 crisis and how it affected emerging economies' banking systems in comparison with those of developed ones. The emerging economies chosen were Hungary, Latvia, Slovenia[5] (EU countries), and the ones analyzed in the first part. The developed countries chosen were Denmark, France, Germany, Italy, Netherlands, Spain, UK, and USA. The latter economies were

[5] Slovenia and Latvia status were changed by the IMF to Developed Economy in 2007 and 2014 respectively. In our analysis we considered them as emerging countries since our data starts in 1999.

selected because they all adopted Basel II while experiencing a banking crisis. In addition, the data covers the period 1999-2016, taking into reflection the introduction of the euro (€) in the Eurozone, Basel II adoption, and the years after the GFC (8Y corresponding to a Juglar Cycle).

Overall, in Table I we can see the list of countries that were analyzed, displaying their Basel adoption dates and banking crises starting year.

Table I: Countries' Basel I and II Adoption dates, and their banking crises starting year (organized by type of economy)

Type of Economy	Country	Basel I	Basel II	Crisis in Analysis
Emergent (According to IMF)	Argentina	01/01/1993	31/12/2013	1980, 2001
	Colombia	01/01/1993	01/01/2015	1982, 1998
	Ecuador	01/01/1995	01/01/2011	1982, 1998
	Hungary	01/01/1991	01/01/2008	2008
	Latvia	01/10/1999	01/01/2008	2008
	Mexico	01/01/1993	01/01/2013	1981, 1994
	Slovenia	01/01/1991	01/01/2008	2008
	Turkey	01/01/1992	28/06/2012	1982, 2000
Developed (According to IMF)	Denmark	01/01/1993	01/01/2008	2008
	France	01/01/1993	01/01/2008	2008
	Germany	01/01/1993	01/01/2007	2008
	Italy	01/01/1993	01/01/2008	2008
	Netherlands	01/01/1993	01/01/2008	2008
	Spain	01/01/1993	01/01/2008	2008
	UK	01/01/1993	01/01/2008	2007
	USA	01/01/1993	01/01/2008	2008

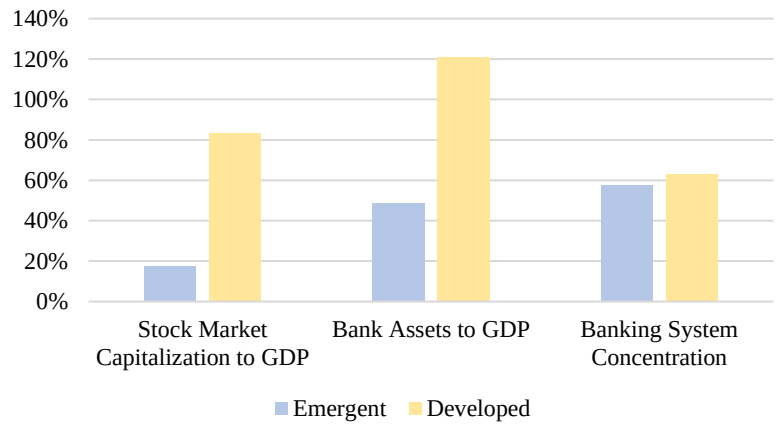
Source: Afanasenko & Reichling (2010), Aydogan (2015), Banco de Mexico (2021), Bank for International Settlements (2014, 2016), Calomiris & Powell (2000), Cho (2013), Cornford (2006), Dugan & XI (2011), International Monetary Fund (2002), International Monetary Fund Database (2016), Jagric et al (2008), Joachim et al (2010), Laeven & Valencia (2020), Lora (2007), Mantilla (2020), and Schmitz (2005).

We adopted Laeven and Valencia's (2020) banking crisis definition, in which a banking crisis begins when there are substantial indications of distress in the banking system (suggested by bank runs, significant losses and/or bank liquidations) and significant policy intervention actions in response to significant losses in it.

3.1. THE LEVEL OF DEVELOPMENT OF THE FINANCIAL SYSTEM IN THE COUNTRIES SELECTED

As displayed below in Figure 1, to analyze the structure of the financial system in our sample of countries, emergent and developed, we decided to do a synchronic analysis in line with other papers that analyze the development of such systems (Beck et al, 2003; Levine, 1997), choosing three variables: Stock Market Capitalization to Gross Domestic Product (GDP), Bank Assets to GDP, and Banking System Concentration. These variables will give us an idea whether the countries chosen are more oriented to market-based systems or banking ones, perceiving the importance of each sector in the countries' GDP, in nominal terms. In addition, the percentage of total assets held by the three largest banks to total banks assets, will give us an insight regarding to how the banking system is disposed. We decided to use reference values of 2016 because: there was more data available; it has been 8 years since the Great Crisis (a Juglar cycle), which allowed economies to return to their pre-crisis level and to develop even more their financial systems; and it is a date closer to today.

Figure 1: Structure of the Financial System by Type of Economy



Source: The Global Economy and CEIC

Analyzing the structure of the financial system of developed countries, we realize that banks have greater weight in nominal GDP than non-bank public companies (USA is an exception, where Stock Market Capitalization to GDP is greater than Bank Assets to GDP). The same happens with our sample of emerging markets, but at a different scale (in emerging countries, the sum of each stock market capitalization and bank assets is less than their nominal GDP Vs in developed countries, the sum of each stock market

capitalization and bank assets is twice their nominal GDP). Regarding to banking concentration, both economies display levels above 50% (emergent = 58% Vs developed = 63%), therefore highly concentrated banking systems.

3.2. EXPLANATORY VARIABLES

In order to answer to our research question, whether regulation has been positive to mitigate the banking crises' effects, we will use the following explanatory variables: **Real GDP per capita** (Base = 2010 US $) which demonstrates the actual impact of crises over the economy (this variable will be used to estimate both Crisis Duration and Output Loss); **Crisis Duration**, as the period between the crisis starting year, according to Laeven & Valencia (2020), and the year when Real GDP returned to its pre-crisis trend[6]; **Output Loss** that permits the quantification of the GDP that was eliminated (computed as the cumulative differences between trend and actual GDP during the crisis) (see Figures 36 to 56 in the appendix); **Bank Capital Ratios**, which indicates banks' ability to absorb losses (see Figures 15 to 35 in the appendix); and **Non-Performing Loans to Total Loans (%),** that reflect banks credit portfolio quality (this variable will only be used to the analysis after 1999 due to lack of data before it). The latter variables will allow us to study the intensity of specific banking crises over the economies in analysis, how banks were prepared to and how they handled those, taking into consideration the development of each banking system. It is important to stance that we cannot guarantee that the results obtained in the following analyzes are purely a consequence of the evolution of regulation, or if other factors were also drivers.

The Real GDP per capita data was collected from the World Bank Database. Bank Capital ratios were assembled from the Federal Reserve Economic Database (St. Louis Fed), the World Bank Database, IMF Elibrary, Banco de la República (Colombia) Database, Banco Central de la República Argentina Database, and the Central Bank of the Republic of Turkey Database. Non-Performing Loans to Total Loans (%) data was gathered solely from the Federal Reserve Economic Database (St. Louis Fed).

[6] Real GDP trend was determined using an Hodrick-Prescott filter ($\lambda = 100$) applied to the log of real GDP series over, at least, 8 years prior the crises starting years (a Juglar cycle). We extrapolated the series for a period of 4 years of crisis, the same methodology used to compute output losses (in line with Laeven & Valencia (2020)).

3.2.1. EMERGING ECONOMIES (1976-2007)

The years after the Bretton Woods collapse were not a period of elevated prosperity and stable growth in the economies in analysis. During this time, they all reported at least two banking crises, facing bank runs, deposit freeze, bank failures, bank recapitalizations, and bank mergers (Laeven & Valencia, 2020; Reinhart & Rogoff, 2009). Between 1976 and 2007 there were only three nations displaying yearly GDP per capita average growth rates above 1% (see Figure 2) – Turkey (2.24%), Colombia (1.77%) and Mexico (1.23%). Argentina and Ecuador reported variations of 0.96% and 0.70% respectively.

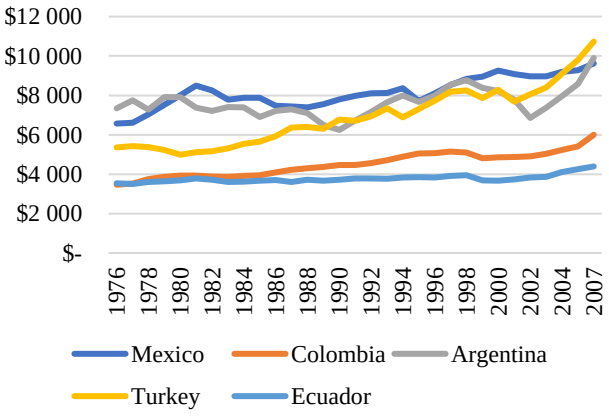
Until 1986, Argentina, Colombia, Ecuador, Mexico, and Turkey had one banking crisis. As can be identified below in Table II, Mexico reported the greatest output loss (26.56%) caused by its 4 years crisis, followed by Argentina with an impact on Real GDP per capita of 15.19% over 3 years of crisis. The remaining three countries display not only lower output losses but also lower crises duration (Turkey was the country that better surpassed its banking system crisis, which had no impact on Real GDP per capita).

