Macroprudential Policy and Bank Stability: International Evidence

by

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Abstract

This study investigates the impact of macroprudential policies on bank risk. We contribute to the literature by examining the effectiveness of five different types of macroprudential policies; namely capital based instruments, asset based instruments, liquidity instruments, reserve requirements and foreign exchange based instruments, for 132 countries over the period 1996 - 2017. We also examine whether the effectiveness of the macroprudential policies in mitigating bank risk depends on other financial and institutional factors of the country. Our main findings are as follows: First, we find that capital based instruments are the most effective policy instruments to reduce bank risk. Second, certain macroprudential policies work better in reducing bank risk under a more competitive banking environment than others. Third, better institutions and regulations help enhance the effectiveness of macroprudential policies on bank risk. Finally, the effect of macroprudential policies on bank risk are asymmetric. Generally, tightening episodes are more effective than loosening episodes. These results are robust to alternative measures of banking sector risk and macroprudential indicators.

Contents

Figures:

Tables:

1. Introduction

Financial crises are terrible events, with banking crises in particular being associated with credit losses (European Central Bank, 2010). The Global Financial Crisis cost 12% of potential GDP according to the Federal Reserve of San Francisco, with it only costing 5% had the recession been shallower, with them finding it has cost on average each American 70,000 (Barnichon et al., 2018). These costs are before including the other flow on effects, including the bankruptcy of Iceland, the substantial debt issues in Southern Europe and the collapse of Northern Rock. Austerity was introduced, alongside substantial government bailouts. Countries without much direct exposure to the financial markets were still hit. For example, New Zealand had a 1.9% drop in GDP per capita in 2008 (The World Bank, n.d.). Financial crises more broadly have been found to cause a significant decline in real GDP, alongside increasing unemployment (Romer & Romer, 2017). Regulation before the GFC was found to have been potentially contributing to the severity of the GFC, as well as to have had serious issues in regard to the calculation of banking (Demirgüç-Kunt & Servén, 2010). In particular, banking regulation operated on BASEL II, which was based on microprudential policy, which focuses on the individual bank's default risk at a given time. Basel II also ignored the interconnectivity and potential correlations inherent within a financial system. A flaw of this can be seen by looking at the scenario of selling a leveraged asset to repay debt. If one bank attempts to do this, there are unlikely to be any issues. Under microprudential policy, if the entire banking system is doing this with an asset, this may lead to a loan loss spiral (European Central Bank, 2010).

Numerous changes were made after the Global Financial Crisis (GFC) to the regulatory framework. For example, capital was redefined, and the European Central Bank (ECB) implemented new liquidity instruments, to cover both short term and long-term risks (European Central Bank, 2010). The GFC led to unprecedented steps in regard to the provision of liquidity (Demirgüç-Kunt & Servén, 2010). As a new system was needed, BASEL III was introduced, accompanied by a more widespread use of macroprudential policy.

Macroprudential policy is the current mainstream banking regulation (Altunbas et al., 2018). Its main focus is to stop the collapse of the banking system, with a focus on interlinkages rather than individual default risk. Macroprudential policy has two focuses, with the first being that of the interconnectivity of banks. This was how one banks actions may affect another's risk. For example, this could be externalities regarding collective borrowing, as individual

borrowers do not internalise the effect of their decisions on asset prices and the impact of them changing their behaviour (Galati & Moessner, 2018). The second focus is on time, in particular how risk can be built up in good times, for it to cause issues in bad times. One example of a time based policy is Dynamic Provisioning (DP) which requires increased provisions for loans during good times, to be used during bad ones (Ely et al., 2021).

Our motivations for this thesis are to find do macroprudential policies work, which macroprudential policies work and under what circumstances do they work. As previously mentioned, both BASEL I and BASEL II had adverse knock-on effects that may have increased risk during the global financial crisis rather than decreased it. Hence, seeing if macroprudential policy has been successful is vital, as unfortunately poorly designed policies may cause more harm than good. As regulators have fixed resources in regard to time, finding out which are more successful than others, alongside under which circumstances do they work best. As financial markets vary greatly all over the world, knowing when best to implement them are likely to vary from country to country.

There have been numerous papers looking at the relationship between macroprudential policies and risk, with most focusing on one instrument, or all of them in a general term. Bermpei et al. (2018) focused solely on institutional strength in regard to policies being implemented in emerging and developing economies. They also focused solely on Capital Regulation, rather than a broader mix of macroprudential policies, although did find that capital regulations were correlated with greater stability (Bermpei et al., 2018). Laeven & Levine (2009) do find that capital requirements do increase the Z score by increasing capital to asset ratio. It has been found that leverage restrictions, at least through a theoretical model, is significant at reducing risk (European Central Bank, 2015). However empirically, leverage restrictions led to banks taking on more risk, but being more stable (European Central Bank, 2015). Another paper has found that macroprudential policies are more effective under tightening than loosening (Altunbas et al., 2018). Altunbas et al. (2018) also found macroprudential policy to be effective. It has been found that differing policies work better in differing countries, indicating heterogeneity in the strength of macroprudential policies by circumstance (Lee et al., 2016). Some papers have found issues regarding macroprudential policies. macroprudential policies have been found to have spill overs, however these are not severe enough to warrant global coordination unless global demand is low (Jeanne, 2014). There are numerous issues regarding the use of macroprudential policies. There is no consensus on objectives, what counts as macroprudential policies, and how to quantify risk in the greater

financial sector, with a few countries macroprudential policies being split over multiple regulators (Visco, 2011).

Our paper does go a step further compared to most. Firstly in similar vein to Lee et al (2016), we see if there is heterogeneity in regard to macroprudential policy. Using the five categories described by Altunbas et al (2018) we see how each five of the categories work using the IMF's IMaPP database to create our five categories, those being reserve requirements (RR), asset based instruments (ABI) capital based instruments (Cap), liquidity instruments (Liq) and foreign exchange based instruments (FX). We also include numerous financial environment controls, to see whether there have been other factors that have had an effect regarding the implementation of macroprudential policy, and how the banking sector responds to them. These include institutional measures and competition to see how the entire financial market may influence the effectiveness of macroprudential policies.

Within our regressions we follow a design partially based on that by Altunbas et al. (2018), by following their methodology to include both tightenings and loosenings. This will allow us to check if there are any asymmetries in the regressions. We also include other transformations, and as our robustness check include a crises index created by Laeven & Valencia (2018).

We find heterogeneity in the effectiveness of macroprudential results. In particular, we find no correlation between foreign exchange instruments and risk, as well as between the reserve requirements and risk. Under some circumstances, we find the other three measures correlated with lower risk, those being capital based instruments, liquidity based instruments and asset based instruments. We find that institutional strength is important in some circumstances, with concentration being important in a few. We find competition to have heterogenous results in regard to both macroprudential policies and risk, likely indicating a true result of no relationship.

The remainder of this paper will go as follows. Firstly, we will cover theoretical connections regarding first macroprudential policy, and then our other financial environmental variables and controls to see how they may relate to their implementation. Then, this paper will cover the collection and measurement of many of those variables, including how they are measured, and where the datasets come from if that can be uncovered. We then go onto our empirical specifications, going into further detail of how both the regressions are calculated, as well as any transformations of macroprudential policy done in them. After that, the focus goes

onto the results of the regressions which have been done, as well as the robustness checks. There is then a brief section on limitations, followed by the conclusion.

2 Theoretical Connections

2.1 Macroprudential Policies

Macroprudential policy has been an important development in banking regulation in the last few decades. It was first widely adapted after the Asian Financial Crises, in mainly Asian countries. Its aims are to tackle how the entire banking system's risk rather than individual members of the banking system (Altunbas et al., 2018). For example, macroprudential policies addressees the externalities done by collective borrowing (Galati & Moessner, 2018). It also aims to mitigate issues regarding to the build-up of risk during good economic times. Despite aforementioned difficulties in measuring its implementation and success, the use of macroprudential policy grew steadily from the 1990s until its implementation plateaued in 2012, by which point over 90% of countries had enacted at least one macroprudential policy (Alam et al., 2019).

2.2 Competition, Concentration their effects on Macroprudential Policy and Risk

Banks take on risk as part of their daily business. Banks tend to have their own risk departments yet tend to have issues regarding mitigating systemic risk and may take insufficient insurance against a deleveraging episode (Galati & Moessner, 2018). This indicates that the need for regulation regarding risk taking that affects the entire system is needed. Secondly, it has been noted that banks with low profitability take on more risk, in an effort to increase their profitability (Beirne & Friedrich, 2017).

Increased competition could affect the riskiness of a banking system. The new bank could have increased diversification, reduced its own risk, but also hurt the profitability of the already established banks' risk. There is a vast literature on how differing levels of competition affect the risk of a banking system. Some papers have found that competition is correlated with higher risk (Bushman et al., 2016) (Beck et al., 2006) (Świtała et al., 2014) (Ashraf, 2018) , whereas others have found the opposite case (Anginer et al., 2014). One paper has found that this relationship is dependent on elements such as deposit insurance (Beck et al., 2013). Due to this lack of clarity, but numerous papers claiming there to be a relationship, we have included

competition in our regressions. As competition is also a marker of how differing banking systems operate, it is entirely possible that it would affect the implementation of macroprudential policies. For such a reason, it will be used as an interaction term as well.

It is also possible that concentration may affect out implementations of macroprudential policies. Concentration is how much of the market is concentrated in a select few firms, whether it be the biggest 10% or the largest 3 banks, and has been used in such papers as Anginer, Demirguc-Kunt et al (2014). Beck et al (2006) found that concentration was correlated with lower risk. Concentration has also been found as a good indicator for profitability of banks, which could lead to an argument that it allows for greater shock resistance to profits, potentially leading to lower profits (Beirne & Friedrich, 2017). For this reason, we have included concentration, to see if our results correspond to previous ones. We have also included it regarding the interaction term in case this profitability of the banking sector affects the implementation of macroprudential policies.

2.3 Regulatory Quality, Institutional Risk and Macroprudential Policy

The effects of competition, however, is not the only possible factor to influence the success of macroprudential policies. It is also extremely likely that the regulatory framework could be of vital performance. Firstly, weak regulatory framework could lead to low levels of enforcement, indicating a de jure change of macroprudential policies does not lead to a de facto change of them. Secondly, the institutional strength could influence the compliance, leading to more effective macroprudential policies, potentially leading to greater success of these policies, which if they are successful, would lead to lower levels of risk. There is a wide array of literature on institutions and risk. Bermpei, Kaleva's & Nguyen (2018) had two hypotheses, where they saw institutional strength could either be a compliment to capital tools, or it could be a substitute to capital regulations. The results that they found where that some measures of institutional strength were indeed substitutes with capital requirements in terms of regulatory effects, whereas others were more complimentary, in particular political stability (Bermpei et al., 2018). It has also been found that rather that the effect of risk is more associated with the reduction in volatility in regard to the profit of a company, as well as the profitability of a company than through affecting the bank capital to assets ratio (Bermpei et al., 2018). Regulatory quality, which is a form of measuring institutional strength, has been found to improve the effectiveness of Macroprudential policies (Beirne & Friedrich, 2017). Strength of supervisors has been found to be significant in reducing risk (Tabak et al., 2016). Overall,

these results indicate that we should expect institutions to have a significant result in at least some of our regressions, especially as the consensus is either it is insignificant or important. We will also include institutional strength in an interaction term, as we feel it could also affect the implementation of the macroprudential policies.

2.4 Board Reform and incentives to implement Macroprudential Policy

Institutional measures may help strengthen compliance, but it is the firm's decision to comply depends on its own management as well. The firm's management and board could potentially be incentivised by board reform into going further than the macroprudential policies require, so looking at the implementation of these reforms could be important. Reforms to the board structure of a company have been shown to lead to the reduction of some types of risk (Hu et al., 2020) . In particular, the paper by Hu, Li, Taboada & Zhang (2020) uses a stock price crash risk, where loss of value is the main variable, which is likely to be correlated with default risk, albeit not perfectly. The reason for this success, is in their view that the reforms have allowed boards to overcome frictions which may prevent or discourage good board practices (Hu et al., 2020). It has also been found that accountability board reforms increases the capital reserves and liquid assets used by savings banks, without any changes to the regulatory requirements (Körner, 2016). Hence, the reforms to the board could change the riskiness of the banks, and hence the entire system. It could also potentially be that these reforms may change the approach of these banks in regard to an implementation of macroprudential policies.

2.5 The Financial and Economic Environment, and Macroprudential Policy.

The decisions of leadership at banks could be influenced by other factors when regarding the implementation of macroprudential policies. These include specific characteristics of the banking sector, such as it is possible that profitability could influence risk (Beirne & Friedrich, 2017). They state that this is due to greater profitability allows for less vulnerability to shocks, and more able to afford the costs of these, hence they take do not need to increase their returns substantially (Beirne & Friedrich, 2017). Banks with low profitability however may take on more risks to keep their profits under a shock, which could include the cost of complying with a macroprudential policy (Beirne & Friedrich, 2017). A second element to consider is that of the funding structure and allocation of credit in an economy, so potentially including the credit to deposit ratio would be a worthwhile pursuit. We include GDP per capita and Deposits to GDP as they potentially act as a proxy for financial development for the country. We include

Credit to GDP to see if the size of the financial system, and lending, relative to the size of the economy have any importance to the economy. Inflation has also been included, as that could potentially lead to changes in both the nominal and real interest rate, which could lead to changing risk portfolios within a country. Inflation has been used in a few other papers as a macroprudential control (Ma & Yao, 2022). Higher inflation most often leads to these higher interest rates, which lead to reduced economic growth, could lead to bubbles bursting, potentially weakening the financial markets. All of these results indicate we will control for these variables to hope to remove our results being affected by the differing natures of various banking systems

3: Dataset and Variables

3.1: Dataset parameters

Our dataset is of 2806 number of observations of 132 number of countries, from 1996 to 2017, for those with at least a Z score and a macroprudential observation[1]. The dataset is from various datasets. The risk measure, as well as some controls, is from the World Bank's Financial Development database. The macroprudential instruments originate from the IMaPP index from the World Bank and are elaborated furthermore below.

3.2 Measure of risk

Measuring the effectiveness of macroprudential policies requires a measurement of financial system soundness. Within this, there are many trade-offs and difficulties in regard to measurement. Asymmetric information is a significant issue for external evaluators, as we must rely on accounting and market data (Chiaramonte et al., 2015). Accounting data is quite wide ranging and easy to collect but suffers from confidentiality bias (Chiaramonte et al., 2015). Market data on the other hand has strong limitations in areas such as Europe, as it requires all banks to be listed in a liquid market (Chiaramonte et al., 2015).

As this paper focuses on an international measure, the Z-Score, with its accounting data is beneficial on its simplicity in measurement, allowing for a greater representation of the world's banking sector. It relies on accounting data, that is relatively common, that being Total

[1] *Please see Appendix 1 for more detail on the databases size, source and what they measure*

Assets, Total Equity and Return on Assets.[2]. The Z score has been found to be as good as the aforementioned CAMELS index, despite being simpler, with particular strength with larger banks, likely due to the higher scrutiny (Chiaramonte et al., 2015). The Z Score has also been widely used (Laeven & Levine, 2009) (Ely et al., 2021) (Luo et al., 2016). The World Bank's Financial Development Index is the source we use to find the country wide Z score[3].

3.3 Macroprudential Policy Data

The index we use for macroprudential instruments is the IMF's IMaPP index, collected on the 5/1/2022. This dataset has 161 countries from the period of 1990 to 2020 from when we collected it[4]. The database does not include all of the potential macroprudential tools as it only includes those they can verify, which was limited by language and reporting differences (Alam et al., 2019) . The dataset was done in a semi binary system, where on a monthly basis it is -1 in regard to a loosening of a policy, with +1 in regard to a tightening, and 0 in regards to no change in a policy (Alam et al., 2019). The reason for its design is that it allows them to extract information across differing countries and their differing policies (Alam et al., 2019). Alam et al. (2019) do not they would have wished to be able to show the intensity of these changes, but due to the heterogeneity of macroprudential policies over the world has led to it being difficult, if not impossible to actually do so. The dataset is comprised from many others, including The Global Macroprudential policy instrument survey conducted in 2013, the European Systemic Risk Board database, alongside other papers (Alam et al., 2019). To gain further information, they obtain information from national sources, the Bank for International Settlements, the Financial Stability Board, as well as the IMF official documents (Alam et al., 2019). It includes fifteen differing variables, those being Countercyclical Capital buffers (CCB), Capital Conservation Buffer (Conservation), Capital Requirements (Capital), Limits on leverage (LVR), Loan loss provision requirements (LLP),Limits on Credit Growth (LCG) , Loan Restrictions (LoanR), Limits on Foreign Currency lending (LFC), Loan to value ratio (LTV), Limits to debt service (DSTI), Taxes on specified transactions, assets or liabilities (Tax), Liquidity requirements (Liquidity), LTD LFX RR, Capital Requirements for Significant Important Financial Institutions). The database indicates that the greatest amount of strengthening occurred from 2016 to 2019, with the greatest weakening occurring in 2020.