Table II: Crisis Output Loss by emergent country (1976-2007)

Country	I	II
Argentina	15.19% (1980-1983)	22.45% (2001-2003)
Colombia	3.12% (1982-1984)	10.00% (1998-2000)
Ecuador	6.06% (1982-1984)	10.19% (1998-2001)
Mexico	26.56% (1981-1985)	11.14% (1994-1996)
Turkey	0.00% (1982)	2.83% (2000-2002)

Source: Own Calculations

Figure 2: GDP per capita (constant 2010 US$) by emergent country (1976-2007)



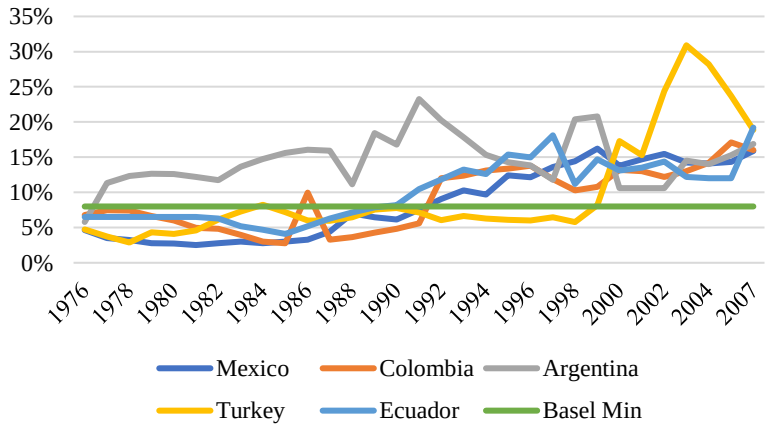
Source: The World Bank

In the second banking crisis analyzed that these five countries went through, solely one was able to contain its output losses to a single digit as can be seen above in Table II (once again, Turkey was the country that better overtake a banking crisis, with an impact on Real GDP per capita of 2.83% across 2 years). Argentina had the highest output loss (22.45% which was 48% more compared with its first crisis analyzed). Ecuador almost

doubled the impact on Real GDP per capita in the second crisis, and Colombia more than tripled it. Contradicting the trend of increasing output losses, Mexico reduced it across crises (still it displays the second largest impact on Real GDP per capita). Regarding to crisis duration, they all reported 2 years of banking crisis (except Ecuador with 3 years).

Before these emerging countries' banking systems adopted Basel I, in general their capital ratios were below the 8% safety net, and during crises they were not strong enough to sustain their capital levels and to increase those in the years after that as can be seen in Figure 3. Mexico and Colombia were the most troubling cases, as their capital ratios achieved a level of 2.52% (in the crisis starting year) and 2.77% (one year after the end of crisis) respectively (until 1992 none of these banking systems displayed capital ratios of at least 8%). Ecuador banking system's capital ratio also deteriorated during the banking crisis, but it managed to improve it on a continuing basis across the years (in 1990 achieved the 8% target). Of the five, the Turkish banking system was the only one that managed to strengthen its capital ratio in the crisis starting year (still it was below the 8% level and continued that way for several years). In terms of fulfilling the 8% capital requirement before the Basel's implementation, Argentina was an exception among the former banking systems as their banks' capital ratios were above 10% since 1977. The latter does not surprise us since Argentina's history of economic and financial instability.

Figure 3: Banks' Capital to Total Assets (emergent countries 1976-2007)



Source: Banks Association of Turkey, Banco Central del Ecuador, Banco Central de la República Argentina, Banco de la República, Banco de México, Central Bank of the Republic of Turkey, Federal Reserve Bank of St. Louis, Gobierno de México, and IMF.

To contradict the cycle of instability among banks, Basel I was seen as a sign of trust and stability in the international banking system. Therefore, emerging countries urged to

be part of this movement. Argentina, Colombia, and Mexico adopted the Basel Capital Accord in 1993, while Turkey had done it a year before (though Turkish banking system was only complying with it in 1999). Ecuador was a late adopter compared with the latter countries, adopting it in 1995. Considering that G-10 countries should be fully complying with Basel I in 1993, it is impressive how most of the countries' banking systems analyzed in this section were also capable to implement it at a similar pace. As displayed in Figure 3, in the second crisis, all of them registered capital levels far stronger than 8%. Nevertheless, it is possible to identify capital deteriorations, but banks worked to mitigate those by improving their ratios in the first or second year of crisis.

The adoption of the Basel Capital Accord in the economies chosen, did not stop them from having banking crises and, in general, with more impact on Real GDP per capita (implying that greater regulation might not mean less crises and crises with less intensity). Four out of five of these countries had more output losses in the second crisis than in the first, but the duration of them seems to be diminishing. The higher cost of crises can be linked to the development and structure of each banking system, but a smaller duration and a greater speed in reinforcing banks capital ratios may result from Basel I's adoption. The average period of a banking crisis in our sample of countries went from 2.4 to 2.2 years. Regarding to banks' capital ratios, after the adoption of Basel I banks were able to preserve high ratios in times of crisis, and to strengthen those in the following years, which did not happen in their first crisis analyzed. In Table III, it is possible to recognize the progress of banks' capital ratios before and after Basel I adoption.

Table III: Average Banks' Capital Ratios prior and after Basel I adoption by non-EU emergent countries

Country	[1976, Adoption Year[	[Adoption Year, 2007]
Argentina	14.38%	14.92%
Colombia	5.73%	13.32%
Ecuador	7.48%	14.06%
Mexico	4.41%	13.83%
Turkey	5.90%	14.51%

Source: Own Calculations

Note: See Table I for the adoption years

As shown above, it is quite clear that banks drastically lifted their capital ratios after the Basel Capital Accord adoption. Across our analyze, we believe that the adoption of

an international Accord in the latter markets brought seriousness and stability to their banking systems. It pressed banks, supervisors, and governments to react promptly to a situation of failure, not just by solving it rapidly but to make sure that banks had sufficient capital to cross it.

3.2.2. ADVANCED ECONOMIES (1999-2016)

The end and the beginning of a new century meant expansion for the chosen developed countries. Between 1999 and 2007, they all reported average annual GDP growth rates greater than 1.5% (except Italy with 1.16%), but that stopped with the emergence of the GFC. In general, their real production of goods and services per capita started to decrease in 2007, getting to a bottom in 2009. As shown in Table IV, the average annual GDP growth rates between 1999-2007 and 2008-2016 are completely different, demonstrating the impact of the GFC in each economy (until 2016, none of the developed countries was able to return to its pre-crisis yearly average GDP per capita growth rate).

Table IV: Average Real GDP per capita growth rate by developed country (1999-2016)

Country	1999-2007	2008-2016	1999-2016
Denmark	1.67%	0.13%	0.90%
France	1.58%	0.15%	0.86%
Germany	1.54%	1.07%	1.30%
Italy	1.16%	-1.17%	0.00%
Netherlands	2.07%	0.20%	1.13%
Spain	2.39%	-0.30%	1.05%
UK	2.25%	0.28%	1.26%
USA	1.92%	0.63%	1.27%

Source: Own Calculations

As can be seen in Table V, in the USA, where the GFC erupted, the banking crisis lasted 2 years and had an output loss of 6.19% which was the smallest impact over our chosen developed countries. Due to globalization, the GFC also affected Europe having an average impact on our sample of European countries of 9.68% on Real GDP per capita across 2.57 years. France was the nation with the second lowest impact on Real GDP per capita (6.71%) over a period of 2 years of crisis, followed by Italy with an impact of 7.09% throughout the same period. Denmark and Germany's banking crises also lasted two years and had a double-digit effect of 10.07% and 11.13% correspondingly. UK was

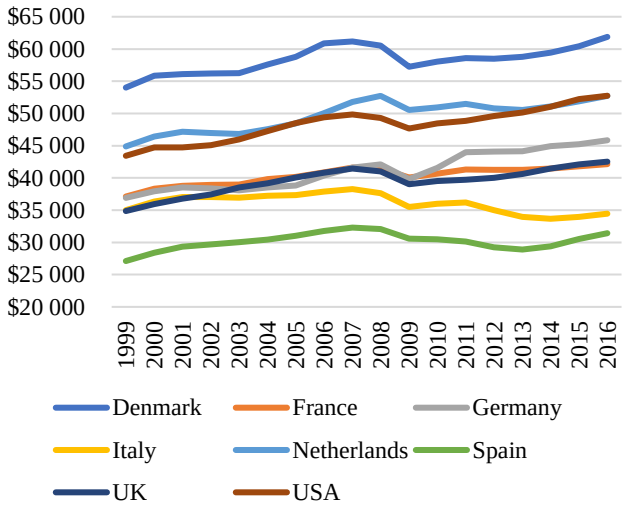
the only nation in which the banking crisis started a year sooner than the others (2007) taking an output loss of 9.33% across 3 years, therefore recovering at the same time as the previous 5 economies analyzed. Lastly, having 3 and 4 years of crisis, Spain and Netherlands had an output loss of 9.01% and 14.38%, respectively.

Table V: Crisis Output Loss by developed country (1999-2016)

Country	Crisis Output Loss
Denmark	10.07% (2008-2010)
France	6.71% (2008-2010)
Germany	11.13% (2008-2010)
Italy	7.09% (2008-2010)
Netherlands	14.38% (2008-2012)
Spain	9.01% (2008-2011)
UK	9.33% (2007-2010)
USA	6.19% (2008-2010)

Source: Own Calculations

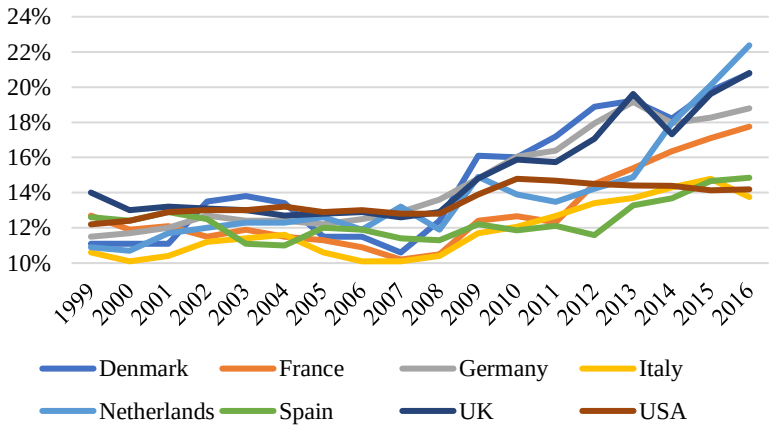
Figure 4: GDP per capita (constant 2010 US$) by developed country (1999-2016)



Source: The World Bank

All the developed countries described above adopted Basel I and Basel II in 1993 and 2008, respectively (Germany adopted Basel II in 2007). Examining banks' capital ratios between 1999-2007, we can conclude that, in general, these ratios deteriorated slightly before the GFC, somewhat similar to what a few non-EU emerging countries (analyzed in the period 1976-2007) experienced before a banking crisis (as presented in Figure 5). Nevertheless, in this period they were all able to maintain bank capital ratios above 10%. In 2008, four out of eight countries were capable to increase their banks' capital ratios, one maintained, and three suffered deteriorations (Netherland's banking system capital ratio was the most affected, falling from 13.2% to 11.9% but it was still high compared with those from France (10.5%), Italy (10.4%) and Spain (11.3%)).

Figure 5: Banks' Capital to Total Assets (developed countries 1999-2016)



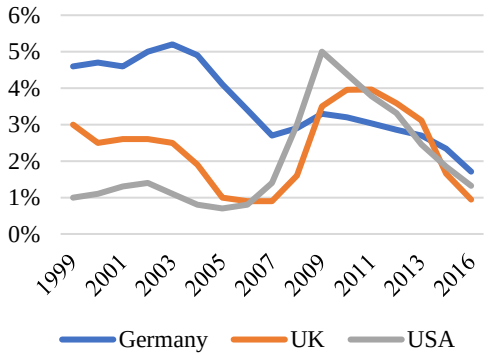
Source: Federal Reserve Bank of St. Louis

The surge of a global financial crisis at the same time that these countries needed to be fully complying with Basel II (beginning of 2008) could compromised the efficacy of the latter (ex: banks could not be able to fulfill the compliance requirements and the capital ratios). However, banks reacted very positively demonstrating that their efforts in the years of preparation for full adoption of Basel II paid off, and that the new Accord fostered stability in the global banking system. In the following years as displayed in Figure 5, in each developed economy, banks were able to lift their capital ratios to levels never achieved before.

What banks were not able to control in the rise of the GFC was the deterioration of their credit portfolios' quality[7]. As displayed in Figure 6, between 1999 and 2007 Germany and UK faced a reduction of banks' non-performing loans to total loans, in different proportions. In the USA, banks were also displaying this pattern but with an exception, the previous ratio started to invert its trend in 2006. In 2008, they all exhibited signs of corrosion on their banks' credit portfolios powered by the GFC. Germany and USA's banks managed to improve their credit portfolio quality in 2010, while the UK only succeeded to do it in 2012 (although banks in UK were slowest in improving their credit portfolios, they were the ones displaying better quality in 2014-2016).

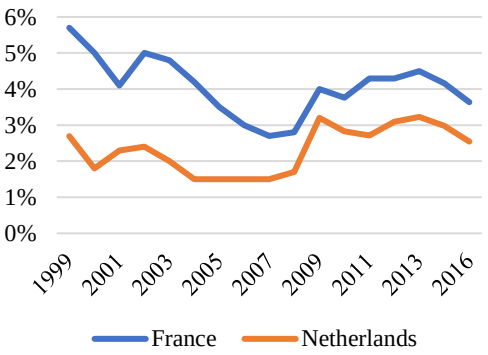
[7] This analyze will be divided in three parts, one for each group of countries (organized taking into consideration the performance similarity of their banks' credit portfolio quality): (1) Germany, UK, and USA; (2) France and Netherlands; and (3) Denmark, Italy, and Spain.

Figure 6: Germany, UK and USA banks' Non-Performing Loans to Total Loans



Source: Federal Reserve Bank of St. Louis

Figure 7: France and Netherlands banks' Non-Performing Loans to Total Loans

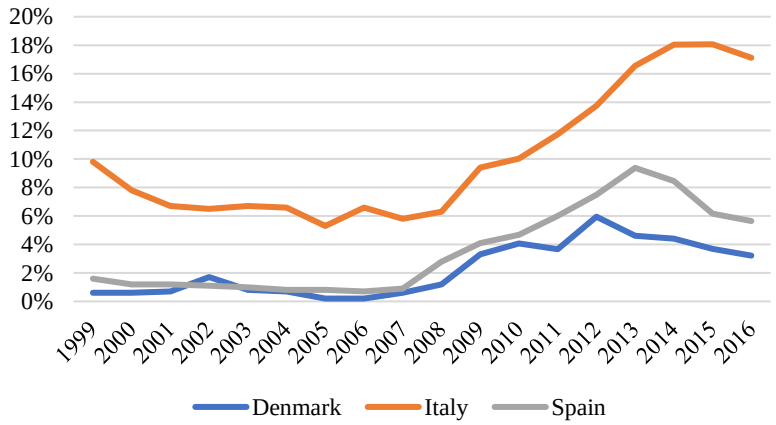


Source: Federal Reserve Bank of St. Louis

In Figure 7, it is possible to find that banks in France and in Netherlands were able to reduce their non-performing loans to total loans between 2002 and 2007. The previous ratios started rising in both economies in 2008, showing strong sings of inversion in 2014. One characteristic that these specific two banking systems share, is that the deterioration of their credit portfolios' quality happened really fast when the GFC exploded, but the improvement of these took much more years.

The last group of countries were the ones displaying higher rates of non-performing loans to total loans. Since 1999 that banks in Denmark and Spain displayed a similar path in what concerns to credit portfolio quality. Following 2010, the spread between the previous banking systems widened, in which banks in Spain started to face higher weights of non-performing loans in total loans compared to Denmark – Spain's banking system achieved a peak of 9.38% in 2013, while Denmark had already reached it a year before (2012 = 5.95% Vs 2013 = 4.62%). Italy was without doubt the economy where banks most struggled to control the level of bad credit in their credit portfolios. Between 1999 and 2007, they were already facing levels greater than those that the countries analyzed above registered during the GFC. With the evolution of the GFC, Italy's banking system credit portfolio quality worsened even more, achieving record levels of 18.06% in 2015. The latter evolution can be seen in Figure 8.

Figure 8: Denmark, Italy and Spain banks' Non-Performing Loans to Total Loans



Source: Federal Reserve Bank of St. Louis

A conclusion that is transversal to all the countries' banking systems previously analyzed, is that none of them was able to return, until 2016, to their pre-crisis levels of non-performing loans to total loans.

The continuous adoption of enhanced Accords by this group of countries did not exclude them of having banking crises, causing tremendous losses for their economies. From a merely standpoint of existence of banking crises and their intensity, we may agree that banking regulation is not effective in advanced economies. Nevertheless, if we add to the equation banks' capital ratios and non-performing loans to total loans, we recognize that banking systems had strong levels of capital in relation to their assets when they faced a crisis, and that even with a deterioration of their credit portfolios' quality banks managed to reenforce their capital ratios. Taking all the variables into consideration, increasing regulation makes banks in developed countries safer and more robust.

3.2.3. EMERGENT ECONOMIES (1999-2016)

The EU emerging economies analyzed reveal Real GDP per capita growth rates, prior the GFC, far better than the ones from the developed nations studied in the former topic. However, this disparity has eased after Hungary, Latvia, and Slovenia (EU members since 2004) went through a banking crisis in 2008 as can be noticed in Table VI.

Table VI: Average Real GDP per capita growth rate by EU emergent country

Country	1999-2007	2008-2016	1999-2016
Hungary	3.91%	1.12%	2.51%
Latvia	8.62%	0.93%	4.78%
Slovenia	4.09%	-0.02%	2.04%

Source: Own Calculations

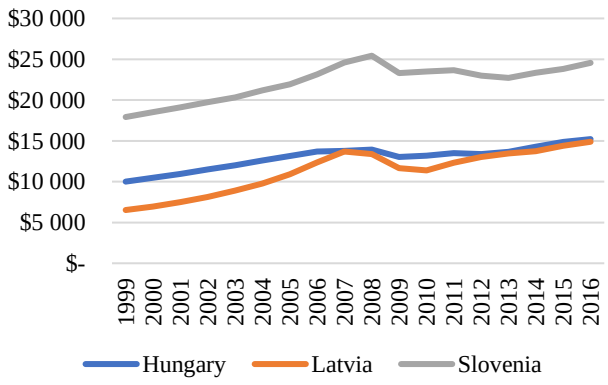
As can observed in Table VII and Figure 9, Hungary was the country where the banking crisis lasted less and had the lowest impact over Real GDP per capita (duration of 2 years and an output loss of 5.7%). Slovenia's banking crisis occupies the second place in terms of crisis' duration and output loss, destroying 24.07% of Real GDP per capita in three years. Latvia was the most affected by the GFC, displaying a crisis duration of 4 years and an impressive output loss of 65.89%. In the previous two economies, the GFC caused huge output losses but did not stop them from showing yearly Real GDP per capita growth rates stronger than those of some developed countries in the same period (2008-2016).