[2] *See the Appendix 1 for the Z-Score Formula*
[3] *See Appendix 1 for the formula regarding the country-wide bank Z-Score*
[4] *Notes: See Appendix 1 for definition of Macroprudential variables*

We have included graphs of the implementations of macroprudential policies in both the world and some sample countries. These can be seen from figures 1 and 2, which show implementation globally with and without directionality, and figures 3 to 12, which are for a sample of countries' implementation of macroprudential policies.

3.4 Measures of Competition and Concentration

For competition and concentration, we use The World Bank's Financial Development Index. From this, we collect five measures, those being the Lerner index, Boone indicator, H Stat, 3 bank asset concentration and 5 bank asset concentration. The Lerner index is an indicator based off the relationship between Price and marginal cost, with 0 indicating perfect competition, and 1 indicating monopolistic power. The second we use is the Boone indicator, which is based on elasticities. The final is the H stat, which although we collect, does not have enough samples to have a good dataset, so is not included in our regressions. We use two concentration measures, those being 3 bank asset concentration and 5 bank asset concentration. Those are measured as the proportion of a total banking system's assets are held by the respected largest number of banks, those being either 5 or 3.

3.5 Measures of Institutional Strength

We use two measures find the strength of regulatory institutions. The first is a mixture of political, corruption and other risks called the ICRG dataset. This dataset goes from 1970 to 2019, with a higher value indicating less riskiness. It is composed of the following variables: Government Stability, Socioeconomic Conditions, Investment Profit, Internal Conflict, External Conflict, Corruption, Military in Politics, Religious Tension, Law and Order, Ethnic Tensions, Democratic Accountability and Bureaucratic Quality. Hence, it can be described as a measure of the institutional strength of a country broadly, alongside the operating environment. The second is the regulatory quality index, which is from the World Bank. This is from 1970 to 2019, which is of a similar construction to the ICRG database, with the use of various other datasets used to create it. This, in contrast to the ICRG database, is a narrower variable, focusing on the regulatory quality, as the name suggests, rather than the broader operating environment. It has the same directionality as the ICRG measure above, with a higher value indicating greater regulatory quality.

3.6 Measures of Board Reforms

We also use a reform indicator, from (Hu et al., 2020). This has been transformed into a difference in difference model, where 1 is given to a year when a reform was either passed, or after such a year, and a 0 to a year in which no reform had yet occurred. The dataset extends from 1998 to 2007, covering 23 countries.

3.7 Measures of Financial Crisis

We use the crises regressions as a form of robustness checks, so needed a database which provided a simple method to determine when a systemic banking crisis did occur. For this, we came to the working paper by Laeven & Valencia (2018). It covers 151 banking crises, which are categorised by fulfilling two characteristics, possessing significant signs of financial distress in the banking system and a significant banking policy intervention measure in response to significant losses in the banking system. The first year where both characteristics are included is hence listed as the crisis year (Laeven & Valencia, 2018).

4. Empirical Specification

We class the macroprudential variables under five different categories, as done by (Altunbas et al., 2018). The first is capital based instruments (Cap), which focus on those that use capital requirements in various forms as the basis of these policies. The second is asset based instruments (ABI) which looks at those policies that focus on the risks associated with the purchase of assets using credit. Foreign exchange instruments (FX) refers to policies aimed at limiting risks associated with foreign currency activities. liquidity instruments (Liq) are those that focus on liquidity risks of banks. reserve requirements (RR) are those policies focusing on reserve requirements. In terms of creation, we calculate capital based instruments as the sum of Countercyclical Capital Buffers (CCB), Capital Conservation Buffer (Conservation), Capital Requirements (CAP), and capital restrictions on systemically important financial institutions (SIFI). Asset based instruments (ABI) is created by summing Leverage (LVR), LCG (Limits on Credit Growth), Loan to value ratio (LTV) and Limits on debt to service income ratio and loan to income ratio (DSTI). Foreign exchange based instruments (FX) are the sum of limits on foreign currency positions (LFX) and limits on foreign currency lending (LFC). The final two are reserve requirements (RR), which is solely the IMaPP's Reserve Requirements, and liquidity instruments (Liq), which is solely the IMaPP's Liquidity.

We are also doing asymmetric regressions alongside our main regressions, in line with Altunbas et al. (2018). This to see if there are differing effects regarding the tightening and loosening of macroprudential policies. To create these asymmetries, we have to split the macroprudential measures. If it is a tightening, we set it to be 1 if any of the components has a result greater than 0 for the respected year and country, with a 0 if it has a result less than 1, to create the positive change in a macroprudential tool. Negative changes are done in a similar method, with it being 1 if any of the components are less than 0, with it being 0. If any are greater than -1. We also do a monthly change in regressions. This is to see if the number of changes annually could impact our results regarding the asymmetric regressions. These look at the number of changes in a year, meaning this variable is no longer binary, but could potentially indicate a little more intensity. First, we calculate the asymmetric variable on a monthly basis for each of the components, then we annualise it, before then creating the macroprudential types.

Our baseline regression equation takes the form:

$$Y_{it} = \beta_0 + \beta_i X_{it} + \gamma_i Z_{it} + \mu_i + \tau_t + \epsilon_{it}$$

where Y_{it} refers to the bank risk measure, X_{it} refers to the macroprudential policy measures, Z refers to the set of control variables, μ_i is the country fixed effects, τ_t is the time fixed effects and ϵ_{it} is the error time. The set of control variables included in our regressions are credit to deposit ratio (CredDep), inflation, deposits to GDP ratio (DepGDP), credit to GDP ratio (CredGDP), cost to income ratio (CostInc) and the natural log of GDP per capita (lnGDPPC).

Then, we process to test whether the relationship between macroprudential policies and bank risk is impacted by additional financial and institutional variables. Our regression takes the form:

$$Y_{it} = \beta_0 + \beta_i X_{it} + \varphi_i F_{it} + \delta_i X_{it} * F_{it} + \gamma_i Z_{it} + \mu_i + \tau_t + \epsilon_{it}$$

where F_{it} refers to the financial and institutional variables like competition, concentration, reform indicator and institutional measures. To control for potential endogeneity, we lag all our explanatory variables. We use robust standard errors adjusted for heteroskedasticity and allow for one-way clustering by country.

5.Results

5.1 Effect of Macroprudential Policies on Bank Risk

We find from our main regressions that capital based instruments tend to be the most consistently significant, although potentially under a few circumstances, with Liquidity being significant under strong institutional strength. This indicates that capital based instruments are effective at addressing risk under numerous situations, with liquidity based instruments being effective only under strong institutional and regulatory environments.

Table 1 presents the results of our baseline regressions, where we investigate the relationship between capital based instrument and bank risk. Column 1 present the results of the regression with any control variables. In columns 2 through 7, we include additional macroeconomic control variables that affect bank risk one at a time. Finally, in column 8, we include all the control variables together. We find that across all the specifications, the coefficient of capital based instrument is positive and statistically significant. This indicates that a tightening of macroprudential policies reduce bank risk. This result is in line with the previous studies that have shown a similar effect such as Altunbas et al. (2018). We also find that high credit to GDP ratios lead to increased risk, as does high cost to income ratios, confirming Beirne & Friedrich (2017) result. This means that high levels of credit indicate a risky banking sector which is to be expected. It also indicates that low levels of profitability leads to higher levels of risk.

Table 2 presents the result of our baselines regressions when we investigate the relationships from the other macroprudential policy categories and bank risk. Column 1 presents the results for reserve requirements, column 2 presents them for asset based instruments, column 3 presents them for liquidity and column 4 for foreign exchange based instruments. All four columns have all controls from column 8 from table 1. We find a lack of significant results regarding these macroprudential policies, which is in contrast to Altunbas et al. (2018).

Table 3 presents the result of our regression with competition on bank risk. Column 1 is for the Lerner index and column 2 is for the Boone indicator. In this and almost all following regressions, we use interaction terms, which are created multiplying the respected financial environment measure by our macroprudential variables. Both columns indicate at the 10% level that capital based instruments reduce risk, although column 2 indicates that low levels of

competition could offset that. This in contrast to some of the previous literature on competition, which somewhat indicated competition increased risk

Table 4 presents the result of our regression with competition on bank risk. Columns 1 to 4 are the Lerner index and columns 5 to 8 are the Boone indicator. From column 2, asset based instruments increase risk at the 10% level. From columns 5 and 7, reserve requirements and foreign exchange based instruments decrease risk under lower levels of competition. From columns 5 to 8, we can see the Boone indicator indicates that lower levels of competition decrease risk. These results indicate support for the competition-risk hypothesis, which is relatively popular.

Table 5 presents the result of our regression with concentration on bank risk with capital based instruments. Column 1 is the 5 bank asset concentration, with column 2 the 3 bank asset concentration. There are no significant results.

Table 6 presents the result of our regression with concentration on bank risk. Columns 1 to 4 is the 5 bank asset concentration, with columns 5 to 8 on 3 bank asset concentration. At the 10% level, from column 2, we can see the effectiveness of asset based income is dependent on the level of concentration, being more effective at low levels. From table 6, we can see at the 10% level, asset based instruments may increase risk, with a greater effect at higher levels of concentration.

Table 7 presents the result of our regression with institutions on bank risk with capital based instruments. Column 1 is the ICRG, with column 2 the regulatory quality. Columns 1 and 2 both show the effectiveness of capital based instruments is entirely determined by the institutional and regulatory strength of the country in terms of reducing bank risk. This is in line with our expectations.

Table 8 presents the result of our regression with concentration on bank risk. Columns 1 to 4 is the ICRG with columns 5 to 8 on regulatory quality. From columns 3 and 7, it is clear that the effectiveness of liquidity based instruments is determined by the strength of both regulatory quality and institutional strength, with stronger levels leading to a reduction in risk from them.

Table 9 presents the result of our regression with board reform on bank risk with capital based instruments. The results are at the 10% level, capital based instruments is associated with reduced risk, which is in line with previous studies on macroprudential policies.

Table 10 presents the result of our regression with concentration on bank risk. At the 10% level, from column 2 asset based instruments increase risk, which is not in line with previous studies. In column 5, it indicates that foreign exchange based instruments increase risk unless a reform of the board has been undertaken, which is a surprising and confusing result.

5.2 Asymmetric changes of Macroprudential Policies

The next set of regressions are those involving the introduction of asymmetries. These asymmetries are done by as mentioned above, turning the changes of macroprudential policies into two categories, those being tightenings and loosenings. A tightening is when a macroprudential policy is made more restrictive, forcing the banks to take additional steps. A loosening is when these regulations are relaxed. We do this as there has been literature which indicates that tightenings are more effective than loosenings (Altunbas et al., 2018). This could also help explain which direction is influencing our previous results, as a tightening could be driving an entire macroprudential category's result, as could a loosening. We would expect to see that the tightenings are more significant and may be driving our results A tightening was previously framed as a +1 to the term, a loosening is framed as a -1 occurring amongst any of the constituent parts of our macroprudential variables. The next set of regressions hence redo all of the regressions of the previous set, just with a few slight changes. Firstly, all macroprudential variables are included in one table. Secondly, we will not be testing the financial and economic variables individually. And finally, all regressions are done with both the tightenings (pos) and loosenings (neg).

Table 11 presents the result of our baseline asymmetric regression on bank risk. Columns 1 and 6 indicate that a tightening of capital based instruments decreases risk, whilst a loosening increases it, which is in line with previous studies At the 10% level, from column 7 a loosening of asset based instruments increases risk, which is not in line with previous studies.

Table 12 presents the result of our baseline asymmetric regression with competition on bank risk. Columns 1 to 10 represent tightenings, columns 11 to 20 represent tightenings. Columns 1 to 5 and 11 to 15 represent Lerner index, columns 6 to 10 and 16 to 20 represent the Boone indicator. Column 1 indicates that a tightening of capital based instruments decreases risk at the 10% significance level. Column 6 indicates that a tightening of capital

based instruments decreases risk if competition levels are high. Column 11 indicates that a loosening of capital based instruments increases risk if competition levels are high. Column 15 indicates the same result as column 11, but at the 10% level for the foreign exchange based instruments. Columns 17, 19 and 20 indicate that the loosening of reserve requirements, liquidity instruments and foreign exchange based instruments increase risk if competition levels are low. These results indicate we are unsure about the true nature of competition and risk, as well as how a loosening of foreign exchange based instruments related to competition and risk. In regard to capital based instruments, higher levels of competition increase its effectiveness. In regard to a loosening of reserve requirements and liquidity, lower levels may increase its effectiveness. Hence overall, we have heterogeneity in how competition affects the implementation of macroprudential policies.

Table 13 presents the result of our baseline asymmetric regression with concentration on bank risk. Columns 1 to 10 represent tightenings, columns 11 to 20 represent tightenings. Columns 1 to 5 and 11 to 15 represent 5 bank asset concentration, columns 6 to 10 and 16 to 20 represent the 3 bank asset concentration. From columns 5 and 9, we can see that a tightening of asset based instruments effectiveness is determined by the level of concentration, with lower concentration increasing its effectiveness. From columns 10 and 15, we can see that foreign exchange based instruments are more and less effective under low concentration, hence we do not find any result from them.

Table 14 presents the result of our baseline asymmetric regression with institutions on bank risk. Columns 1 to 10 represent tightenings, columns 11 to 20 represent tightenings. Columns 1 to 5 and 11 to 15 represent ICRG, columns 6 to 10 and 16 to 20 represent regulatory quality. From columns 1 and 11, we find that the loosening and tightening of reserve requirements give somewhat contradictory results, although at differing levels of significance, with both finding they reduce risk under worse institutional strength. From column 3, we find that a tightening of capital based instruments are only effective under strong institutional strength. From columns 4 and 8, we find a tightening of liquidity instruments are only effective under strong institutional strength, with greater strength increasing their effectiveness. From column 16, we find at the 10% significance level, that a loosening of capital based instruments does more damage under strong institutional strength, with the same being true of a loosening of liquidity instruments in column 19. Overall, these results indicate capital based instruments and liquidity instruments successfulness is determined by the institutional strength of the country, which potentially lines up with previous literature.

Table 15 presents the result of our baseline asymmetric regression with board reform on bank risk. Columns 1 to 5 represent tightenings, columns 6 to 10 represent tightenings. We find that a tightening of capital based instruments is significant at the 10% level in column 1. From column 5, we find that a tightening of foreign exchange based instruments is only not detrimental if a board reform has not been implemented. From column 8, we find a loosening of asset based instruments leads to lower risk. Overall, these results are unlikely to line up with any literature.

5.3 Monthly Asymmetric Macroprudential Policies

The next set of regressions focus on the monthly change in macroprudential terms, and at the asymmetric effects. These have been done a similar, albeit different method to the previous regressions. We have done this due to the annual summation of macroprudential policies could lead to a cancellation of a tightening and a loosening in our period. This is due to there seems to be asymmetric effects, so by summing annually we could be losing some significant results. To calculate this by finding if a positive or negative change for each of the macroprudential components (i.e. CCB) occurs on a monthly basis, and creating a binary variable if this occurs for each macroprudential components. We then do the annual summation to get our final measure. This hence means this will include more of the policy implementations, but means our final variables are no longer binary We expect to see differing results compared to the asymmetric results, but still with the asymmetries with stronger relationships regarding the tightenings than loosenings We follow the same regression forms as we did for the standard asymmetric regressions.

Table 16 presents the results for the monthly asymmetric regression on bank risk, looking at the baseline regressions. Columns 1 to 5 are for each of the representative macroeconomic categories. Our results are that a tightening in capital has a negative significant relationship with risk, whereas both loosening of asset based instruments and foreign exchange instruments have a significant negative relationship as well with risk. This indicates that a tightening of capital reduces risk, as is expected. The results of the loosening are in steep contrast to previous literature.

Table 17 presents the results for the monthly asymmetric regressions with competition on bank risk. Columns 1 to 10 are the tightenings, with columns 11 to 20 are for the loosenings. Columns 1 to 5 and 11 to 15 are on the Lerner index, and 6 to 10 are on the Boone indicator.