Table VII: Crisis Output Loss by EU emergent country

Country	Crisis Output Loss
Hungary	5.70% (2008-2010)
Latvia	65.89% (2008-2012)
Slovenia	24.07% (2008-2011)

Source: Own Calculations

Figure 9: GDP per capita (constant 2010 US$) by EU emergent country

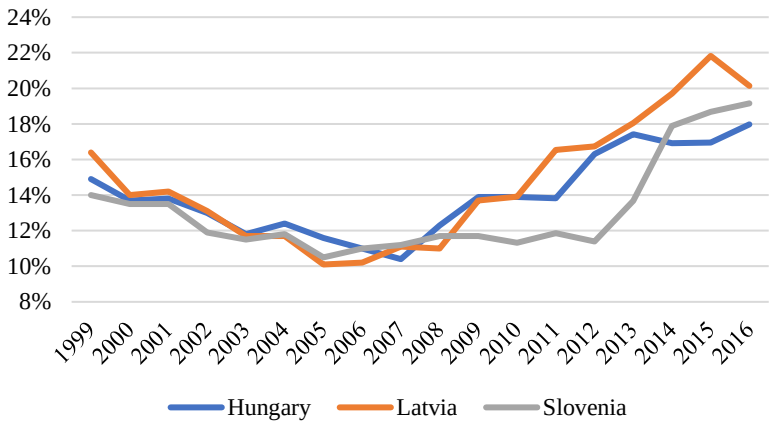


Source: The World Bank

As members of the EU, Hungary, Latvia and Slovenia adopted Basel II in 2008 (Basel I was in force in these countries between 1999-2007). Between 1999 and 2016, their banking systems never achieved capital ratios below 10%, but they have demonstrated downtrends in some periods of time as can be noticed in Figure 10. The same pattern verifies again, in which banks' capital ratios deteriorated in the years before the GFC. During the 2008 crisis, banks in these countries did not show significant deteriorations in

their capital ratios, where Hungary and Latvia were able to drastically raise those in 2008 and 2009, respectively, while banks in Slovenia only did it in 2013. In 2016 they were all displaying levels above 17.5%.

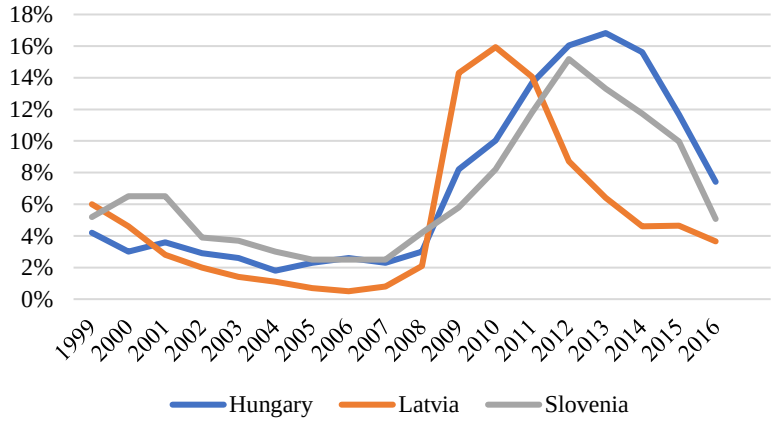
Figure 10: Banks' Capital to Total Assets (EU emergent countries)



Source: Federal Reserve Bank of St. Louis

In terms of banks' credit portfolio quality, this variable was severely affected with the GFC as illustrated in Figure 11 (until then, the three banking systems were displaying improvements on it). Latvia experienced the fastest surge of non-performing loans to total loans and the fastest recovery of the three countries (maximum in 2010 = 15.93%). Banks' credit portfolio credit quality in Hungary and Slovenia deteriorated until 2013 (= 16.83%) and 2012 (= 15.18%), accordingly. One thing that they all have in common is that the surge and the drop of the weight of banks' non-performing loans to total loans evolved at a similar speed. Up to 2016, none of them was able to return to their pre-crisis level.

Figure 11: Banks' Non-Performing Loans to Total Loans by EU emergent country

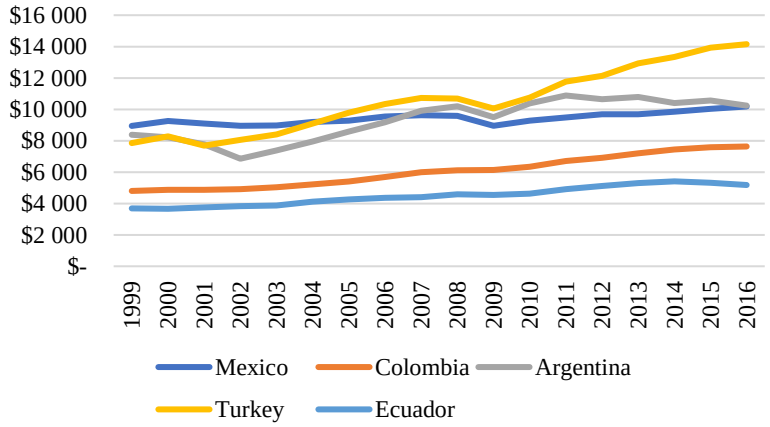


Source: Federal Reserve Bank of St. Louis

The adoption of Basel II at the same time as the developed countries analyzed did not prevent them from suffering Real GDP per capita losses. From a merely standpoint of existence of banking crises and their intensity, we may agree that banking regulation is not also effective in emergent economies. Nonetheless, if we consider the performance of banks' capital ratios and non-performing loans to total loans, we recognize that banking systems held strong levels of capital in relation to their assets when they faced a crisis, and that even with a corrosion of their credit portfolios' quality banks managed to boost their capital ratios. Taking all the variables into consideration, increased regulation makes banks in emerging countries safer and more robust.

Regarding to the non-EU emerging countries analyzed in the period 1976-2007, we also examined how their Real GDP per capita, banks' capital ratios, and banks' non-performing loans to total loans evolved in the period surrounding the GFC. Although they did not report a banking crisis in this timeline, these economies experienced some delays in terms of their real growth. A part of them was already experiencing declines in economic growth before 2008, with 2009 as the year of greater impact and 2010 as the year of recovery for all of them (see Figure 12).

Figure 12: GDP per capita (constant 2010 US$) by non-EU emergent country



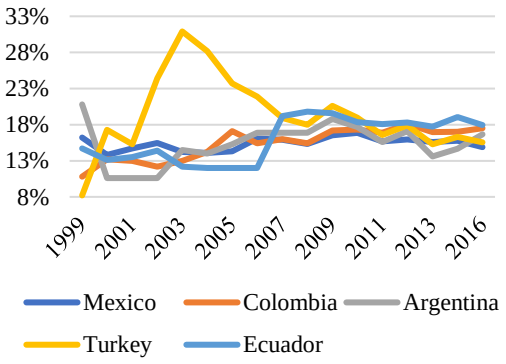
Source: The World Bank

In more detail: Mexico and Turkey reflected signs of economic retraction in 2007, where this trend continued until 2009. In one year (by 2010), both conducted and impressive recovery, achieving their pre-crisis levels of Real GDP per capita growth (Mexico – 2009 = -6.91% & 2010 = 3.55%; Turkey – 2009 = -6.22% & 2010 = 6.69%); in Argentina and Colombia, the yearly growth rate of Real GDP per capita decelerated in 2008, recovering to their pre-crisis levels in 2010 (8.89%) and 2011 (5.75%) respectively; Ecuador was an

exception, because it was the only emerging country from this basket that expanded its economy in 2008 (4.5% compared to 2007), struggling in 2009 (-1.06% compared to 2008), and expanding once again in 2010.

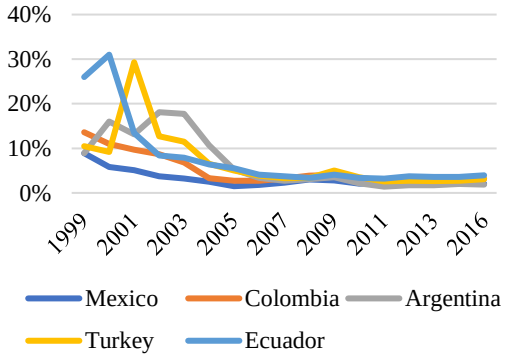
If we also analyze banks' capital ratios, these five economies' banking systems hold their ratios above 15% during the GFC, almost 2 times the level required by the Basel Capital Accord as shown in Figure 13. In addition, banks in Argentina, Colombia, Ecuador, Mexico, and Turkey did a terrific work on improving their credit portfolios' quality prior 2008, where these were hardly affected by the GFC (stayed below or equal to 5%) as displayed in Figure 14.

Figure 13: Banks' Capital to Total Assets (non-EU emergent countries)



Source: Federal Reserve Bank of St. Louis

Figure 14: Banks' Non-Performing Loans to Total Loans by non-EU emergent country



Source: Federal Reserve Bank of St. Louis

The fact that each banking system did not register a banking crisis that could result from the heavy Real GDP per capita losses it is very interesting to analyze. In their previous crises, this non-EU emergent countries' banking systems were severely affected by the enormous disruptions on their national production capacity of goods and services. However, during the 2008 crisis we see a clear independence between banks' heath and economies' health, where the first demonstrated resilience while the second was showing signs of vulnerability. There are several reasons that can explain this as the improvement of banks' performance, or sovereign intervention. We will not commit to an answer because we may be missing variables, but we believe a smaller development of emergent countries' banking systems contributed to a lower impact of the GFC on them (for instance, reduced interdependency due to lower operations with financial derivatives). Thus, the effectiveness of regulation may depend on the development of each banking system.

4. CONCLUSION

The main purpose of this dissertation was to analyze whether the evolution of regulation since the last quarter of the 20th century in the banking system has allowed to mitigate banking crises, both in terms of their impact in the financial system, as well as in the frequency and number of crises. It is inevitable to affirm that banking crises persist to exist while regulation and compliance requirements continue to surge. Is banking regulation failing its purpose? We don't believe so. The impact of banking crises, as we have resumed below, on each banking system seems to be contained. Moreover, one of the goals of banking regulation is to mitigate systematic risk, which has been being achieved.