A tightening of capital based instruments reduces risk according to column 1, with this effect being determined by level of competition according to column 6. According to column 11, a loosening of capital based instruments increases risk, with this effect being dependent on the level of competition, with low levels causing the sign to reverse. Columns 17,19,20 indicate that a loosening of Reserve requirements, liquidity instruments and foreign exchange based instruments leads to increased risk under low levels of competition, and decreased risk under high levels. The results for the capital based instruments are consistent with the literature, with the loosening results for the other variables being inconsistent with it.

Table 18 presents the results for the monthly asymmetric regressions with concentration on bank risk. Columns 1 to 10 are the tightenings of macroprudential policies, columns 11 to 20 are the loosenings of macroprudential policies. Columns 1 to 5 and 11 to 15 are the 5 bank asset concentration (5BAC) and columns 6 to 10 and 16 to 20 are the 3 bank asset concentration (3BAC) . A tightening of asset based instruments is dependent on the level of concentration, with low levels of concentration causing a reduction in risk. At the 10% level, column 10 indicates that a tightening of foreign exchange based instruments is also dependent on risk, with low levels of concentration causing a reduction in risk. A loosening of the foreign exchange based instruments from column 15 shows that it is dependent on risk, with lower levels of concentration causing a reduction in risk. The results from the foreign exchange based instruments hence seem to be inconsistent. The asset based instruments, however, are in line with previous results, as they do indicate, under some circumstances, macroprudential policies are effective.

Table 19 presents the results for the monthly asymmetric regressions with institutions on bank risk. Columns 1 to 10 are the tightenings of macroprudential policies, with columns 11 to 20 are loosenings of macroprudential policies. Columns 1 to 5 and columns 11 to 15 are the ICRG measure, with columns 6 to 10 and 16 to 20 are the regulatory quality (RQ) regressions. From column 1, the tightening of reserve requirements is more effective under lower institutional strength. From column 3, the tightening of capital based instruments is more effective under higher institutional strength. From columns 4 and 9, the tightening of liquidity instruments is more effective under higher institutional strength. From columns 18 and 20, a loosening of asset based instruments or foreign exchange based instruments leads to lower risk. From columns 19, at the 10% level a loosening of liquidity instruments leads to greater risk under stronger institutional strength. These results indicate that liquidity instruments and the tightening of capital based instruments work best under strong institutions, whilst the tightening

of reserve requirements work best under weak ones. However, the results from the loosening of asset based instruments and foreign exchange based instruments are not in line with the literature.

Table 20 presents the results for the monthly asymmetric regressions with the board reform index on bank risk. Columns 1 to 5 are the tightening regressions, with columns 6 to 10 the loosening regressions. From column 1, at the 10% level, the tightening of the capital based instruments leads to reduced risk. From column 5, a tightening of foreign exchange based instruments leads to increased risk unless a board reform has been passed, which mitigates the result. From column 8, a loosening of asset based instruments will reduce risk unless a board reform has been passed, which mitigates the results the next regression set is the reform index. This indicates that board reforms may be important to avoid spill overs from some macroprudential policies.

5.4 Overall results

The overall results are as followed. In the main regressions, we find capital based instruments is significant at the 10% level at least, reducing risk under all results excluding those involving the, institutions or concentration measures. Its effectiveness is dependent on competition and institutional strength, with it working best under high levels of competition and strong institutions. From the asymmetric regressions, it is found that the tightening of capital based instruments were more effective, with its effectiveness dependent on institutional strength and competition. It was found that a loosening would increase risk, especially under high levels of competition.

Overall, this indicates that capital based instruments reduce lower risk, especially when to tightening. However, it is dependent on competition within the banking sector, alongside the institutional strength of the regulators in the country, with high levels of competition and strong institutions increasing effectiveness.

In the main regressions, only under the Boone indicator was any element of the reserve requirements significant, which indicated there was greater effectiveness under lower levels of institutional strength. From the asymmetric results, it is clear that a loosening of reserve requirements increases risk under lower levels of competition. There are unclear results in regard to institutional strength. From the monthly asymmetric results, these clear the

institutional strength question, by showing greater effectiveness of reserve requirements under weaker institutional strength.

In the main regressions, the asset based instruments failed to give any results that were significant at the 5% level. At the 10% however, we can see that higher levels of concentration increase the riskiness of asset based instruments, with a few results indicating asset based instruments may increase risk. Under the asymmetric regressions, there are a multitude of results where the loosening of asset based instruments is correlated with lower risks, those being in the Boone indicator, and the reform index regression. Under tightening, both concentration measures indicate that under low concentration, a tightening of asset based instruments is correlated with low risk, whereas under high concentration, this effect is mitigated severely, and potentially reversed. Overall, our results indicate that concentration seems to be important in the implementation of asset based instruments, as well as there are a few results indicating loosening may be correlated with lower risk, although the reasoning behind this is unknown.

In the main regressions, liquidity instruments hold quite a few significant results. From the main regressions, the institutional measures indicate that under higher levels of institutional strength, liquidity instruments become more effective. The Boone indicator has a positive interaction term, indicating that liquidity instruments are correlated with lower risk under low levels of competition. Under asymmetric regressions results, we can see that it is a loosening of liquidity instruments that is affected by competition, with lower levels of competition increasing the risk of a loosening there is one significant result. In regard to a tightening of liquidity instruments, it is clear that stronger institutions make it more effective. It is also clear that under a loosening, there is greater effects under stronger institutions. Overall, the usefulness of liquidity instruments tends to be determined by the institutional strength, which indicate the size and level of correlation is determined by those measures.

Finally, foreign exchange based instruments have two significant results. In the main regressions, it is clear its use is detrimental without a board reform being passed, which mitigates the result. Under the asymmetric results, we get many inconsistencies. Starting out at the Competition measures, at the 10% level, under the Lerner index, a loosening of foreign exchange instruments is associated with higher risk under high levels of competition, with it being associated with lower risk under low levels of competition. Under the Boone indicator, however, the results indicate that under low levels of competition, a loosening is correlated

with lower risk. As these results are inconsistent, we cannot say what the true effect of competition on the implementation of foreign exchange based instruments is. There were more results under concentration, albeit equally inconsistent. Under the five bank asset concentration, the indication was that a loosening would have greater correlation with higher risk, whereas under the three bank asset concentration indicates that a tightening would have a greater correlation with lower risk under lower levels of concentration. These also mean we are unsure of how concentration affects foreign exchange based instruments. Finally, the reform regressions do come with some significant results, with the tightening correlated with higher risk unless the reform had been passed, in which case it becomes correlated with lower risk. Hence, our results do not support the implementation of foreign exchange based instruments

6 Robustness Check

To act as a robustness check, we have decided to change our dependent variable from Z Score to a binary variable indicating whether a systemic banking crisis began in that year called Crisis. This variable is calculated from the dataset by Laeven & Valencia (2018). In these regressions, we use the logit function in lieu of xtreg function used in the previous regressions, although we still use the same structure to all other elements within these regressions.

Table 21 presents the results for the baseline regressions on Crises, Columns 1 to 5 represent each of the macroprudential policies. From column 4, it is shown that the liquidity reduces the chance of crisis occurring. We also find that the credit to deposit ratio and cost to income ratios increase the chance of a crisis occurring. The result regarding to the cost to income ratio is consistent with our previous result, with the other two not being represented in Table 1 or Table 2.

Table 22 presents the results for the regressions with competition on crises. Columns 1 to 5 are for the Lerner Index, with columns 6 to 10 for the Boone Indicator. From column 7, we can see that under lower levels of competition, capital based instruments lead to higher likelihood of crisis, whilst under higher levels of competition capital based instruments lead to a lower likelihood of crisis. From column 9, we see that liquidity is also dependent on the level of competition, with low levels of competition leading to higher likelihood of a crisis. From column 8, we see that asset based instruments are dependent on competition, but in the reverse manner. The results regarding capital based instruments are consistent with what we have

previously found, the results regarding liquidity are inconsistent and the results regarding asset based instruments are neither in support or direct contrast to our previous results.

Table 23 presents the results for the regressions with concentration on crises. Columns 1 to 5 are for the 5 bank asset concentration, with columns 6 to 10 are for the three bank asset concentration. From columns 5 and 10, foreign exchange instruments tend to be effective in reducing the likelihood of crises, especially under lower levels of concentration. From columns 4 and 9, liquidity instruments tend to be effective in reducing the likelihood of crises under high levels of concentration. Neither of these results were found in the previous regressions.

Table 24 presents the results for the regressions with institutions on crises. Columns 1 to 5 are for the ICRG, with columns 6 to 10 are for the regulatory quality. From column 1, we find that capital based instruments reduce the likelihood of a crisis under weak institutional environment. From column 8, we find that asset based instruments increase the likelihood of a crisis at the 10% level. From column 9, we find that liquidity reduces the likelihood of a crisis. These results are mostly not conferred from the previous regression, with the capital based instruments actively opposing our previous results.

In this robustness check, we have decided to exclude doing a robustness check on the reform index. That is due to a lack of observations, with when both datasets being combined there were only three instances of a macroprudential policy being changed the year before a crisis occurred. As there are 5 categories of macroprudential policy, this is an insufficient size to get us results for each category, for this reason, we have not reported any regression results.

Overall, the robustness checks results do not confirm our initial results. In these regressions, we found two instances where there was direct support, those being capital based instruments and the Boone indicator and the cost to income ratio. There was one instance of direct contrast, regarding the capital based instruments and ICRG. However, the majority of significant results were inconsistent.

7. Limitations

The first limitation was the size and scope of our dataset. Due to time constraints, we have been limited to country level rather than bank level measures for many variables, such as Z score and competition. Our dataset could also be improved further by also getting more data on systemic banking crises and banking board reforms.

One limitation is causality. Unfortunately, we cannot definitively prove causality within our regressions. One potential solution to this could be using matching methods to deal with this in case of non-linearities of the relationship. Another solution could be to do repeated results of difference in difference regressions using synthetic controls.

8. Conclusions

In summary, we really cannot be certain of the strength of our results. This is due to numerous issues. Firstly, our robustness checks do contrast substantially with our initial results. They do not support our aforementioned results, and they often contradict them. We also have significant issues regarding causality, as due to the nature of the data alongside other limitations, causation has unfortunately not been able to be done in our regressions. Also, due to the nature of the variable, there could be some weaknesses involving the measurement of risk. Nevertheless, our results do indicate some interesting conclusions. Firstly, there tend to be more significant results under tightenings than loosenings, indicating that tightening has greater effect.

Capital based instruments tended to be significant and negatively correlated with risk in most circumstances. In particular, although to a lesser extent than liquidity, its strength does seem to have been influenced by the strength of institutions within a country, with stronger institutions indicating a higher correlation with lower risk for capital based instruments. The asymmetric regressions indicated that both tightening and loosening indicate that capital has a negative correlation of risk, indicating that the loosening of capital based instruments is correlated with worse results. There is potentially a relationship between capital based instruments and competition, with indications being the relationship of capital based instruments and negative risk is stronger under low levels of competition, although a few results were insignificant meaning we cannot be sure of the veracity of such a statement.

Liquidity instruments tended to work most effectively under strong levels of institutional strength, with potential downsides under weak ones. Hence, strong institutions matter for liquidity instruments, in particular when tightening. If loosening, under lower levels of competition will cause greater risk to occur than under higher levels.

Asset based instruments are most effective under low levels of concentration, especially when tightening. It also has been found that when loosening, the lower level of competition in the banking sector will increase the risk of doing so.

In regard to foreign exchange instruments, there was one significant result in the main regressions, that being foreign exchange instruments are correlated with higher risk, unless a reform of the corporate structure has been implemented. This has been found to be the case under tightening but not loosening of it. Overall, however it is not found to have a negative correlation with risk in any circumstance that is consistent and significant, indicating that our results do not support their use.

With reserve requirements we have found that the interaction term between it and Boone is negatively correlated with risk, in particular regarding the loosening of reserve requirements. It indicates that under lower levels of competition, a loosening is correlated with higher risk. Hence, under some measures of competition, we find that loosening reserve requirements can be somewhat mitigated by having high levels of competition. We also find from the monthly regressions that a tightening of reserve requirements are more effective under low institutional strength, indicating they are a good tool to use if operating in a weak institutional strength environment.

In regard to the competition measures, we come to some interesting results. Overall, the Lerner index on its own does not give us any significant results. The Boone indicator indicated that lower levels of competition were correlated with lower risk. However, the interaction term for capital based instruments and Boone indicates that higher levels of competition is correlated with lower risk under a change of capital based instruments. Under a loosening of capital based instruments, higher competition leads to greater risk. However, under higher levels of competition when loosening liquidity instruments, foreign exchange based instruments and reserve requirements is correlated with lower levels of risk when measured by the Boone indicator. Overall, these results seem to be incoherent and inconsistent, likely indicating either that competition has no effect on risk, or has heterogenous effects on risk. We would be more likely to side with it having no effect on risk, as that seems to be the most consistent. These results are in line with the lack of consensus from previous papers.

In regard to concentration, the results are quite clear. Concentration, as measured by either the three or five bank asset concentrations, does not have any effect on risk, except under one circumstance, which is the interaction term between the concentration measures and asset

based instruments. Those results indicated that under lower levels of concentration, there was a further decrease in risk from tightening asset based instruments. Hence concentration was found to be insignificant excluding under asset based instruments. This is potentially in conflict with previous papers, although it has been noted that some of its effectiveness could be attributed to the cost to income ratio, which was significant in our regressions (Beirne & Friedrich, 2017). Hence, we are not surprised by our results for the most part in regards to concentration, although the result regarding the asset based instruments is a surprising one.

Institutional measures, those being regulatory quality and ICRG measure, tended on their own to be insignificant, indicating that they are not correlated with lower levels of risk on their own. However, as an interaction term, there were a few significant outcomes, with ICRG indicating that both capital based instruments and liquidity based instruments correlation sign regarding risk was entirely dependent on the strength of institutions when a tightening occurred. From the monthly asymmetric regressions, the reserve requirements indicated a strange outcome, where the tightening works more effectively under low institutional strength as measured by the ICRG measure. In regard to the regulatory quality, the liquidity based instruments strength was determined by the institutional strength. Thus, excluding the strange outcome of the reserve requirements, our results indicate that the strength of institutions do matter in regards to the tightening of both capital and liquidity instruments. The divergence between these two results is expected however, as the two measures we have measure considerably different things. The ICRG measures the riskiness of a country, in regard to all forms of political, economic and other forms of risks. In comparison regulatory quality is measuring the regulatory quality, which is different from this, as it follows a more narrow view. Overall, these results indicate that although institutions on their own may not reduce risk, their strength determines the effectiveness of macroprudential policies.

The reform index does show some significant results, although there are some serious issues regarding it. Its lack of observations and short time period mean we cannot be certain these results and are hence not confident in them. They do indicate that a tightening of foreign exchange based instruments is correlated with higher risk if there is no reform taken place, and may potentially cause a loosening of asset based instruments to be correlated with lower risk. However, these results are from a very small database, which could be a significant issue.

Looking at the individual controls, there were two that were significant. Those two are cost to income ratio, and the credit to GDP ratio. These are both positively correlated with the

next period's risk level. This indicates that higher levels of credit to GDP are correlated with risk. This indicates that, in a completely expected result, that countries with a higher credit ratio are those that are riskier. The second result is in line with the previous results, which indicates that a higher cost to income ratio leads to higher levels of risk. This is due to having a higher ratio may lead to taking on more risks to maintain profits. Hence, we find both controls in line with our expectations and the previous literature. Other controls however were not significant.

Overall, our conclusions indicate that in some instances, some macroprudential policies are significant. We also find that the institutions do matter for capital based instruments, reserve requirements and liquidity instruments. Concentration matters for asset based instruments, namely for all of the aforementioned the tightening. We find that institutional measures do matter in some cases, which is in line with previous works, although our results seem to be more exact. We also find that two elements of the financial markets, those being credit to GDP and cost to income ratio are correlated with higher risk. Our results seem to corroborate the overall trends in regard to results regarding competition indicating there is little correlation between either and risk amongst our sample.

Further study does need to be done in our view. Going into a more microeconomic scale, looking at individual banks would be a better start. We would suggest also expanding the reform index, as we felt that was too small. It could also be good to look into case studies and difference in difference to find concrete causal evidence of the results of macroprudential policy and banking stability. Finally, potentially looking at transforming the Z score to make it a better representation of systemic risk, whether in regard to Anginer et al. (2014) or Li et al. (2020) could lead to more interesting results. Further study could also use the Leave One Out method (LOO) in regard to the Z score. The Leave one out method is based on calculating both the Z score of the entire country and the Z score of the country less one bank (Li et al., 2020). They then calculate the percentage change of the one removed compared to the whole country, and then test its significance (Li et al., 2020). Hence there are many potential future avenues for research in regard to this research.

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GRAPHS

Figure 1: Global implementation of Macroprudential Policies including directionality

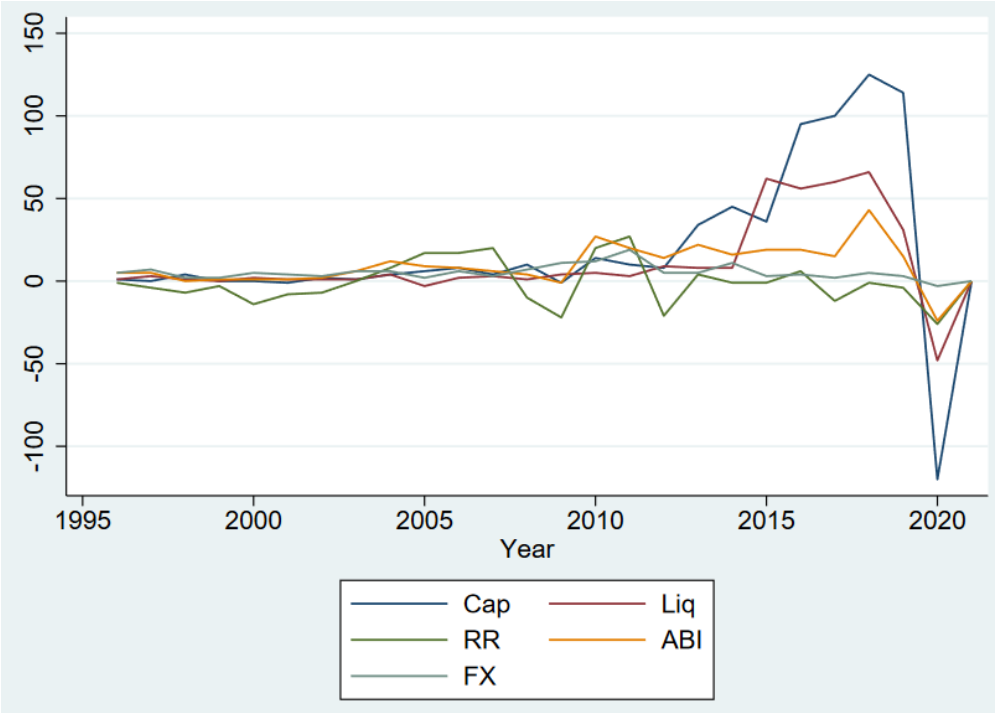


Figure 2: Global implementation and modifications of Macroprudential Policy

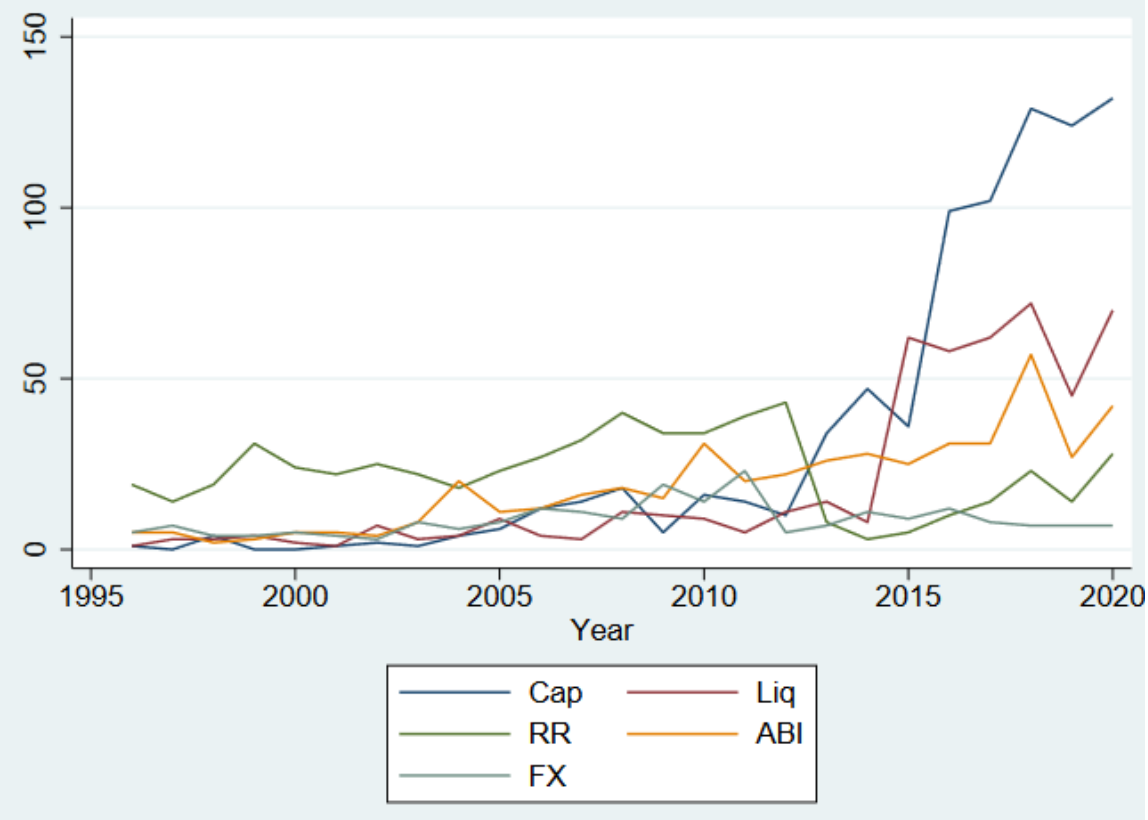


Figure 3: Implementation and direction of Macroprudential Policies in Argentina

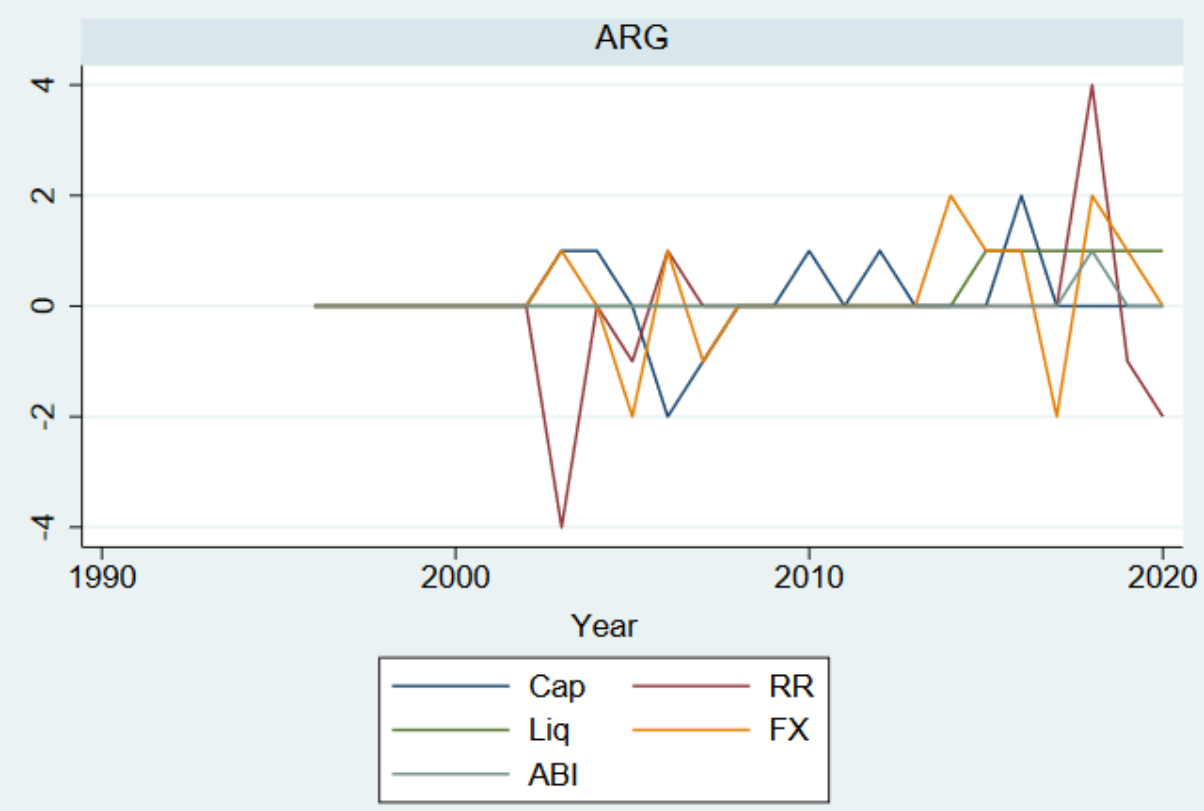


Figure 4: Implementation and direction of Macroprudential Policies in Hong Kong

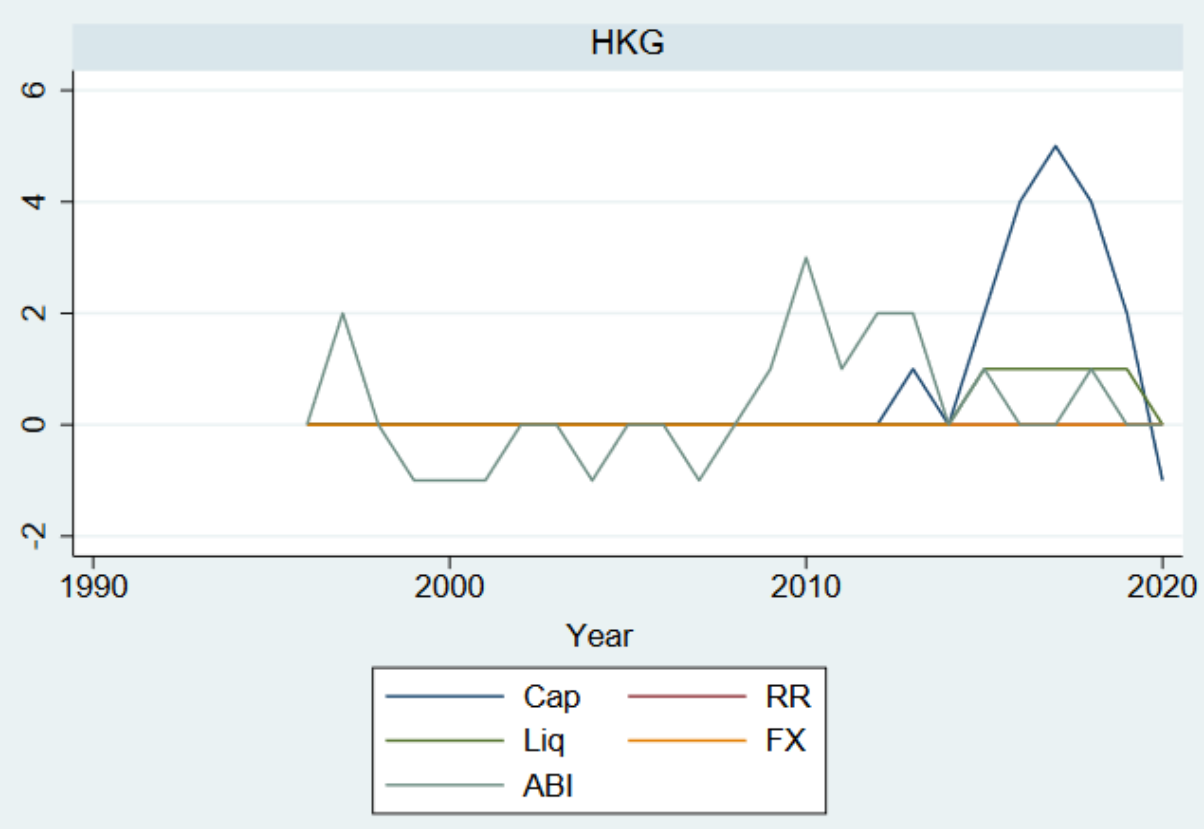


Figure 5: Implementation and direction of Macroprudential Policies in Hungary

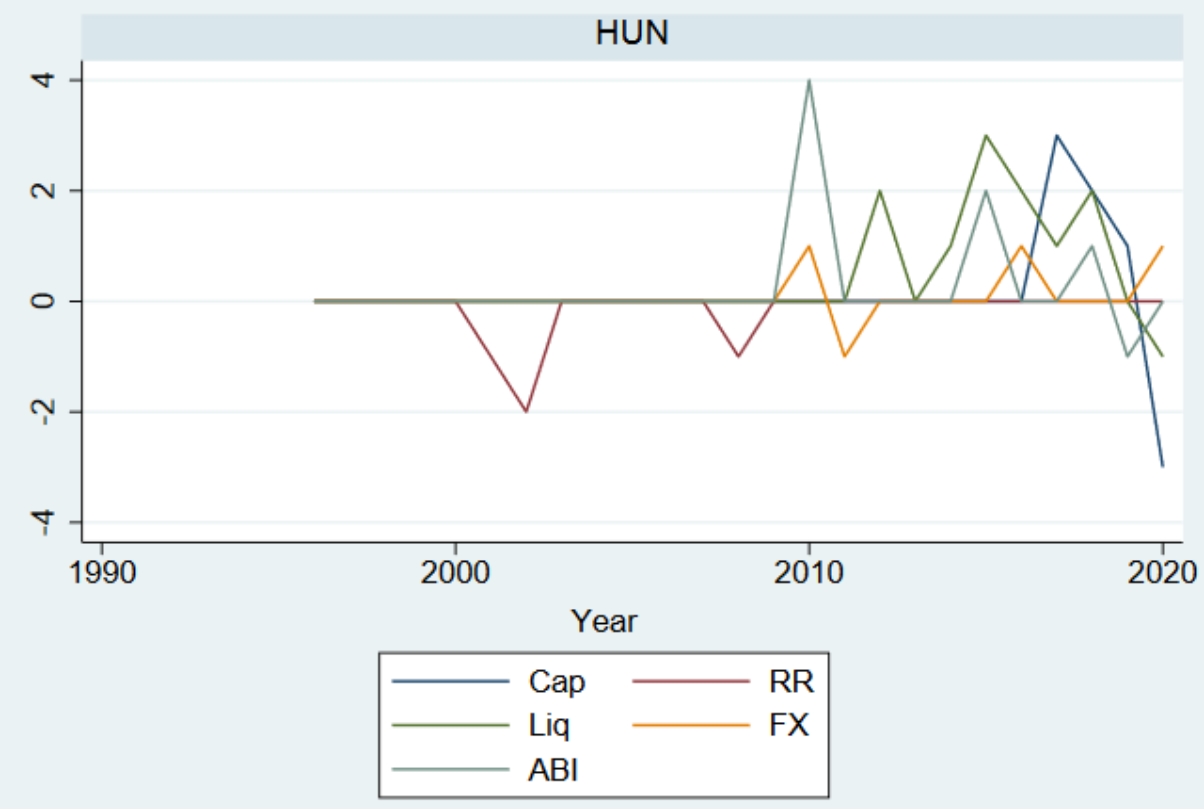


Figure 6: Implementation and direction of Macroprudential Policies in India

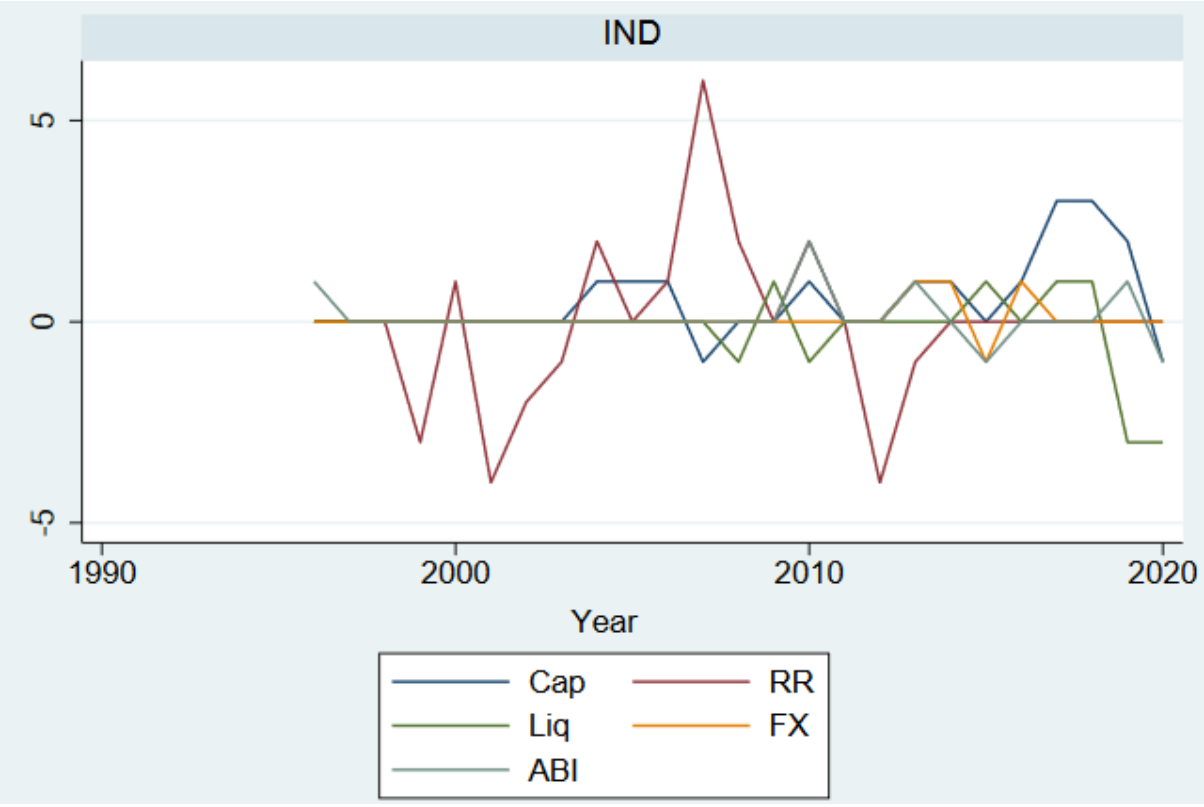


Figure 7: Implementation and direction of Macroprudential Policies in Israel

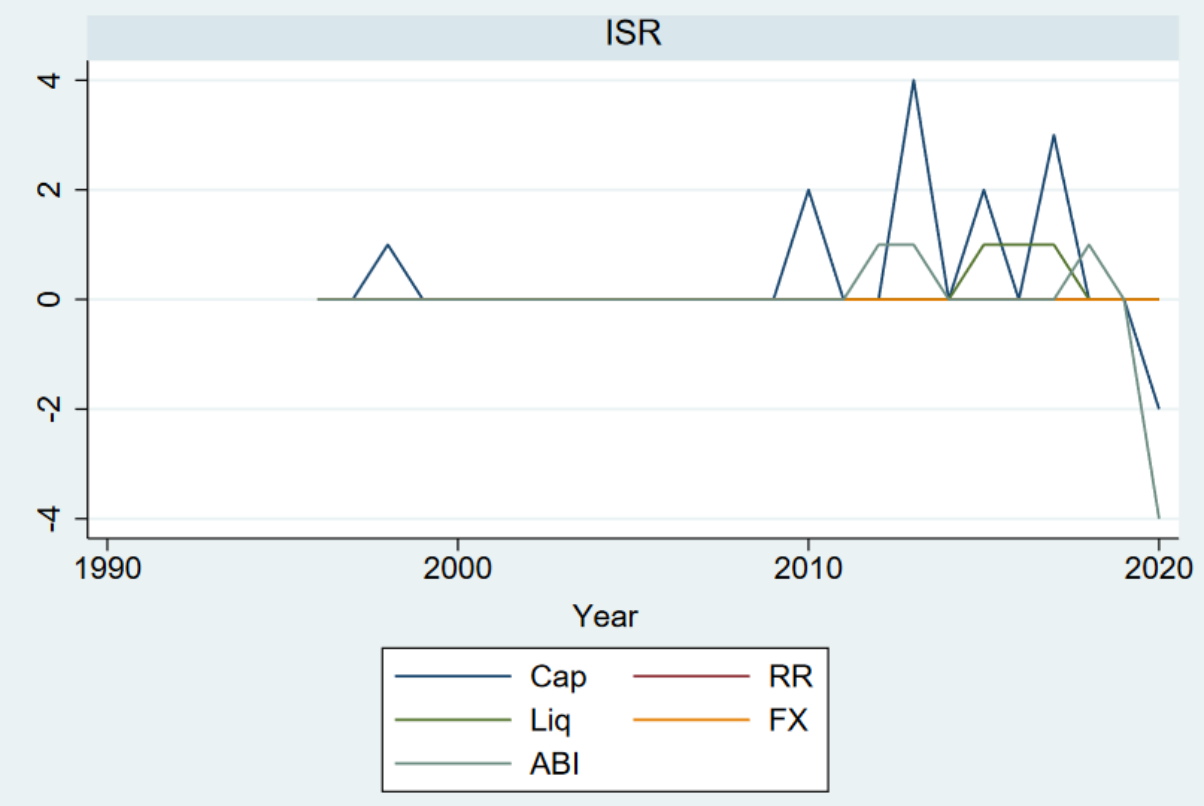


Figure 8: Implementation and direction of Macroprudential Policies in South Korea