The Latin American and Turkish's banking systems demonstrated an impressive positive evolution throughout the period 1976-2016. Until Basel I's adoption, there was a clear instability and shortage of banks' capital in relation to their assets, which questioned their ability of overcoming a crisis. In these five countries, the implementation of the Basel Capital Accord brought banks capital ratios up and allowed for banks to recover sooner from a crisis. In terms of output losses, which is transversal to all countries, they continued high (as stated before, it can be linked with the structure and development of each economy). All their work done across the years permitted them to not experience a banking crisis while the world was experiencing one due to the GFC. Maybe Basel I was the reason behind this, in the sense that the Accord, although it could be outdated to accommodate all the financial developments at that time, it was still valid for these banking systems, as they were not so developed as the others analyzed in this dissertation.

In the developed countries assessed, although they were demonstrating deteriorations of their banking systems' capital ratios prior the GFC, they never compromised the 8% level. As countries were expanding, banks were lightening their capital and non-capital requirements. Nevertheless, it seems that the adoption of Basel II by these countries' banking systems in 2008 allowed banks to raise their capital ratios while their economies were suffering losses and banks' clients were defaulting on their loans. The EU emerging countries analyzed also experienced the latter reality, particularly the strengthen of banks capital ratios after the GFC. On the other side, their significant output losses and massive

quality deteriorations on their banks' credit portfolios, a lot higher than the ones from the developed countries, can be explained not by the Basel Accord itself, but the social and economy instability that these types of economies experience in times of stress.

Between 2001 and 2012, banking systems' capital ratios in Latin America and Turkey were a lot higher compared with the EU emergent economies and with the developed ones (including USA). After this period, the non-EU emergent countries displayed lower capital ratios than the others. A later adoption of Basel II in these banking systems can be the origin of this inversion. The new Accord required years of preparation from banks and supervisors, and capital resources that banks needed to put aside to invest in new systems, technologies, processes, and human capital. Therefore, impacting banks' capital ratios negatively. Another aspect that we want to point out, is the level of capital that banks in developed countries strived to keep. Usually, capital ratios in emergent economies are higher than the latter due to the risk that banks in these geographies face, but under Basel II it seems that the Accord and supervisors did not differentiate the type of economy in what concerns to requiring or incentivizing banks to hold sizable capital buffers.

In terms of non-performing loans, the non-EU emergent countries studied displayed continuous improvements on those, not even when a banking crisis erupted in the United States and that spread worldwide. The same cannot be stressed for the developed and EU emergent economies analyzed, as they all suffered impacts on their credit portfolios' quality, especially Italy. It was not supposed for Basel II to solve banks' issues in terms of their credit portfolios' quality, but to ensure that a deterioration of those would not significantly harm their capital levels. Therefore, we can affirm that, although banks' non-performing loans to total loans remained high in several countries, the New Basel Capital Accord delivered what it promised in the sense that banks' demonstrated resilience through their firm capital ratios. In addition, the GDP per capita deviations from its trend that some nations registered in 2008 and 2009 while their banking systems were already under Basel II should not be seen as failure of it. Actually, the fact that the adoption of the latter did not avoid them from having great impact on their Real GDP per capita does not surprise us since this variable is not exclusively associated with the financial components of crises, but also the social and political ones.

As final remark, it is important to stance that the adoption of an international Accord was not by itself the reason why each banking system evolved. Just like a guitar, its value it's not measure by its design or adornments, but for what the guitarist can do with it. Without all the effort of banks, supervisors, governments, and other entities, banking systems' improvements were not possible. This was the biggest change between Basel I and Basel II in our opinion, how it became clear that banks had to understand the supervisors' role, supervisors should understand banks' issues and challenges, and that they all needed to work as one.

Limitations of the MFW: Throughout this thesis, our focus was on banking regulation and its institutional perspective. Certainly, there are other variables and countries besides the ones we have chosen that may influence our perspective about the efficacy of the Accords that bound banking systems. Therefore, all the conclusions that we have made with recourse to a descriptive methodology and a specific sample of countries are not generalizable.

As a future investigation, it would be interesting to study if the inferences taken across this work are similar or comparable if we had chosen a different sample of countries and variables.

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APPENDICES

Pillar I – The Capital Ratio[8] (Composed by at least 4% of Tiers I and II, separately).

$$\textbf{Basel I: } \frac{\textbf{(Tier I + Tier II) Capital} - \textbf{Adjustments}}{\textbf{RWA}_{\textbf{(Credit Risk)}} + \textbf{RWA}_{\textbf{(Market Risk)}}} * \textbf{100} \geq \textbf{8}\%$$

$$\textbf{Basel II: } \frac{\textbf{(Tier I + Tier II + Tier III) Capital} - \textbf{Adjustments}}{\textbf{RWA}_{\textbf{(Credit Risk)}} + \textbf{RWA}_{\textbf{(Operational Risk)}} + \textbf{RWA}_{\textbf{(Market Risk)}}} * \textbf{100} \geq \textbf{8}\%$$

The Committee considered that a risk-weighted assets (RWA) approach was preferable for determining the minimum level of banks' capital since it comprehended a fairer approach when comparing different international banking systems.

Tier I (or Core Capital) – **Equity** and **Disclosed Reserves**.

Tier II (or Supplementary Capital) – **Undisclosed Reserves**, included if they had been registered in the Profit and Loss account; **Revaluation Reserves**, that reflect variations in the balance sheet from differences between assets' market value and their book value; **General Provisions/General Loan-Loss Reserves**, which are capital cushions that reduce the impact of future unidentified possible losses; **Hybrid Debt Capital Instruments**, that share equity and debt characteristics (eligible if they, could support losses on a regular basis without starting a sell-off); and **Subordinated Term Debt**, which incorporates conventional unsecured debt with a maturity of at least 5 years.

Tier III – **Short-Term Subordinated Debt**, that had to, among other requirements, become (if necessary) part of banks' permanent capital, and therefore available to absorb losses in a situation of insolvency.

Adjustments – **Goodwill**; **Investments in Banks' Subsidiaries**, whose capital had not been taken from that of the parent; **Banks' Holdings of Capital,** if required by the national supervisors; and **Rises in Equity Capital Derived from Securitization Exposures**, (only applicable to Basel II).

RWA for Credit Risk – Under Basel I, the credit risk of banks' exposures was determined using risk-weights (higher the weight, higher the risk) and conversion factors

[8] (Basel Committee on Banking Supervision, 1988; Basel Committee on Banking Supervision, 1991; Basel Committee on Banking Supervision, 2001; Basel Committee on Banking Supervision, 2005)

defined in the Framework. In Basel II, banks could use the SA and the Internal Ratings Approach to calculate credit risk. The first method was very similar to the one in Basel I, except that the risk-weights of each exposure depended on its credit quality assessment (done by external credit assessment institutions recognized by the Committee). Under the second method, divided into two approaches, the capital charge for credit risk was based on the risk components associated to each exposure (the Probability of Default (PD), Loss Given Default, Exposure at Default, and Maturity). The difference between them is the number of elements that banks needed to determine (only the PD, or all the components).

RWA for Operational Risk – Basel II displayed three methods to assess the capital charge for operational risk: the Basic Indicator approach, the SA, and the Advanced Measurement approaches. In the first two, banks were required to use the formulas and factors provided by the Committee. Under the third, the capital charge was determined by banks' internal models.

RWA for Market Risk – To calculate this capital charge, banks could use the SA, or the Internal Methods approach. In the first, the RWA were determined using risk-weights defined in the Framework. Under the second method, the amount of capital that a bank had to hold for market risk was determined by its internal models (value at risk models).

All internal models required supervisory approval.

Pillar II – Supervisory Review Process

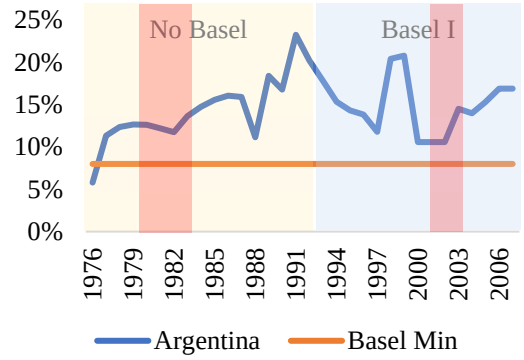
It established guidelines for institutions and supervisors, on how to assess and monitor the internal and external risks present in banks' activity, and the ones that result from that. This was done to ensure that they had enough capital to operate, to drive them to improve their risk management techniques, and to monitor and manage risks more efficiently.

Pillar III – Market Discipline

It established disclosure requirements, as a mean to ensure better market practices. All information that could influence the economic decision of any person should be disclosed, which would contribute to a transparent and stronger banking environment (as information regarding the capital structure). Although there were deadlines on banks' disclosure processes, they should report information as soon as possible.