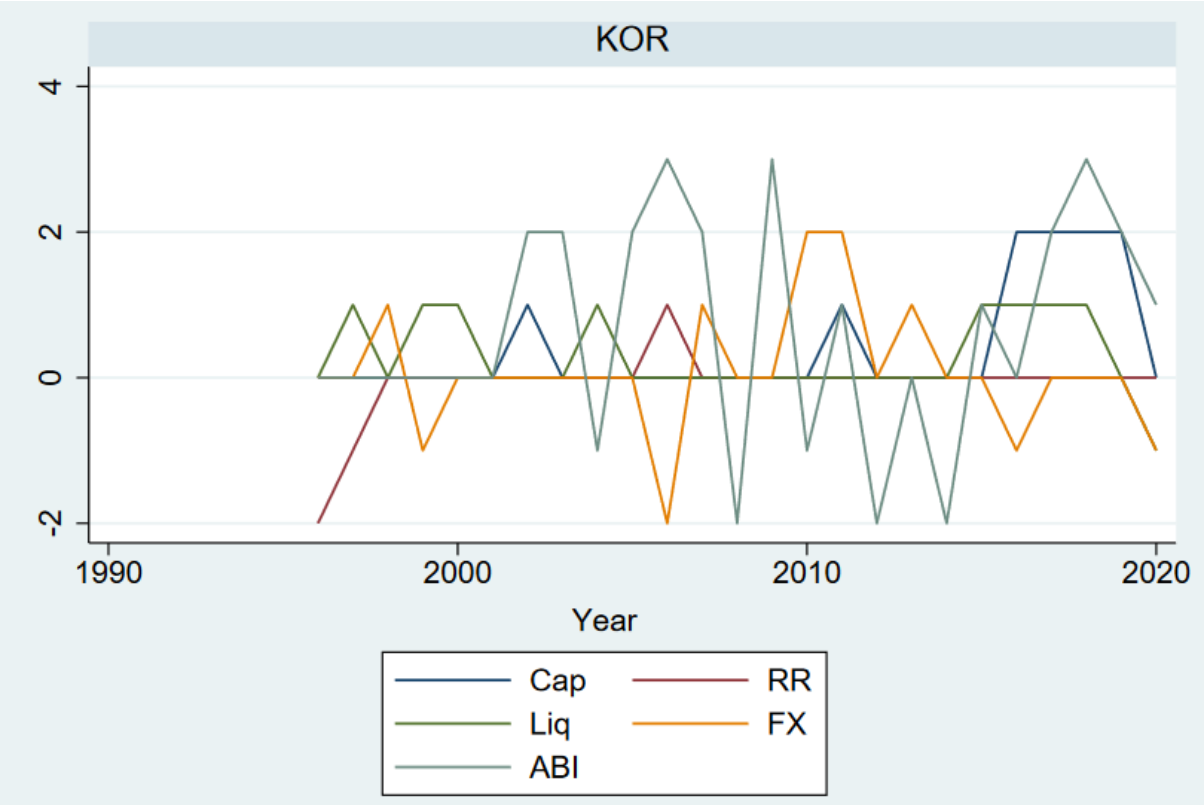


Figure 9: Implementation and direction of Macroprudential Policies in Pakistan

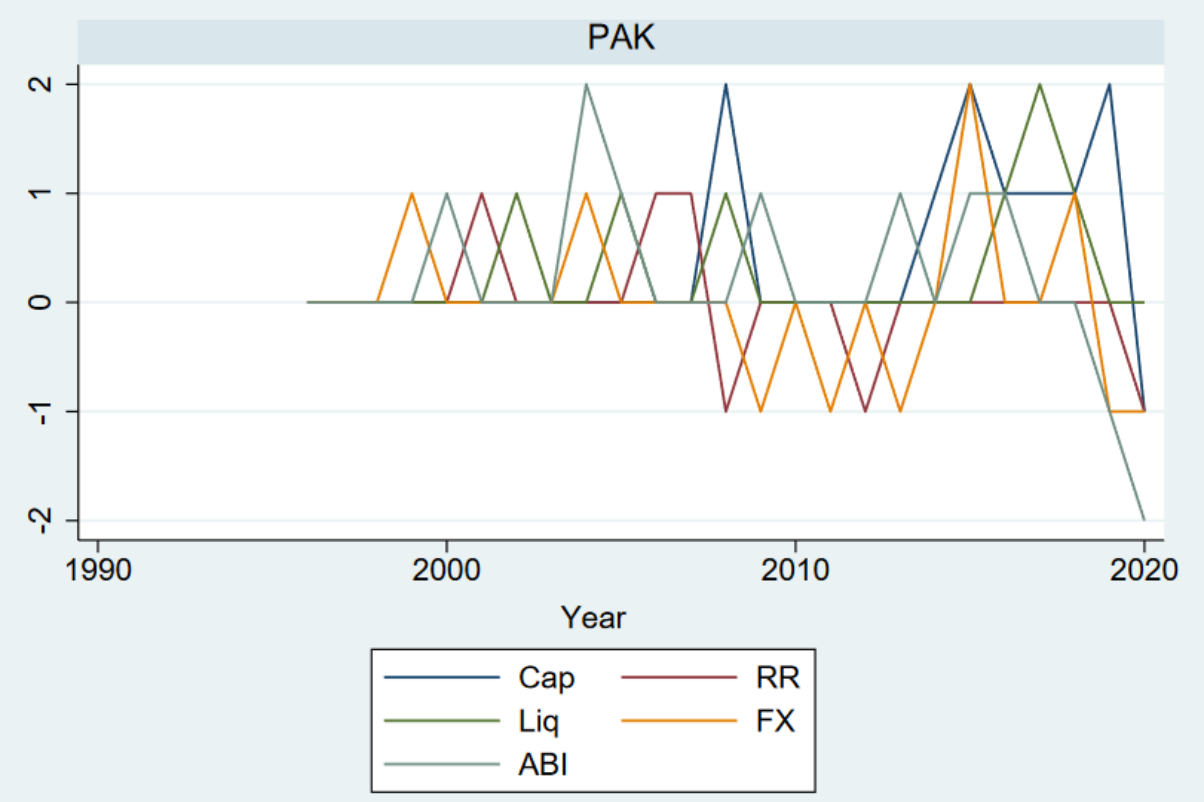


Figure 10: Implementation and direction of Macroprudential Policies in Romania

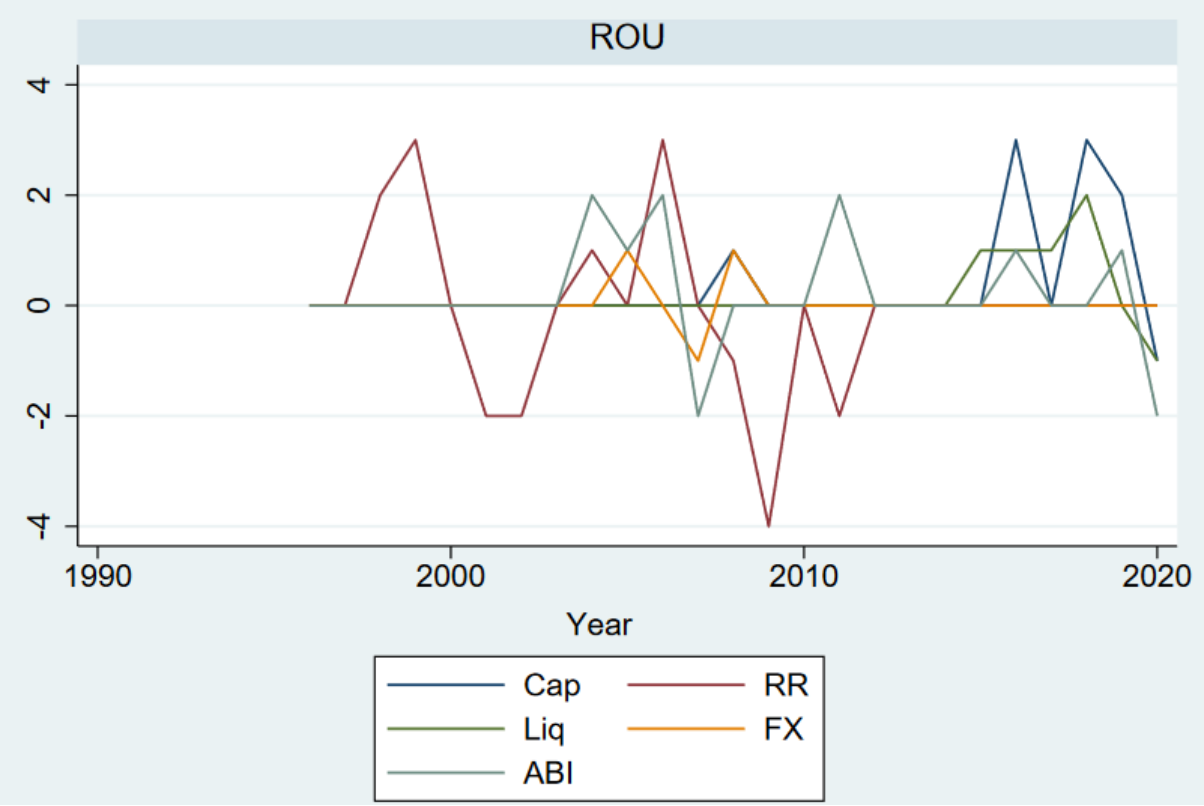


Figure 11: Implementation and direction of Macroprudential Policies in Russia

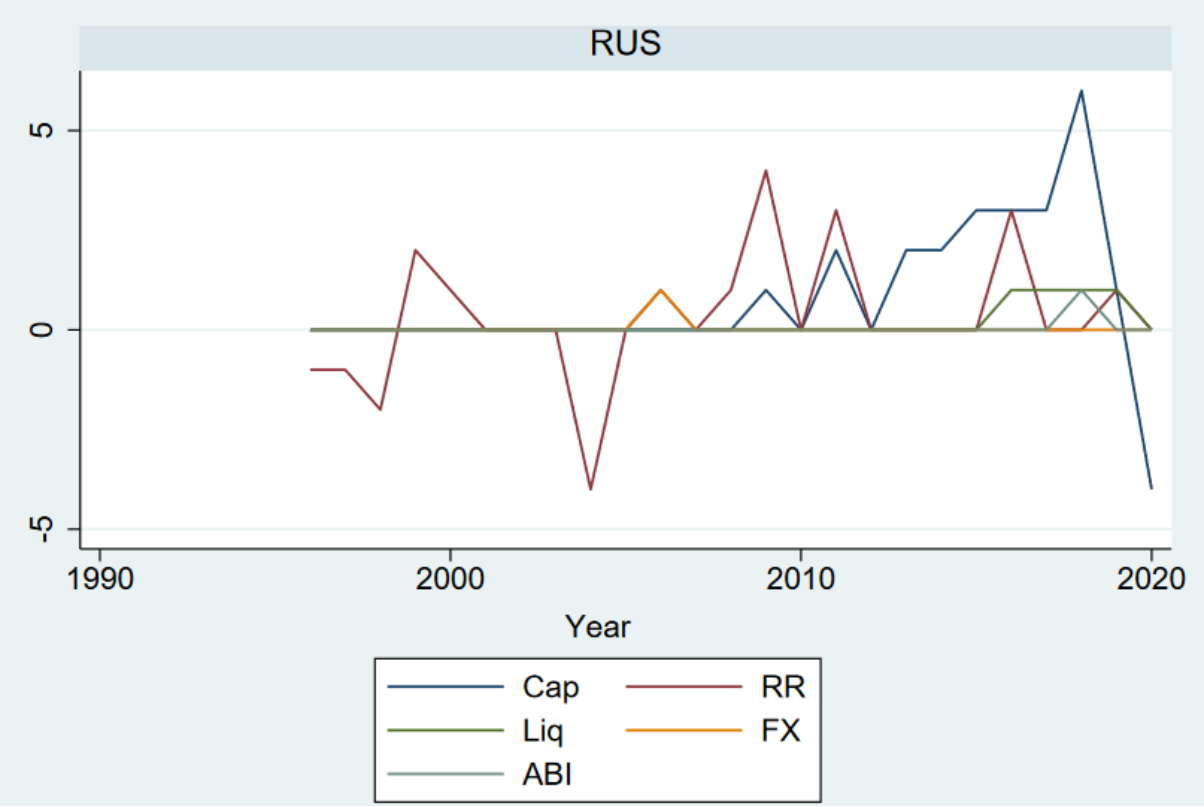
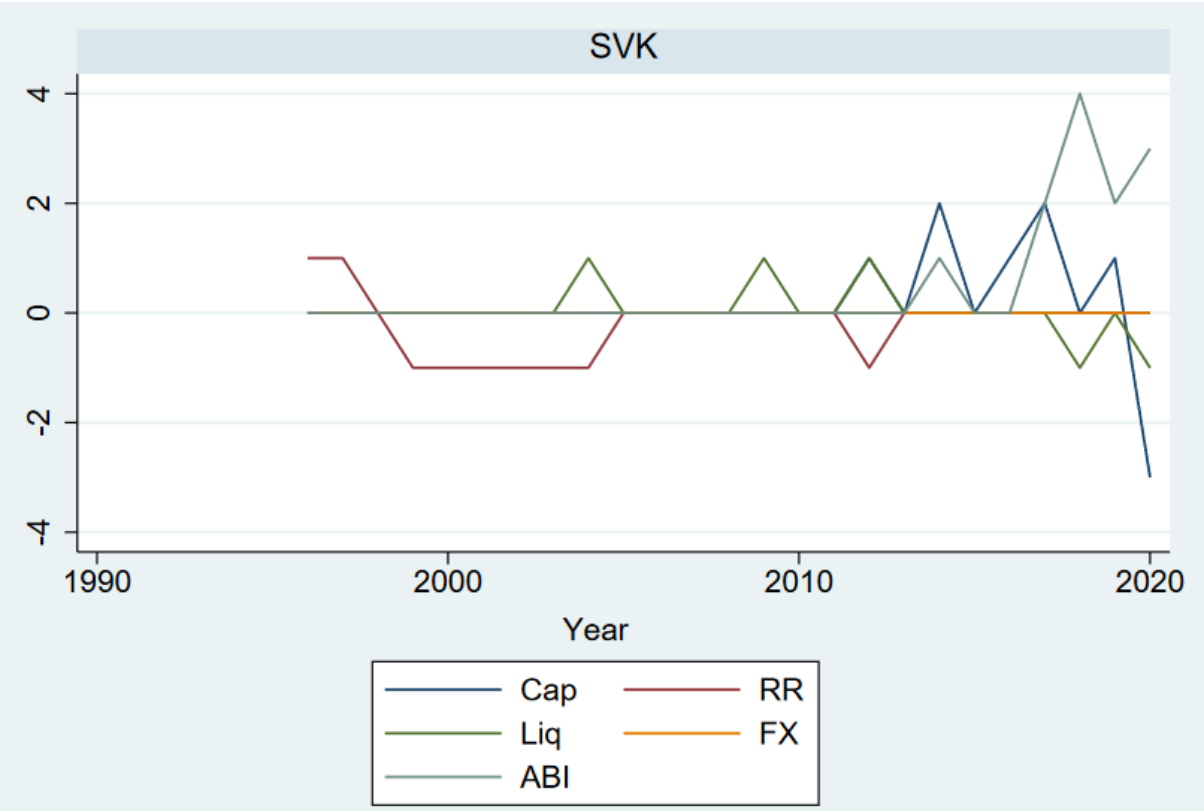


Figure 12: Implementation and direction of Macroprudential Policies in Slovakia



TABLES

Table 1: Effect of Capital Based Instruments on Bank Risk

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
l.Cap	0.397**	0.394**	0.399**	0.391**	0.385**	0.419**	0.410**	0.430***
	(0.182)	(0.182)	(0.187)	(0.182)	(0.176)	(0.166)	(0.178)	(0.160)
l.lnGDPPC		-0.116						-0.177
		(0.965)						(1.025)
l.Inflation			-0.001					-0.001*
			(0.001)					(0.001)
l.CredGDP				-0.025***				-0.031**
				(0.008)				(0.013)
l.CostInc					-0.024**			-0.031**
					(0.011)			(0.012)
l.CredDep						0.002**		0.005
						(0.001)		(0.005)
l.DepGDP							-0.018	0.003
							(0.013)	(0.021)
Observations	2,687	2,663	2,583	2,572	2,661	2,467	2,556	2,379
R-squared	0.037	0.039	0.040	0.051	0.046	0.045	0.045	0.064
No. of Countries	132	131	130	130	132	128	129	127
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

*Notes: See Table A1 Appendix 1 for definition of variables. The dependent variable in the regressions is the Bank Z Score. All the estimates have been carried out using the fixed-effects regressions. Robust standard errors are given in parenthesis. In all panels, the standard errors are robust to heteroskedasticity and are clustered at the country level. ***, ** and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.*

Table 2: Effect of Macroprudential Policies on Bank Risk

VARIABLES	(1) RR	(2) ABI	(3) Liq	(4) FX
l.MP	0.022	-0.150	0.110	-0.328
	(0.091)	(0.158)	(0.249)	(0.336)
l.DepGDP	0.004	0.004	0.004	0.004
	(0.020)	(0.020)	(0.020)	(0.020)
l.CredDep	0.005	0.005	0.005	0.005
	(0.005)	(0.005)	(0.005)	(0.005)
l.CostInc	-0.031**	-0.031**	-0.031**	-0.031**
	(0.012)	(0.012)	(0.012)	(0.012)
l.lnGDPPC	-0.197	-0.177	-0.195	-0.198
	(1.024)	(1.023)	(1.026)	(1.025)
l.Inflation	-0.001*	-0.001*	-0.001*	-0.001*
	(0.001)	(0.001)	(0.001)	(0.001)
l.CredGDP	-0.031**	-0.031**	-0.031**	-0.031**
	(0.013)	(0.013)	(0.013)	(0.013)
Observations	2,379	2,379	2,379	2,379
R-squared	0.061	0.062	0.061	0.062
No. of Countries	127	127	127	127
Year FE	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes

*Notes: See Table A1 Appendix 1 for definition of variables. The dependent variable in the regressions is the Bank Z Score. All the estimates have been carried out using the fixed-effects regressions. Robust standard errors are given in parenthesis. In all panels, the standard errors are robust to heteroskedasticity and are clustered at the country level. ***, ** and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively*.

Table 3: Effect of Capital Based Instruments with Competition on Bank Risk

	(1)	(2)
VARIABLES	Lerner	Boone
l.Cap	1.510*	0.297*
	(0.776)	(0.178)
l.Comp	2.699	0.019***
	(1.666)	(0.002)
l.Comp*MP	-3.159	-0.164***
	(2.171)	(0.018)
Observations	1,842	1,775
R-squared	0.058	0.074
No. of Countries	115	122
Finc Con.	Yes	Yes
Year FE	Yes	Yes
Country FE	Yes	Yes

*Notes: See Table A1 Appendix 1 for definition of variables. The dependent variable in the regressions is the Bank Z Score. All the estimates have been carried out using the fixed-effects regressions. Robust standard errors are given in parenthesis. In all panels, the standard errors are robust to heteroskedasticity and are clustered at the country level. ***, ** and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.*

Table 4: Effect of Macroprudential Policies with Competition on Bank Risk

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
			Lerner				Boone	
	RR	ABI	Liq	FX	RR	ABI	Liq	FX
l.MP	0.117	-0.698*	-0.762	-0.031	0.014	-0.228	-0.195	-0.339
	(0.156)	(0.413)	(0.725)	(0.703)	(0.076)	(0.160)	(0.314)	(0.307)
l.Comp	2.665	2.586	2.494	2.534	0.025***	0.029***	0.028***	0.028***
	(1.769)	(1.672)	(1.663)	(1.646)	(0.002)	(0.002)	(0.002)	(0.002)
l.Comp*MP	-0.465	1.075	2.192	-1.039	0.127***	0.019	1.319***	-0.494
	(0.535)	(0.988)	(2.646)	(1.793)	(0.020)	(0.029)	(0.396)	(0.501)
Observations	1,842	1,842	1,842	1,842	1,775	1,775	1,775	1,775
R-squared	0.054	0.055	0.054	0.054	0.068	0.066	0.067	0.066
No. of Countries	115	115	115	115	122	122	122	122
Finc Con.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

*Notes: See Table A1 Appendix 1 for definition of variables. The dependent variable in the regressions is the Bank Z Score. All the estimates have been carried out using the fixed-effects regressions. Robust standard errors are given in parenthesis. In all panels, the standard errors are robust to heteroskedasticity and are clustered at the country level. ***, ** and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.*