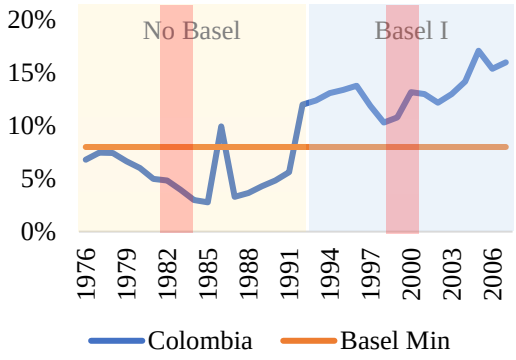
FIGURES (15 TO 56)

Figure 15: Argentina Banks' Capital Ratios (%) (1976-2007)



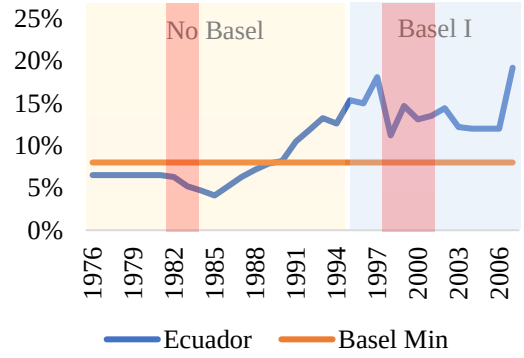
Source: Banco Central de la República Argentina and IMF

Figure 16: Colombia Banks' Capital Ratios (%) (1976-2007)



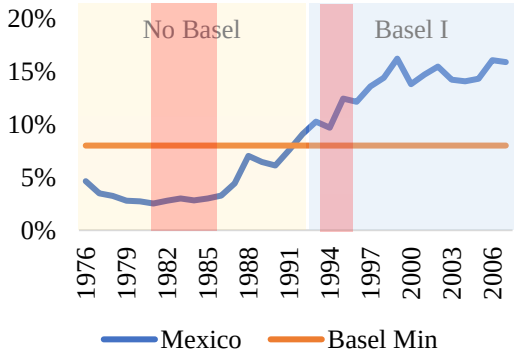
Source: Banco de la República and IMF

Figure 17: Ecuador Banks' Capital Ratios (%) (1976-2007)



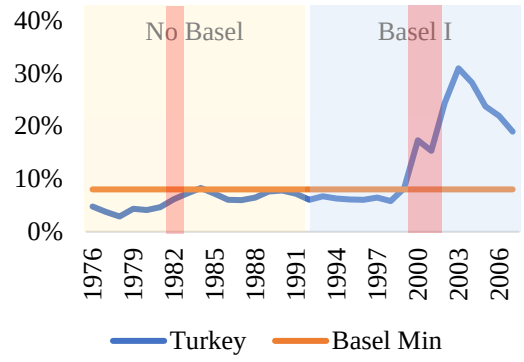
Source: Banco Central del Ecuador and IMF

Figure 18: Mexico Banks' Capital Ratios (%) (1976-2007)



Source: Banco and Gobierno de México, and IMF

Figure 19: Turkey Banks' Capital Ratios (%) (1976-2007)



Source: Banks Association of Turkey, Central Bank of Republic of Turkey, and IMF

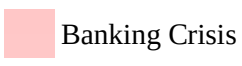
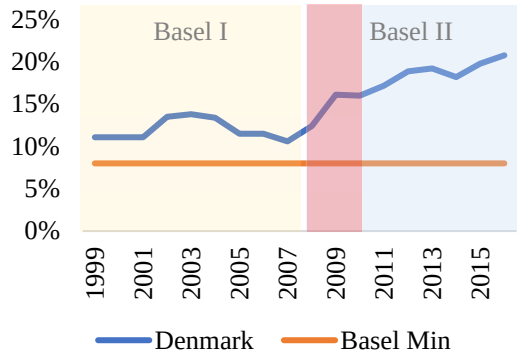
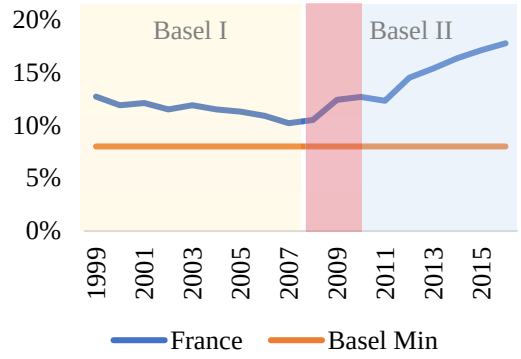


Figure 20: Denmark Banks' Capital Ratios (%) (1999-2016)



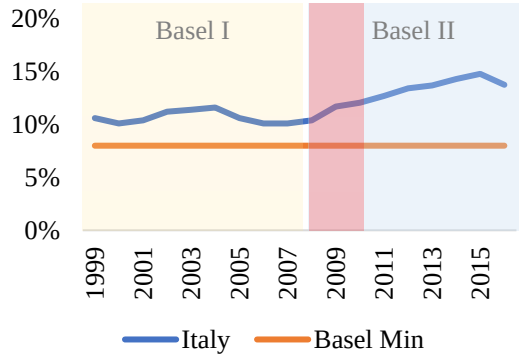
Source: Federal Reserve Bank of St. Louis

Figure 21: France Banks' Capital Ratios (%) (1999-2016)



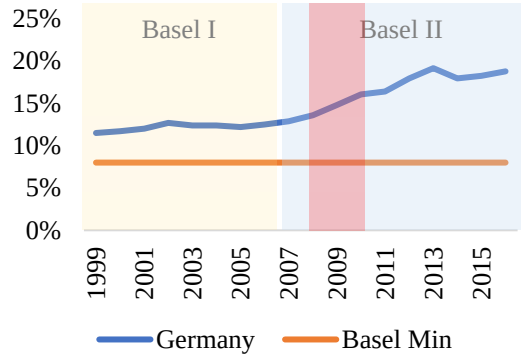
Source: Federal Reserve Bank of St. Louis

Figure 22: Italy Banks' Capital Ratios (%) (1999-2016)



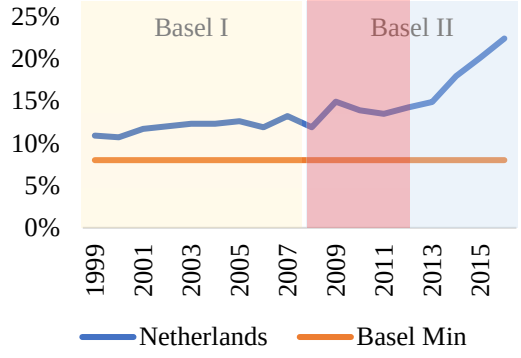
Source: Federal Reserve Bank of St. Louis

Figure 23: Germany Banks' Capital Ratios (%) (1999-2016)



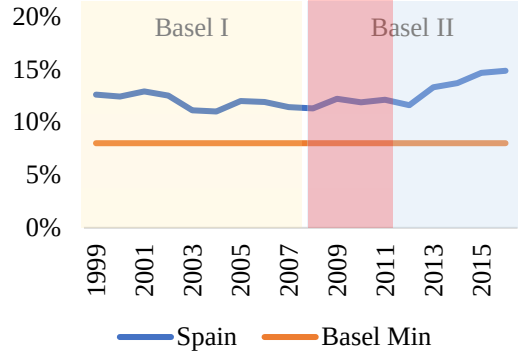
Source: Federal Reserve Bank of St. Louis

Figure 24: Netherlands Banks' Capital Ratios (%) (1999-2016)



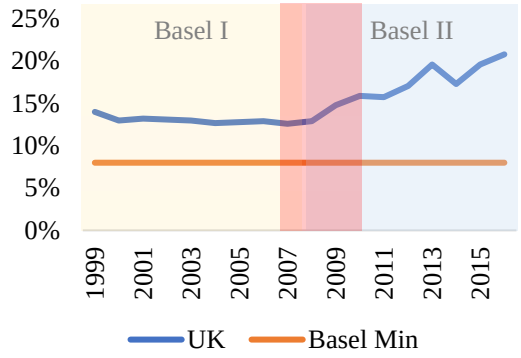
Source: Federal Reserve Bank of St. Louis

Figure 25: Spain Banks' Capital Ratios (%) (1999-2016)



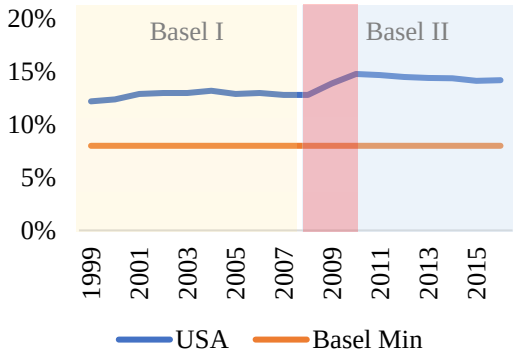
Source: Federal Reserve Bank of St. Louis

Figure 26: UK Banks' Capital Ratios (%) (1999-2016)



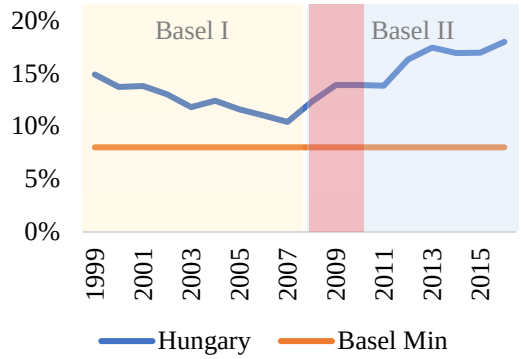
Source: Federal Reserve Bank of St. Louis

Figure 27: USA Banks' Capital Ratios (%) (1999-2016)



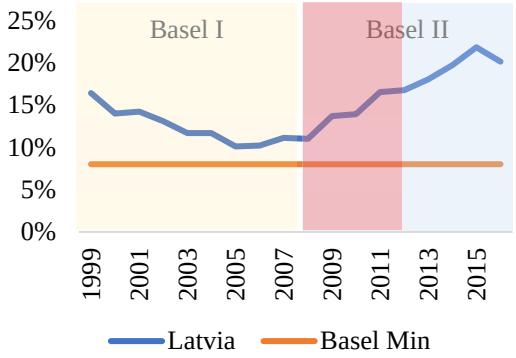
Source: Federal Reserve Bank of St. Louis

Figure 28: Hungary Banks' Capital Ratios (%) (1999-2016)



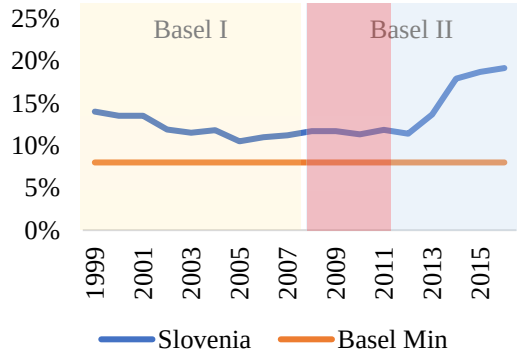
Source: Federal Reserve Bank of St. Louis