Table 5: Effect of Capital Based Instruments with Concentration on Bank Risk

VARIABLES	(1) 5 BAC	(2) 3 BAC
l.Cap	-0.263	0.159
	(0.784)	(0.597)
l.Conc*Cap	0.009	0.003
	(0.009)	(0.008)
L.Conc	0.004	0.006
	(0.018)	(0.012)
Observations	1,607	1,823
R-squared	0.109	0.084
No. of Countries	119	123
Finc Con.	Yes	Yes
Year FE	Yes	Yes
Country FE	Yes	Yes

*Notes: See Table A1 Appendix 1 for definition of variables. The dependent variable in the regressions is the Bank Z Score. All the estimates have been carried out using the fixed-effects regressions. Robust standard errors are given in parenthesis. In all panels, the standard errors are robust to heteroskedasticity and are clustered at the country level. ***, ** and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively*.

Table 6: Effect of Macroprudential Policies with Concentration on Bank Risk

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
			5BAC				3BAC	
	RR	ABI	Liq	FX	RR	ABI	Liq	FX
l.MP	0.452	1.219*	-0.174	0.033	0.225	0.773	0.408	1.070
	(0.321)	(0.712)	(1.012)	(1.282)	(0.263)	(0.505)	(0.831)	(1.144)
l.Conc*MP	-0.006	-0.018*	0.005	-0.003	-0.003	-0.016*	-0.004	-0.022
	(0.004)	(0.010)	(0.014)	(0.018)	(0.004)	(0.008)	(0.013)	(0.021)
l.Conc	0.006	0.007	0.005	0.006	0.007	0.009	0.007	0.008
	(0.017)	(0.017)	(0.018)	(0.017)	(0.012)	(0.012)	(0.013)	(0.012)
Observations	1,607	1,607	1,607	1,607	1,823	1,823	1,823	1,823
R-squared	0.104	0.106	0.104	0.104	0.081	0.084	0.081	0.083
No. of Countries	119	119	119	119	123	123	123	123
Finc Con.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

*Notes: See Table A1 Appendix 1 for definition of variables. The dependent variable in the regressions is the Bank Z Score. All the estimates have been carried out using the fixed-effects regressions. Robust standard errors are given in parenthesis. In all panels, the standard errors are robust to heteroskedasticity and are clustered at the country level. ***, ** and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.*

Table 7: Effect of Capital Based Instruments with Institutions on Bank Risk

VARIABLES	(1) ICRG	(2) RQ
l.Cap	-2.799**	0.191
	(0.018)	(0.013)
l.Inst*Cap	0.042**	0.401**
	(0.017)	(0.194)
l.Inst	0.008	-1.018
	(0.046)	(0.819)
Observations	1,990	2,073
R-squared	0.066	0.090
No. of Countries	105	127
Finc Con.	Yes	Yes
Year FE	Yes	Yes
Country FE	Yes	Yes

*Notes: See Table A1 Appendix 1 for definition of variables. The dependent variable in the regressions is the Bank Z Score. All the estimates have been carried out using the fixed-effects regressions. Robust standard errors are given in parenthesis. In all panels, the standard errors are robust to heteroskedasticity and are clustered at the country level. ***, ** and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively*.

Table 8: Effect of Macroprudential Policies with Institutions on Bank Risk

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	ICRG				RQ			
	RR	ABI	Liq	FX	RR	ABI	Liq	FX
l.MP	0.533	0.153	-4.941***	0.498	0.037	0.083	-0.153	-0.280
	(0.844)	(1.053)	(1.788)	(1.929)	(0.070)	(0.225)	(0.267)	(0.272)
l.Inst*MP	-0.007	-0.006	0.067***	-0.010	0.001	-0.293	0.724**	-0.087
	(0.012)	(0.014)	(0.024)	(0.031)	(0.136)	(0.216)	(0.323)	(0.288)
l.Inst	0.012	0.014	0.010	0.013	-0.814	-0.791	-0.922	-0.814
	(0.047)	(0.047)	(0.047)	(0.046)	(0.817)	(0.805)	(0.816)	(0.818)
Observations	1,990	1,990	1,990	1,990	2,073	2,073	2,073	2,073
R-squared	0.063	0.064	0.065	0.063	0.083	0.084	0.087	0.084
No. of Countries	105	105	105	105	127	127	127	127
Finc Con.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

*Notes: See Table A1 Appendix 1 for definition of variables. The dependent variable in the regressions is the Bank Z Score. All the estimates have been carried out using the fixed-effects regressions. Robust standard errors are given in parenthesis. In all panels, the standard errors are robust to heteroskedasticity and are clustered at the country level. ***, ** and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.*

Table 9: Effect of Capital Based Instruments with Board Reform on Bank Risk

	(1)
l.Cap	1.584*
	-0.899
l.Ref	-0.541
	-0.981
l.Ref*Cap	-0.921
	-0.888
Observations	647
No. of Countries	36
R-squared	0.15
Finc Con.	Yes
Year FE	Yes
Country FE	Yes

*Notes: See Table A1 Appendix 1 for definition of variables. The dependent variable in the regressions is the Bank Z Score. All the estimates have been carried out using the fixed-effects regressions. Robust standard errors are given in parenthesis. In all panels, the standard errors are robust to heteroskedasticity and are clustered at the country level. ***, ** and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively*.

Table 10: Effect of Macroprudential Policies with Board Reform on Bank Risk

VARIABLES	(1) RR	(2) ABI	(3) Liq	(4) FX
l.MP	0.118	-1.390*	0.188	-2.820**
	(0.259)	(0.766)	(0.813)	(1.069)
l.Ref	-0.490	-0.474	-0.480	-0.604
	(0.982)	(0.969)	(0.987)	(0.983)
l.Ref*MP	0.105	1.007	-0.240	2.989**
	(0.173)	(0.803)	(0.831)	(1.168)
Observations	647	647	647	647
R-squared	0.141	0.146	0.139	0.144
No. of Countries	36	36	36	36
Finc Con.	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes

*Notes: See Table A1 Appendix 1 for definition of variables. The dependent variable in the regressions is the Bank Z Score. All the estimates have been carried out using the fixed-effects regressions. Robust standard errors are given in parenthesis. In all panels, the standard errors are robust to heteroskedasticity and are clustered at the country level. ***, ** and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.*

Table 11: Effect of Asymmetric Macroprudential Policies on Bank Risk

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
VARIABLES	posCap	posRR	posABI	posLiq	posFX	negRR	negABI	negCap	negLiq	negFX
l.MP	0.790***	-0.07	-0.12	0.338	-0.368	0.041	0.777*	-1.075**	0.969	1.053
	-0.287	-0.261	-0.283	-0.339	-0.364	-0.332	-0.417	-0.487	-0.777	-0.701
Observations	2,379	2,379	2,379	2,379	2,379	2,379	2,379	2,379	2,379	2,379
R-squared	0.064	0.061	0.061	0.062	0.062	0.061	0.062	0.062	0.062	0.062
Number of CCN	127	127	127	127	127	127	127	127	127	127
Finc Con.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

*Notes: See Table A1 Appendix 1 for definition of variables. The dependent variable in the regressions is the Bank Z Score. All the estimates have been carried out using the fixed-effects regressions. Robust standard errors are given in parenthesis. In all panels, the standard errors are robust to heteroskedasticity and are clustered at the country level. ***, ** and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.*

Table 12: Effect of Asymmetric Macroprudential Policies with Competition on Bank Risk

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
VARIABLES	Lerner					Boone				
	posCap	posLiq	posRR	posABI	posFX	posCap	posLiq	posRR	posABI	posFX
l.MP	2.181*	-0.985	0.411	-1.408	-0.771	0.291	-0.247	-0.147	-0.296	-0.424
	(1.254)	(1.087)	(0.649)	(0.918)	(1.067)	(0.282)	(0.386)	(0.289)	(0.281)	(0.293)
l.Comp	2.711	2.491	2.920	2.447	2.498	0.019***	0.028***	0.028***	0.028***	0.028***
	(1.678)	(1.668)	(1.949)	(1.675)	(1.638)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
l.Comp*MP	-4.353	3.958	-2.569	3.383	1.411	-0.164***	-0.006	0.103	-0.284	-0.372
	(3.298)	(3.907)	(2.149)	(2.307)	(2.806)	(0.019)	(0.714)	(0.132)	(0.317)	(0.627)
Observations	1,842	1,842	1,842	1,842	1,842	1,775	1,775	1,775	1,775	1,775
R-squared	0.058	0.054	0.054	0.055	0.054	0.074	0.065	0.065	0.065	0.066
Number of CCN	115	115	115	115	115	122	122	122	122	122
Finc Con.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

*Notes: See Table A1 Appendix 1 for definition of variables. The dependent variable in the regressions is the Bank Z Score. All the estimates have been carried out using the fixed-effects regressions. Robust standard errors are given in parenthesis. In all panels, the standard errors are robust to heteroskedasticity and are clustered at the country level. ***, ** and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.*

VARIABLES	(11)	(12)	(13) Lerner	(14)	(15)	(16)	(17)	(18) Boone	(19)	(20)
	negCap	negRR	negABI	negLiq	negFX	negCap	negRR	negABI	negLiq	negFX
l.Comp	2.526	2.517	2.609	2.544	2.401	0.028***	0.025***	0.029***	0.028***	0.028***
	(1.643)	(1.679)	(1.681)	(1.657)	(1.617)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
l.MP	-3.225***	-0.111	1.971	2.289	-2.302*	-0.665	0.036	1.209**	0.672	0.364
	(0.774)	(0.906)	(1.905)	(2.211)	(1.307)	(0.474)	(0.253)	(0.476)	(0.788)	(0.710)
l.Comp*MP	8.817**	1.298	-3.168	-3.831	13.541*	5.648	-0.127***	-0.008	-2.050***	-10.406**
	(3.873)	(3.666)	(6.348)	(6.580)	(7.705)	(3.459)	(0.021)	(0.028)	(0.400)	(4.483)
Observations	1,842	1,842	1,842	1,842	1,842	1,775	1,775	1,775	1,775	1,775
R-squared	0.054	0.054	0.055	0.055	0.056	0.066	0.068	0.068	0.068	0.066
Number of CCN	115	115	115	115	115	122	122	122	122	122
Finc Con.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

*Notes: See Table A1 Appendix 1 for definition of variables. The dependent variable in the regressions is the Bank Z Score. All the estimates have been carried out using the fixed-effects regressions. Robust standard errors are given in parenthesis. In all panels, the standard errors are robust to heteroskedasticity and are clustered at the country level. ***, ** and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.*

Table 13: Effect of Asymmetric Macroprudential Policies with Concentration on Bank Risk

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
			5BAC					3BAC		
	posCap	posLiq	posFX	posRR	posABI	posCap	posLiq	posRR	posABI	posFX
l.MP	0.570	0.192	1.826	0.690	2.555**	0.618	0.913	-0.515	1.626**	1.748*
	(1.303)	(1.344)	(1.377)	(1.179)	(1.095)	(0.952)	(1.028)	(0.757)	(0.699)	(0.946)
l.Conc*MP	0.002	0.004	-0.028	-0.011	-0.034**	0.000	-0.007	0.008	-0.027**	-0.033*
	(0.016)	(0.017)	(0.021)	(0.016)	(0.016)	(0.014)	(0.016)	(0.013)	(0.012)	(0.018)
l.Conc	0.006	0.005	0.008	0.007	0.009	0.007	0.007	0.006	0.010	0.009
	(0.018)	(0.018)	(0.018)	(0.018)	(0.017)	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)
Observations	1,607	1,607	1,607	1,607	1,607	1,823	1,823	1,823	1,823	1,823
R-squared	0.108	0.106	0.105	0.104	0.106	0.084	0.082	0.081	0.083	0.084
Number of CCN	119	119	119	119	119	123	123	123	123	123
Finc Con.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

*Notes: See Table A1 Appendix 1 for definition of variables. The dependent variable in the regressions is the Bank Z Score. All the estimates have been carried out using the fixed-effects regressions. Robust standard errors are given in parenthesis. In all panels, the standard errors are robust to heteroskedasticity and are clustered at the country level. ***, ** and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively*.

VARIABLES	(11)	(12)	(13) 5BAC	(14)	(15)	(16)	(17)	(18) 3BAC	(19)	(20)
	negCap	negRR	negABI	negLiq	negFX	negCap	negRR	negABI	negLiq	negFX
l.Conc	0.006	0.005	0.006	0.005	0.007	0.007	0.007	0.007	0.006	0.006
	(0.017)	(0.018)	(0.018)	(0.017)	(0.018)	(0.012)	(0.012)	(0.012)	(0.011)	(0.012)
l.MP	2.086	-0.706	0.276	0.016	6.381***	0.717	-0.066	0.042	-1.455	0.385
	(1.691)	(1.297)	(1.923)	(2.984)	(2.279)	(1.143)	(1.133)	(1.595)	(3.315)	(2.959)
l.Conc*MP	-0.037	0.011	0.007	0.007	-0.077***	-0.023	0.003	0.018	0.039	0.009
	(0.023)	(0.017)	(0.025)	(0.045)	(0.028)	(0.015)	(0.018)	(0.027)	(0.058)	(0.050)
Observations	1,607	1,607	1,607	1,607	1,607	1,823	1,823	1,823	1,823	1,823
R-squared	0.105	0.104	0.105	0.104	0.105	0.082	0.081	0.084	0.083	0.082
Number of CCN	119	119	119	119	119	123	123	123	123	123
Finc Con.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

*Notes: See Table A1 Appendix 1 for definition of variables. The dependent variable in the regressions is the Bank Z Score. All the estimates have been carried out using the fixed-effects regressions. Robust standard errors are given in parenthesis. In all panels, the standard errors are robust to heteroskedasticity and are clustered at the country level. ***, ** and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.*

Table 14: Effect of Asymmetric Macroprudential Policies with Institutions on Bank Risk

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
			ICRG					RQ		
	posRR	posABI	posCap	posLiq	posFX	posRR	posABI	posCap	posLiq	posFX
l.MP	8.097***	-0.659	-5.582***	-4.890**	-0.579	-0.092	0.229	0.535	0.065	-0.304
	(2.745)	(2.054)	(1.946)	(1.960)	(1.958)	(0.237)	(0.302)	(0.351)	(0.332)	(0.284)
l.Inst*MP	-0.115***	0.004	0.084***	0.069**	0.005	-0.356	-0.542	0.573	0.795*	-0.094
	(0.039)	(0.029)	(0.027)	(0.027)	(0.032)	(0.399)	(0.347)	(0.368)	(0.408)	(0.326)
l.Inst	0.017	0.014	0.009	0.010	0.013	-0.801	-0.753	-0.995	-0.957	-0.814
Observations	1,990	1,990	1,990	1,990	1,990	2,073	2,073	2,073	2,073	2,073
R-squared	0.065	0.063	0.067	0.064	0.063	0.083	0.084	0.090	0.087	0.083
Number of CCN	105	105	105	105	105	127	127	127	127	127
Finc Con.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

*Notes: See Table A1 Appendix 1 for definition of variables. The dependent variable in the regressions is the Bank Z Score. All the estimates have been carried out using the fixed-effects regressions. Robust standard errors are given in parenthesis. In all panels, the standard errors are robust to heteroskedasticity and are clustered at the country level. ***, ** and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.*

VARIABLES	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
			ICRG					RQ		
	negRR	negABI	negCap	negLiq	negFX	negCap	negRR	negABI	negLiq	negFX
l.Inst	0.017	0.013	0.012	0.014	0.012	-0.832	-0.815	-0.791	-0.801	-0.823
	(0.047)	(0.046)	(0.047)	(0.047)	(0.047)	(0.815)	(0.818)	(0.827)	(0.820)	(0.817)
l.MP	6.010*	-3.900	-1.825	7.025	-7.740	-0.640	0.269	0.871	1.052	1.035
	(3.236)	(3.326)	(1.934)	(6.103)	(5.457)	(0.545)	(0.344)	(0.629)	(0.785)	(0.663)
l.Inst*MP	-0.082*	0.063	0.011	-0.084	0.127	-1.019*	-0.303	-0.510	-1.826*	0.691
	(0.047)	(0.042)	(0.022)	(0.082)	(0.091)	(0.550)	(0.417)	(0.475)	(0.931)	(0.689)
Observations	1,990	1,990	1,990	1,990	1,990	2,073	2,073	2,073	2,073	2,073
R-squared	0.064	0.064	0.063	0.064	0.064	0.084	0.083	0.084	0.085	0.084
No. of Countries	105	105	105	105	105	127	127	127	127	127
Finc Con.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

*Notes: See Table A1 Appendix 1 for definition of variables. The dependent variable in the regressions is the Bank Z Score. All the estimates have been carried out using the fixed-effects regressions. Robust standard errors are given in parenthesis. In all panels, the standard errors are robust to heteroskedasticity and are clustered at the country level. ***, ** and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.*

Table 15: Effect of Asymmetric Macroprudential Policies with Board Reform on Bank Risk

VARIABLES	(1) posCap	(2) posRR	(3) posABI	(4) posLiq	(5) posFX	(6) negCap	(7) negRR	(8) negABI	(9) negLiq	(10) negFX
l.MP	2.070*	3.238	-0.682	0.598	-2.805**	-0.908	0.043	3.263**	-0.198	0.054
	(1.057)	(2.731)	(0.526)	(0.541)	(1.058)	(0.897)	(1.031)	(1.349)	(0.814)	(0.431)
l.Ref	-0.526	-0.338	-0.450	-0.510	-0.609	-0.484	-0.465	-0.437	-0.494	-0.483
	(0.983)	(1.017)	(0.972)	(0.995)	(0.980)	(0.984)	(1.001)	(0.995)	(0.982)	(0.989)
l.Ref*MP	-1.188	-2.466	-0.175		3.059**	0.498	-0.227	-2.428	1.622	
	(1.072)	(3.016)	(0.632)		(1.271)	(1.178)	(0.918)	(1.582)	(2.757)	
Observations	647	647	647	647	647	647	647	647	647	647
R-squared	0.146	0.150	0.145	0.140	0.144	0.139	0.139	0.147	0.140	0.139
No. of Countries	36	36	36	36	36	36	36	36	36	36
Finc Con.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

*Notes: See Table A1 Appendix 1 for definition of variables. The dependent variable in the regressions is the Bank Z Score. All the estimates have been carried out using the fixed-effects regressions. Robust standard errors are given in parenthesis. In all panels, the standard errors are robust to heteroskedasticity and are clustered at the country level. ***, ** and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.*

Table 16: Effect of Monthly Asymmetric Macroprudential Policies on Bank Risk

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
VARIABLES	posCap	posRR	posABI	posLiq	posFX	negRR	negABI	negCap	negLiq	negFX
l.MP	0.790***	-0.070	-0.120	0.338	-0.368	0.091	0.741**	-0.741	0.895	1.176**
	(0.287)	(0.261)	(0.283)	(0.339)	(0.364)	(0.258)	(0.361)	(0.543)	(0.751)	(0.575)
Observations	2,379	2,379	2,379	2,379	2,379	2,379	2,379	2,379	2,379	2,379
R-squared	0.064	0.061	0.061	0.062	0.062	0.061	0.062	0.062	0.062	0.063
No. of Countries	127	127	127	127	127	127	127	127	127	127
Finc Con.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

*Notes: See Tables B1 and B2 in Appendix B for definition of variables. The dependent variable in the regressions is the Bank Z Score. All the estimates have been carried out using the fixed-effects regressions. Robust standard errors are given in parenthesis. In all panels, the standard errors are robust to heteroskedasticity and are clustered at the country level. ***, ** and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. The financial and economic controls from Tables 1 and 2 were included in the regressions but are excluded from this table.*

Table 17: Effect of Monthly Asymmetric Macroprudential Policies with Competition on Bank Risk

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Lerner					Boone				
	posCap	posLiq	posRR	posABI	posFX	posCap	posLiq	posRR	posABI	posFX
l.MP	2.181*	-0.985	0.411	-1.408	-0.771	0.291	-0.247	-0.147	-0.296	-0.424
	(1.254)	(1.087)	(0.649)	(0.918)	(1.067)	(0.282)	(0.386)	(0.289)	(0.281)	(0.293)
l.Comp	2.711	2.491	2.920	2.447	2.498	0.019***	0.028***	0.028***	0.028***	0.028***
	(1.678)	(1.668)	(1.949)	(1.675)	(1.638)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
l.Comp*MP	-4.353	3.958	-2.569	3.383	1.411	-0.164***	-0.006	0.103	-0.284	-0.372
	(3.298)	(3.907)	(2.149)	(2.307)	(2.806)	(0.019)	(0.714)	(0.132)	(0.317)	(0.627)
Observations	1,842	1,842	1,842	1,842	1,842	1,775	1,775	1,775	1,775	1,775
R-squared	0.058	0.054	0.054	0.055	0.054	0.074	0.065	0.065	0.065	0.066
Number of CCN	115	115	115	115	115	122	122	122	122	122
Finc Con.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

*Notes: See Table A1 Appendix 1 for definition of variables. The dependent variable in the regressions is the Bank Z Score. All the estimates have been carried out using the fixed-effects regressions. Robust standard errors are given in parenthesis. In all panels, the standard errors are robust to heteroskedasticity and are clustered at the country level. ***, ** and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.*

VARIABLES	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
			Lerner					Boone		
	negCap	negRR	negABI	negLiq	negFX	negCap	negRR	negABI	negLiq	negFX
l.Comp	2.528	2.509	2.617	2.544	2.403	0.028***	0.025***	0.029***	0.028***	0.028***
	(1.645)	(1.667)	(1.689)	(1.657)	(1.617)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
l.MP	-2.848***	-0.077	2.258	2.289	-1.068	-0.437	0.106	1.026***	0.672	0.622
	(0.745)	(0.444)	(1.832)	(2.211)	(1.486)	(0.508)	(0.233)	(0.380)	(0.788)	(0.789)
l.Comp*MP	8.560**	0.802	-4.699	-3.831	8.993	4.644	-0.127***	-0.011	-2.050***	-1.933***
	(3.683)	(1.563)	(6.166)	(6.580)	(7.054)	(3.845)	(0.021)	(0.028)	(0.400)	(0.336)
Observations	1,842	1,842	1,842	1,842	1,842	1,775	1,775	1,775	1,775	1,775
R-squared	0.054	0.054	0.055	0.055	0.056	0.066	0.068	0.068	0.068	0.067
Number of CCN	115	115	115	115	115	122	122	122	122	122
Finc Con.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

*Notes: See Table A1 Appendix 1 for definition of variables. The dependent variable in the regressions is the Bank Z Score. All the estimates have been carried out using the fixed-effects regressions. Robust standard errors are given in parenthesis. In all panels, the standard errors are robust to heteroskedasticity and are clustered at the country level. ***, ** and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.*

Table 18: Effect of Monthly Asymmetric Macroprudential Policies with Concentration on Bank Risk

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	5BAC					3BAC				
	posCap	posLiq	posRR	`posABI	posFX	posCap	posLiq	posRR	posABI	posFX
l.MP	0.570	0.192	0.690	2.555**	1.826	0.618	0.913	-0.515	1.626**	1.748*
	(1.303)	(1.344)	(1.179)	(1.095)	(1.377)	(0.952)	(1.028)	(0.757)	(0.699)	(0.946)
l.Conc*MP	0.002	0.004	-0.011	-0.034**	-0.028	0.000	-0.007	0.008	-0.027**	-0.033*
	(0.016)	(0.017)	(0.016)	(0.016)	(0.021)	(0.014)	(0.016)	(0.013)	(0.012)	(0.018)
l.Conc	0.006	0.005	0.007	0.009	0.008	0.007	0.007	0.006	0.010	0.009
	(0.018)	(0.018)	(0.018)	(0.017)	(0.018)	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)
Observations	1,607	1,607	1,607	1,607	1,607	1,823	1,823	1,823	1,823	1,823
R-squared	0.108	0.106	0.104	0.106	0.105	0.084	0.082	0.081	0.083	0.084
Number of CCN	119	119	119	119	119	123	123	123	123	123
Finc Con.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