Figure 29: Latvia Banks' Capital Ratios (%) (1999-2016)



Source: Federal Reserve Bank of St. Louis

Figure 30: Slovenia Banks' Capital Ratios (%) (1999-2016)



Source: Federal Reserve Bank of St. Louis

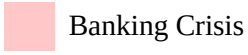
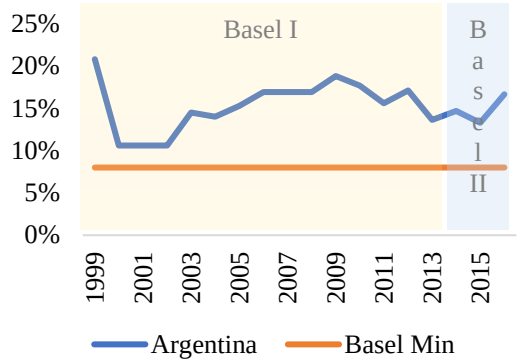
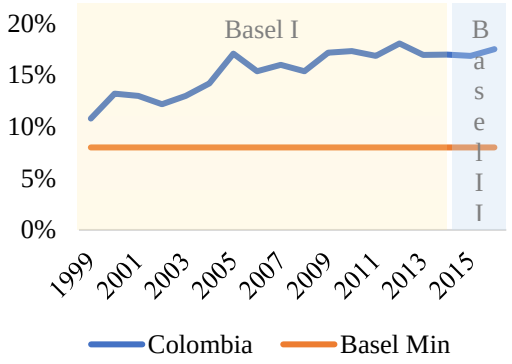


Figure 31: Argentina Banks' Capital Ratios (%) (1999-2016)



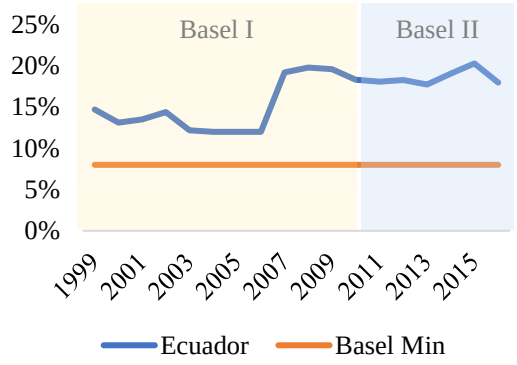
Source: Federal Reserve Bank of St. Louis

Figure 32: Colombia Banks' Capital Ratios (%) (1999-2016)



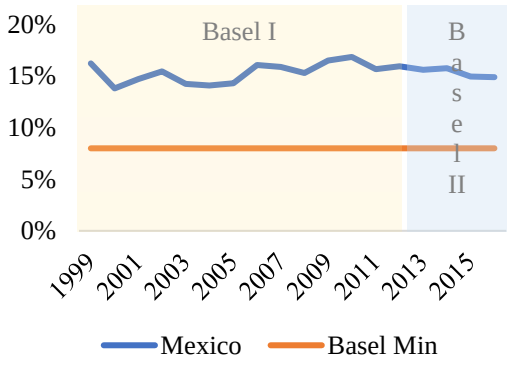
Source: Federal Reserve Bank of St. Louis

Figure 33: Ecuador Banks' Capital Ratios (%) (1999-2016)



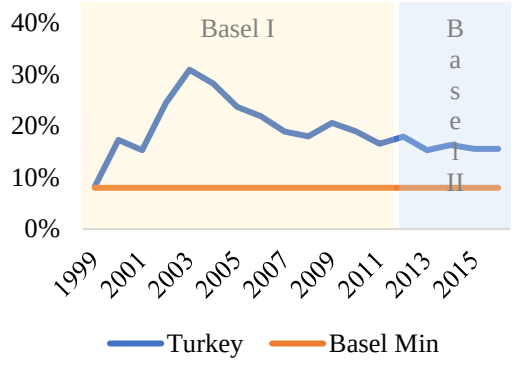
Source: Federal Reserve Bank of St. Louis

Figure 34: Mexico Banks' Capital Ratios (%) (1999-2016)



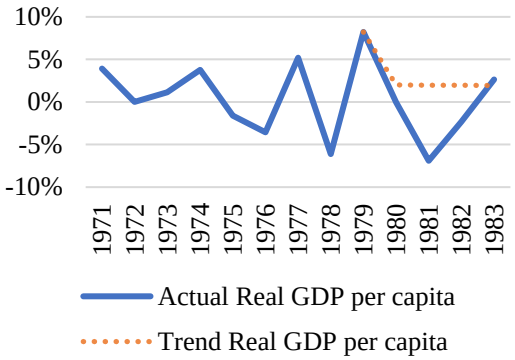
Source: Federal Reserve Bank of St. Louis

Figure 35: Turkey Banks' Capital Ratios (%) (1999-2016)



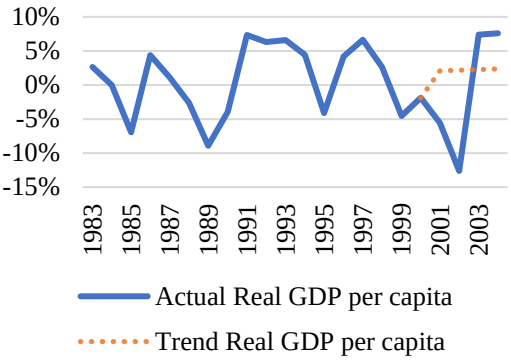
Source: Federal Reserve Bank of St. Louis

Figure 36: Argentina Actual Vs Trend Real GDP per capita (1st Crisis)



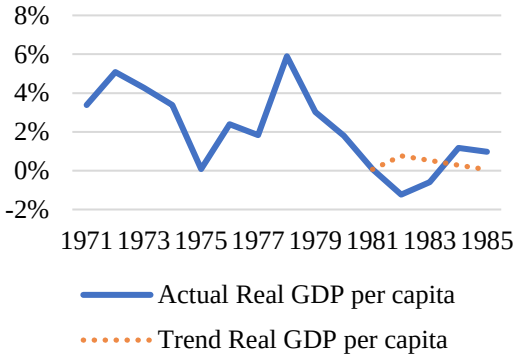
Source: Own calculations

Figure 37: Argentina Actual Vs Trend Real GDP per capita (2nd Crisis)



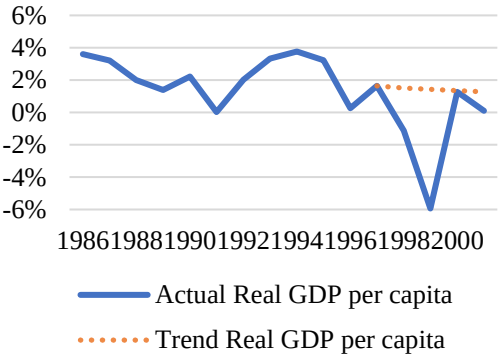
Source: Own calculations

Figure 38: Colombia Actual Vs Trend Real GDP per capita (1st Crisis)



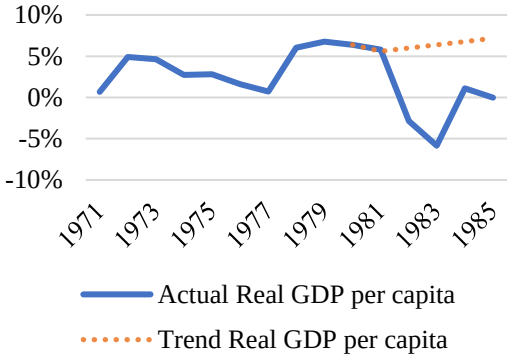
Source: Own calculations

Figure 39: Colombia Actual Vs Trend Real GDP per capita (2nd Crisis)



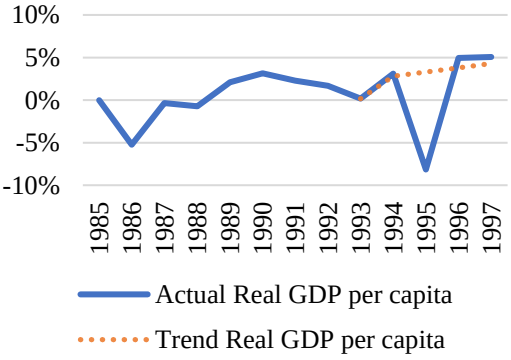
Source: Own calculations

Figure 40: Mexico Actual Vs Trend Real GDP per capita (1st Crisis)



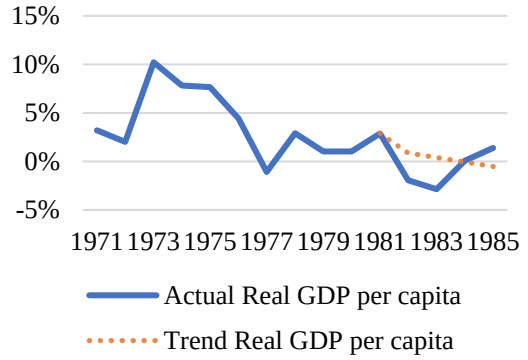
Source: Own calculations

Figure 41: Mexico Actual Vs Trend Real GDP per capita (2nd Crisis)



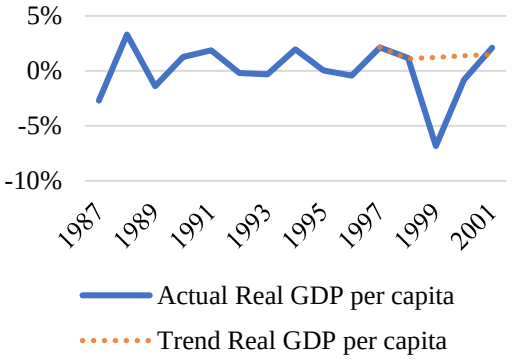
Source: Own calculations

Figure 42: Ecuador Actual Vs Trend Real GDP per capita (1st Crisis)