*Notes: See Table A1 Appendix 1 for definition of variables. The dependent variable in the regressions is the Bank Z Score. All the estimates have been carried out using the fixed-effects regressions. Robust standard errors are given in parenthesis. In all panels, the standard errors are robust to heteroskedasticity and are clustered at the country level. ***, ** and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.*

VARIABLES	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
			5 BAC					3BAC		
	negCap	negRR	negABI	negLiq	negFX	negCap	negRR	negABI	negLiq	negFX
l.Conc	0.006	0.005	0.006	0.005	0.007	0.007	0.006	0.007	0.006	0.006
	(0.017)	(0.018)	(0.018)	(0.017)	(0.018)	(0.012)	(0.012)	(0.012)	(0.011)	(0.012)
l.MP	1.525	-0.404	0.525	-0.749	4.892***	0.667	-0.408	-0.001	-1.856	0.779
	(2.036)	(0.410)	(1.616)	(2.771)	(1.649)	(1.325)	(0.477)	(1.333)	(2.982)	(2.553)
l.Conc*MP	-0.028	0.005	0.003	0.016	-0.054**	-0.020	0.007	0.018	0.044	0.007
	(0.026)	(0.006)	(0.022)	(0.043)	(0.023)	(0.018)	(0.009)	(0.024)	(0.054)	(0.044)
Observations	1,607	1,607	1,607	1,607	1,607	1,823	1,823	1,823	1,823	1,823
R-squared	0.104	0.104	0.105	0.104	0.106	0.081	0.081	0.084	0.083	0.083
Number of CCN	119	119	119	119	119	123	123	123	123	123
Finc Con.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

*Notes: See Table A1 Appendix 1 for definition of variables. The dependent variable in the regressions is the Bank Z Score. All the estimates have been carried out using the fixed-effects regressions. Robust standard errors are given in parenthesis. In all panels, the standard errors are robust to heteroskedasticity and are clustered at the country level. ***, ** and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.*

Table 19: Effect of Monthly Asymmetric Macroprudential Policies with Institutions on Bank Risk

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
			ICRG					RQ		
	posRR	posABI	posCap	posLiq	posFX	posRR	posABI	posCap	posLiq	posFX
l.MP	8.097***	-0.659	-5.582***	-4.890**	-0.579	-0.092	0.229	0.535	0.065	-0.304
	(2.745)	(2.054)	(1.946)	(1.960)	(1.958)	(0.237)	(0.302)	(0.351)	(0.332)	(0.284)
l.Inst*MP	-0.115***	0.004	0.084***	0.069**	0.005	-0.356	-0.542	0.573	0.795*	-0.094
	(0.039)	(0.029)	(0.027)	(0.027)	(0.032)	(0.399)	(0.347)	(0.368)	(0.408)	(0.326)
l.Inst	0.017	0.014	0.009	0.010	0.013	-0.801	-0.753	-0.995	-0.957	-0.814
	(0.046)	(0.047)	(0.046)	(0.047)	(0.046)	(0.819)	(0.812)	(0.820)	(0.820)	(0.818)
Observations	1,990	1,990	1,990	1,990	1,990	2,073	2,073	2,073	2,073	2,073
R-squared	0.065	0.063	0.067	0.064	0.063	0.083	0.084	0.090	0.087	0.083
Number of CCN	105	105	105	105	105	127	127	127	127	127
Finc Con.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

*Notes: See Table A1 Appendix 1 for definition of variables. The dependent variable in the regressions is the Bank Z Score. All the estimates have been carried out using the fixed-effects regressions. Robust standard errors are given in parenthesis. In all panels, the standard errors are robust to heteroskedasticity and are clustered at the country level. ***, ** and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively*.

VARIABLES	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
			ICRG					RQ		
	negRR	negABI	negCap	negLiq	negFX	negCap	negRR	negABI	negLiq	negFX
l.Inst	0.016	0.013	0.012	0.014	0.013	-0.832	-0.804	-0.788	-0.799	-0.816
	(0.047)	(0.046)	(0.047)	(0.047)	(0.047)	(0.816)	(0.819)	(0.830)	(0.820)	(0.818)
l.MP	2.439	-2.552	-1.066	7.048	-2.432	-0.421	0.089	0.743*	0.929	1.071**
	(1.651)	(2.962)	(2.241)	(6.049)	(4.384)	(0.559)	(0.165)	(0.437)	(0.766)	(0.526)
l.Inst*MP	-0.033	0.045	0.006	-0.085	0.050	-0.963	-0.300	-0.431	-1.721*	0.083
	(0.024)	(0.037)	(0.026)	(0.081)	(0.069)	(0.609)	(0.236)	(0.365)	(0.920)	(0.567)
Observations	1,990	1,990	1,990	1,990	1,990	2,073	2,073	2,073	2,073	2,073
R-squared	0.064	0.065	0.063	0.064	0.064	0.084	0.083	0.084	0.085	0.084
Number of CCN	105	105	105	105	105	127	127	127	127	127
Finc Con.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

*Notes: See Table A1 Appendix 1 for definition of variables. The dependent variable in the regressions is the Bank Z Score. All the estimates have been carried out using the fixed-effects regressions. Robust standard errors are given in parenthesis. In all panels, the standard errors are robust to heteroskedasticity and are clustered at the country level. ***, ** and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively*.

Table 20: Effect of Monthly Asymmetric Macroprudential Policies with Board Reform on Bank Risk

VARIABLES	(1) posCap	(2) posRR	(3) posABI	(4) posLiq	(5) posFX	(6) negCap	(7) negRR	(8) negABI	(9) negLiq	(10) negFX
l.MP	2.070*	3.238	-0.682	0.598	-2.805**	-0.877	0.260	3.271**	-0.195	0.064
	(1.057)	(2.731)	(0.526)	(0.541)	(1.058)	(0.899)	(0.602)	(1.349)	(0.818)	(0.478)
l.Ref	-0.526	-0.338	-0.450	-0.510	-0.609	-0.485	-0.465	-0.421	-0.491	-0.484
	(0.983)	(1.017)	(0.972)	(0.995)	(0.980)	(0.985)	(0.999)	(0.993)	(0.982)	(0.990)
l.Ref*MP	-1.188	-2.466	-0.175		3.059**	1.047	-0.096	-2.663*	1.161	
	(1.072)	(3.016)	(0.632)		(1.271)	(1.117)	(0.473)	(1.482)	(2.528)	
Observations	647	647	647	647	647	647	647	647	647	647
R-squared	0.146	0.150	0.145	0.140	0.144	0.139	0.140	0.147	0.140	0.139
No. of Countries	36	36	36	36	36	36	36	36	36	36
Finc Con.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

*Notes: See Table A1 Appendix 1 for definition of variables. The dependent variable in the regressions is the Bank Z Score. All the estimates have been carried out using the fixed-effects regressions. Robust standard errors are given in parenthesis. In all panels, the standard errors are robust to heteroskedasticity and are clustered at the country level. ***, ** and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively..*

Table 21: Effect of Macroprudential Policies on Crises

VARIABLES	(1) CBI	(2) RR	(3) ABI	(4) Liq	(5) FX
l.MP	-0.195	-0.058	0.014	-2.922***	0.394
	(0.403)	(0.142)	(0.295)	(1.046)	(0.601)
l.DepGDP	0.001	0.001	0.001	0.001	0.001
	(0.005)	(0.005)	(0.005)	(0.006)	(0.005)
l.CredDep	0.006***	0.006***	0.006***	0.006***	0.006***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
l.CostInc	0.024***	0.024***	0.024***	0.025***	0.024***
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
l.lnGDPPC	0.121	0.118	0.122	0.128	0.120
	(0.140)	(0.139)	(0.139)	(0.136)	(0.139)
l.Inflation	0.000	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
l.CredGDP	0.008*	0.008*	0.008	0.009	0.008*
	(0.005)	(0.005)	(0.005)	(0.006)	(0.005)
Observations	952	952	952	952	952
Year FE	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes

*Notes: See Table A1 Appendix 1 for definition of variables. The dependent variable in the regressions is the Bank Z Score. All the estimates have been carried out using the fixed-effects regressions. Robust standard errors are given in parenthesis. In all panels, the standard errors are robust to heteroskedasticity and are clustered at the country level. ***, ** and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. We use the logit regression method for this regression.*

Table 22: Effect of Macroprudential Policies with Competition on Crises

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
			Lerner					Boone		
	CBI	RR	ABI	Liq	FX	RR	CBI	ABI	Liq	FX
l.MP	0.914	0.120	0.941	-2.160	0.893	-0.120	-0.270	-0.216	-0.868	0.814
	(0.738)	(0.361)	(0.623)	(1.759)	(0.954)	(0.212)	(0.430)	(0.309)	(0.539)	(0.862)
l.Comp	-1.270	-0.899	-1.303	-1.541	-1.406	-0.010	-0.010	-0.010	-0.011	-0.010
	(1.352)	(1.830)	(1.408)	(1.346)	(1.314)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)
l.CompMP	-5.148	-0.683	-3.393	-3.926	-1.614	-0.235	1.251***	-5.645***	16.884***	0.376
	(3.495)	(1.148)	(2.694)	(4.199)	(3.798)	(1.177)	(0.389)	(2.074)	(2.972)	(0.459)
Observations	832	832	832	832	832	730	730	730	730	730
Finc Con.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

*Notes: See Table A1 Appendix 1 for definition of variables. The dependent variable in the regressions is the Bank Z Score. All the estimates have been carried out using the fixed-effects regressions. Robust standard errors are given in parenthesis. In all panels, the standard errors are robust to heteroskedasticity and are clustered at the country level. ***, ** and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. We use the logit regression method for this regression*.

Table 23: Effect of Macroprudential Policies with Concentration on Crises

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
			5BAC					3BAC		
	CBI	RR	ABI	Liq	FX	Cap	RR	ABI	Liq	FX
l.MP	-1.750	-0.501	0.375	27.178***	-12.429**	-1.670	-0.202	0.422	-0.483	-5.879**
	(1.379)	(1.029)	(2.100)	(5.339)	(4.920)	(1.131)	(0.478)	(1.493)	(2.217)	(2.365)
l.ConcMP	0.019	0.005	0.001	-0.405***	0.177***	0.020	0.002	0.001	-0.062**	0.112***
	(0.017)	(0.015)	(0.023)	(0.076)	(0.067)	(0.015)	(0.009)	(0.019)	(0.030)	(0.041)
l.Conc	-0.039***	-0.038***	-0.036***	-0.045***	-0.044***	-0.038***	-0.036***	-0.036***	-0.042***	-0.042***
	(0.014)	(0.015)	(0.014)	(0.014)	(0.013)	(0.012)	(0.012)	(0.012)	(0.011)	(0.011)
Observations	536	536	536	536	536	607	607	607	607	607
Finc Con.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

*Notes: See Table A1 Appendix 1 for definition of variables. The dependent variable in the regressions is the Bank Z Score. All the estimates have been carried out using the fixed-effects regressions. Robust standard errors are given in parenthesis. In all panels, the standard errors are robust to heteroskedasticity and are clustered at the country level. ***, ** and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. We use the logit regression method for this regression*.

Table 24: Effect of Macroprudential Policies with Institutions on Crises

VARIABLES	(1)	(2)	(3) ICRG	(4)	(5)	(6)	(7)	(8) RQ	(9)	(10)
	CBI	RR	ABI	Liq	FX	CBI	RR	ABI	Liq	FX
l.MP	-5.480**	0.227	3.712	-8.313	3.548	-0.876	-0.170	-0.607	-3.664***	0.701
	(2.708)	(1.785)	(3.316)	(7.213)	(8.213)	(0.741)	(0.242)	(0.584)	(0.960)	(0.754)
l.InstMP	0.067**	-0.004	-0.048	0.072	-0.042	0.525	0.415	0.591*	1.551	-0.561
	(0.032)	(0.025)	(0.044)	(0.091)	(0.108)	(0.469)	(0.981)	(0.311)	(1.081)	(1.244)
l.Inst	-0.028	-0.028	-0.026	-0.030	-0.029	-0.986**	-0.954**	-1.034**	-0.994**	-0.866*
	(0.032)	(0.032)	(0.032)	(0.034)	(0.032)	(0.483)	(0.473)	(0.492)	(0.501)	(0.474)
Observations	804	804	804	804	804	658	658	658	658	658
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

*Notes: See Table A1 Appendix 1 for definition of variables. The dependent variable in the regressions is the Bank Z Score. All the estimates have been carried out using the fixed-effects regressions. Robust standard errors are given in parenthesis. In all panels, the standard errors are robust to heteroskedasticity and are clustered at the country level. ***, ** and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. We use the logit regression method for this regression.*

Appendices

Appendix 1: Definition of variables

Table A1: Measures, their definitions and sources

Measure	Definition and source
Countercyclical Capital Buffers (CCB)	A requirement for banks to maintain a countercyclical capital buffer. Implementations at 0% are not considered as a tightening. **Source** – IMF's IMaPP Index
Conservation	Requirements for banks to maintain a capital conservation, including those established under BASEL III. **Source** – IMF's IMaPP Index
Capital Requirements (Cap)	Capital requirements for banks, including risk weights, systemic risk and minimum capital requirements. This does not include conservation nor CCB, as they are done on their own above. **Source** – IMF's IMaPP Index
Leverage Limits (Lev)	Limits on banks leverage, using the ratio of capital to non-risk weighted assets. **Source** – IMF's IMaPP Index
Limits on Credit Growth (LCG)	Limits on foreign currency lending, including rules and recommendations on such lending. **Source** – IMF's IMaPP Index
Limits on the loan to value ratio (LTV)	Limits on the loan to value ratio, including those on housing, automobiles and commercial real estate. **Source** – IMF's IMaPP Index
Limits on the debt service to income ratio (DSTI)	Limits to the debt service to income ratio and the loan to income ratio. This is specific to those that limit the size of debt services or debt to income ratios.

	Source – IMF's IMaPP Index
Liquidity Requirements (Liq)	Measures taken to mitigate liquidity and funding risks. **Source** – IMF's IMaPP Index
Limits to the loan to deposit (LTD)	Limits and penalties for high loan to deposit ratios. **Source** – IMF's IMaPP Index
Limits on Foreign Exchange Positions (LFX)	Limits on foreign exchange positions, exposures and mismatches. **Source** – IMF's IMaPP Index
Reserve Requirements (RR)	Reserve Requirements aimed for macroprudential purposes. This may include those aimed for monetary policy, due to difficulties in distinguishing between the two. **Source** – IMF's IMaPP Index
Significantly Important Financial Institutions (SIFI)	Measures taken to mitigate risks from significantly important financial institutions. This was introduced in BASEL III (Altunbas et al., 2018). **Source** – IMF's IMaPP Index
Boone Indicator	Measure of competition by looking at elasticities. Higher levels indicate lower levels of competition. **Source: World Bank's Financial Development Index.**
Lerner Index	Measure of competition comparing price and marginal cost, where higher levels indicate lower levels of competition. **Source: World Bank's Financial Development Index.**
DepGDP	Deposits to GDP Ratio. **Source: World Bank's Financial Development Index.**
CredGDP	Credit to GDP Ratio. **Source: World Bank's Financial Development Index.**
CostInc	Cost to Income ratio, used to measure profitability. **Source: World Bank's Financial Development Index.**
lnGDPPC	Natural log of GDP per capita. **Source: World Bank's Financial Development Index.**

Inflation	Inflation. **Source: World Bank's Financial Development Index.**
CredDep	Credit to GDP ratio. **Source: World Bank's Financial Development Index.**
Reform	Binary indicator that a board reform has occurred. **Source: (Hu et al., 2020)**
5BAC	Measure of concentration using the proportion of the largest 5 Banks' assets over the banking sector's assets. **Source: World Bank's Financial Development Index.**
3BAC	Measure concentration derived from the proportion of the 3 largest banks assets compared to the banking sector's assets. **Source: World Bank's Financial Development Index.**
ICRG	Riskiness measure looking at political and economic risk. **Source: ICRG Database.**
RQ	Measure of Regulatory Quality **Source: World Bank's Financial Development Index**
Bank Z-Score	Countrywide Z-Score with formula shown below. Derived from banking data. $$Country\ Z-Score = \frac{\frac{\sum Net\ Income}{\sum Total\ Assets} + \frac{\sum Total\ Equity}{\sum Total\ Assets}}{\sigma(\sum \llbracket Net\ Income \rrbracket)/(\sum Total\ Assets)}$$ **Source: World Bank's Financial Development Index.**
Crises	Binary dataset indicating whether a systemic banking crisis. **Source: (Laeven & Valencia, 2018).**