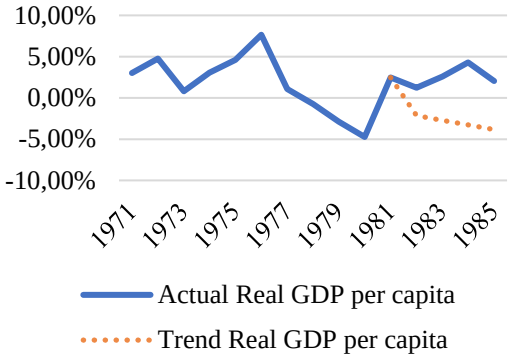
Source: Own calculations

Figure 43: Ecuador Actual Vs Trend Real GDP per capita (2nd Crisis)



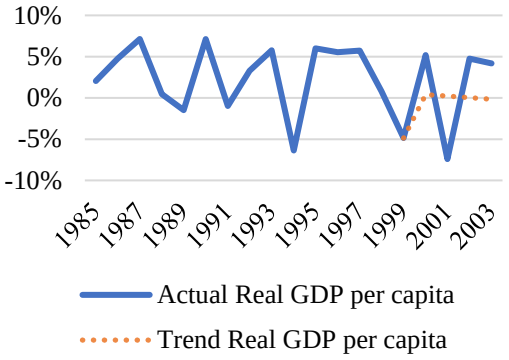
Source: Own calculations

Figure 44: Turkey Actual Vs Trend Real GDP per capita (1st Crisis)



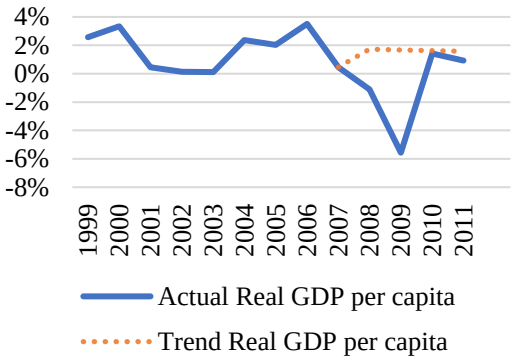
Source: Own calculations

Figure 45: Turkey Actual Vs Trend Real GDP per capita (2nd Crisis)



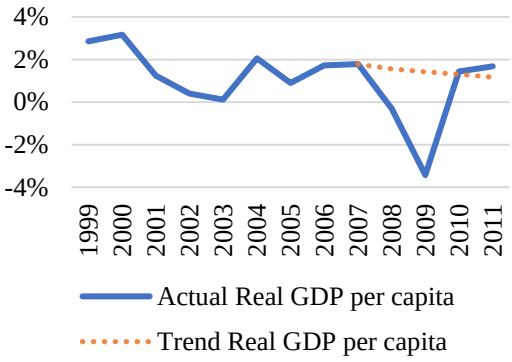
Source: Own calculations

Figure 46: Denmark Actual Vs Trend Real GDP per capita



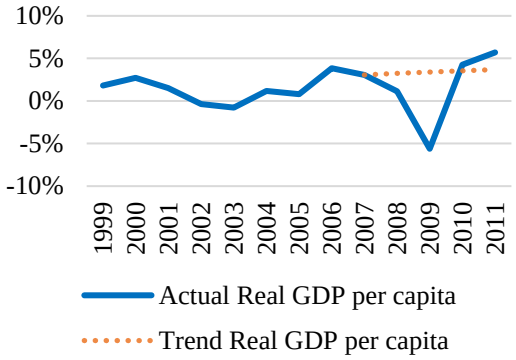
Source: Own calculations

Figure 47: France Actual Vs Trend Real GDP per capita



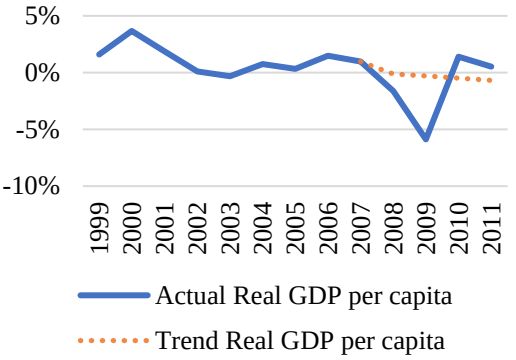
Source: Own calculations

Figure 48: Germany Actual Vs Trend Real GDP per capita



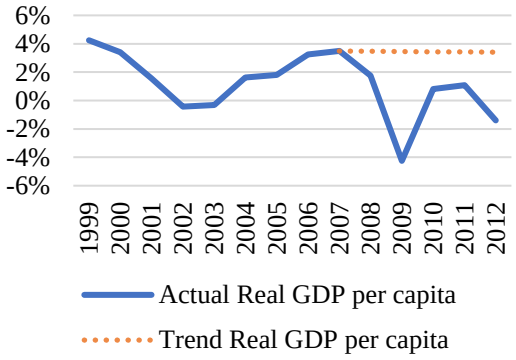
Source: Own calculations

Figure 49: Italy Actual Vs Trend Real GDP per capita



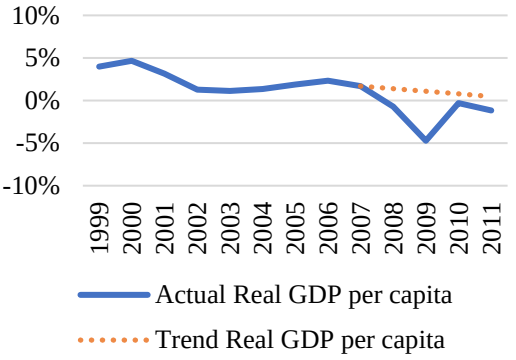
Source: Own calculations

Figure 50: Netherlands Actual Vs Trend Real GDP per capita



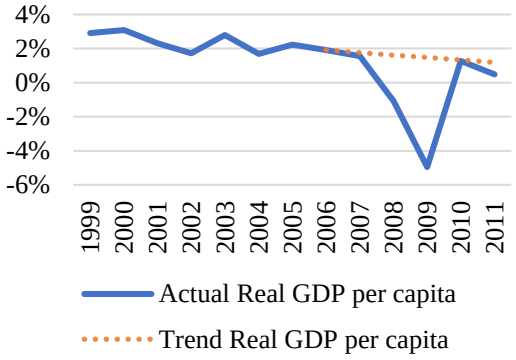
Source: Own calculations

Figure 51: Spain Actual Vs Trend Real GDP per capita



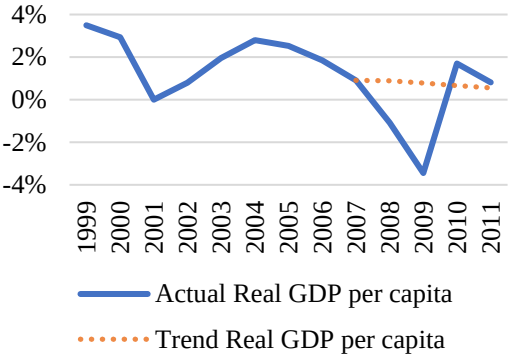
Source: Own calculations

Figure 52: UK Actual Vs Trend Real GDP per capita



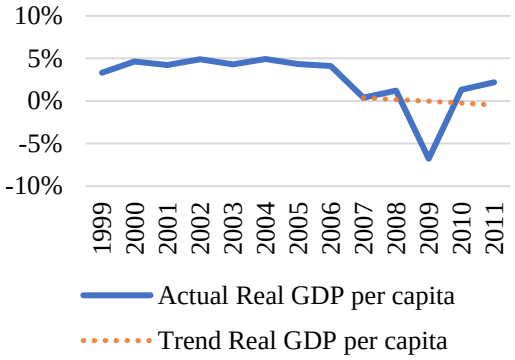
Source: Own calculations

Figure 53: USA Actual Vs Trend Real GDP per capita



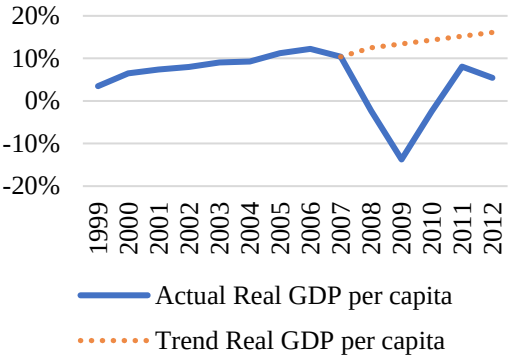
Source: Own calculations

Figure 54: Hungary Actual Vs Trend Real GDP per capita



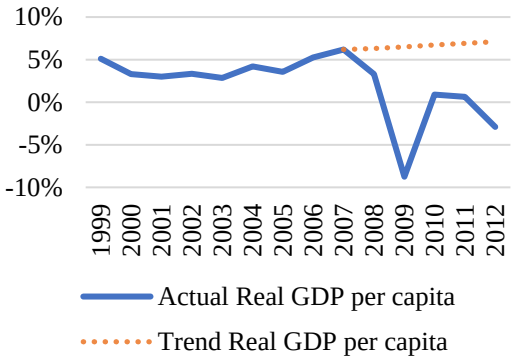
Source: Own calculations

Figure 55: Latvia Actual Vs Trend Real GDP per capita



Source: Own calculations

Figure 56: Slovenia Actual Vs Trend Real GDP per capita



Note: In the cases where actual Real GDP per capita did not return to their pre-crisis trend (Mexico, Netherlands, Spain, Latvia, and Slovenia), we have considered that the crisis ended in the year before Real GDP per capita started to decrease after surging (in line with Laeven & Valencia (2020)).