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Heterogeneous effects of the implementation of macroprudential policies on bank risk

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Abstract

In this article, we analyze the effect of a set of 12 macroprudential policies on the risk-taking of banks using a large number of countries and banks. Our empirical results show that, although on average these policies reduce risk-taking, the effects are quite heterogeneous and vary considerably depending on the instrument implemented, market concentration, size of banks, liquidity, leverage and different levels of risk. Structural policies, such as limits on asset concentration and interbank exposures, are the most effective in terms of financial stability. Borrower based policies, such as loan-to-value and debt-to-income ratios, also have a positive effect on stability. Concentration limits tend to be more effective for larger and more leveraged banks, while loan-to-value and debt-to-income ratios are more effective in concentrated markets. We also show that there seems to be a greater effect through the leverage channel for policies that are most effective in reducing risk-taking.

Keywords: financial stability, macroprudential policies, bank regulation
JEL classification: G21, G28, L10

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1. Introduction

The financial crisis of 2008/2009 demonstrated that the microprudential approach was insufficient to regulate financial systems since it did not take systemic risk into account. Over the last few years, a series of macroprudential policies focus on limiting risk-taking, especially for the larger and more interconnected banks that could generate systemic risk. However, there is a gap in the literature because we know very little about the effects of these macroprudential policies on risk-taking and the behavior of banks in general.

In this article we contribute to the literature by analyzing the effect of macroprudential policies on bank risk-taking, using a large number of countries and banks. Our results show that the effects are quite heterogeneous and vary considerably depending on the instruments implemented, bank characteristics and market structures. However, the empirical results suggest that specific macroprudential measures are effective in reducing risk-taking of the more significant and more essential banks in each country's banking system.

Another contribution was to analyze a large number of macroprudential policies and to compare the effects of the adoption of each of them on bank risk-taking. Our empirical results show that although on average, the effects reduce the risk-taking, the impact of the measures varies substantially. Structural policies, such as limits on asset concentration and interbank exposures, are the most effective in terms of stability. Borrower based policies, such as loan-to-value and debt-to-income ratios, also have a positive effect on stability. Concentration limits tend to be more effective for bigger and more leveraged banks, while loan-to-value and debt-to-income ratios are more effective in concentrated markets. All structural and borrower-based policies appear to be less effective for more stable banks, while capital based policies, such as countercyclical capital requirements, capital surcharges on systematically essential banks, dynamic loan-loss provisions, and leverage ratios, have mixed effects.

Asset-based policies, such as limits on domestic and foreign currency loans and reserve requirements, are the least effective, especially for riskier banks. While reserve requirements produce positive effects on stability when interacted with size, liquidity, and leverage, limits on domestic and foreign currency loans have adverse effects on stability, especially for riskier banks.

We also study which channels explain the effect of macroprudential policies on risk-taking. By decomposing the risk-taking measure (Z-score), we detect a more considerable effect through the

leverage channel in most cases where macroprudential policies were effective in reducing systemic risk or risk-taking. Thus, macroprudential policies limit bank leverage, reducing their exposure to risk.

Our final contribution concerns the approach used to identify the causal relationship between the adoption of macroprudential policies and the effects on risk-taking. Our approach relies on nearest neighbor matching using propensity scores before estimating a system-GMM method to account for the selection bias on the implementation of each policy and the presence of temporal persistence in the Z-score measure. For each country that implemented the policy (treated), we used propensity score matching to include a non-treated country using variables related to bank characteristics and macroeconomic and institutional factors.

In assessing the effects of these macroprudential policies on bank risk-taking, this article relates to recent literature, such as Bruno et al. (2017), Cerutti et al. (2017a), Akinci and Olmstead-Rumsey (2018) and Altunbas et al. (2018). Our results corroborate the results for countries with diverse institutional sets and financial markets, highlighting the main measures taken to mitigate risk for most vulnerable banks.

We particularly study the effects of the implementation of a set of 12 MPs on the risk-taking of banks of several countries and measure the heterogeneity of the effects under different prisms: concentration, size of banks, liquidity, leverage and different levels of risk. In addition to this primary objective, we also seek to measure how the effect of the implementation of regulatory instruments changes for different market structures and characteristics of the banking system especially about variables such as concentration, size of banks, liquidity, and leverage. We evaluate which regulatory instruments are most effective for banks with excessive risk-taking. We also break down the impact of MPs on risk-taking, in order to determine whether the effects of such policies are due to an increase in bank returns or to a decrease in the volatility of these returns. We propose a proper identification approach in order to measure the effects of the implementation of MPs from cross-country data.

To carry out this study, we used a comprehensive accounting database of more than 15,000 banks in 45 different emerging and developed countries, with data ranging between 1995 and 2014. These data, obtained from the BankScope database (BVD-IBCA), contain all the information needed to calculate concentration measures, liquidity, and financial stability, in addition to the

accounting characteristics of the banks. The macroprudential policy database, developed by Cerutti et al. (2017a) and built from the Global Macroprudential Policy Instruments (GMPI) survey conducted during 2013/2014 and 2016/2017, was also used, as well as cross-country macroeconomic and institutional data, obtained from the World Bank and the Heritage Foundation.

To measure the effects of MPs on the financial stability of banks we used a risk measure called Z-score, which is a proxy for financial stability and is inversely proportional to the probability of bank failure. The measures of liquidity, leverage, and size of the banks, as well as the Herfindahl-Hirschman concentration index, were obtained through the accounting data. The use of these risk and concentration measures are common in the literature (Demirgüç-Kunt and Huizinga, 2010; Fazio et al., 2015; Tabak et al., 2012).

In order to estimate and identify the effects of the implementation of the MPs, we first perform a propensity score matching with the countries in our sample to account for possible selection bias of the implementation of each policy. Then we estimate a system-GMM model, as formulated in Arellano and Bover (1995) and Blundell and Bond (1998), since the bank risk variable (Z-score) is a measure that presents temporal persistence and whose lagged values are usually correlated with the fixed effect in panels with short T and long N (Arellano and Bond, 1991). Lastly, we perform the decomposition of the Z-score measure and add interactions to understand the mechanisms through which the MPs affect the risk-taking of banks.

We organize the remainder of the paper as follows. In Section 2 we present a brief literature review and discuss our contribution. Section 3 discusses macroprudential policies and their definitions. Section 5 presents an overview of the data used to perform our empirical exercise. Section 4 presents the methods and identification strategy. Section 6 presents and discusses empirical results and Section 7 concludes the paper.

2. Literature review

The global financial crisis of 2007-2008 rekindled the debate on how to regulate and supervise banks and other financial institutions to ensure financial stability. Macroprudential policies (MPs) regarding credit limits, capital reserves, and bank balance-sheet restrictions were part of the banking regulations discussed at Basel III (BIS, 2011). Both emerging and developed countries have adopted these policies to mitigate the risk of transmission in the banking system and the high costs

associated with adverse shocks to the real side of the economy (Borio, 2010; Claessens, 2015).

Before the global financial crisis (GFC), financial regulation of banks and other financial intermediaries was strongly focused on instruments aimed at reducing the risk of individual bankruptcy, not of the financial system as a whole. However, the bankruptcy of a large financial institution may jeopardize the solvency of the entire system (systemic risk). Tabak et al. (2016) found evidence that banking supervision is positively correlated with bank stability, thus contributing to mitigate systemic risk.

According to Freixas et al. (2015), microprudential regulation that focused solely on the solvency of financial institutions largely ignored the externalities of the financial sector and the real sector for the entire macroeconomic cycle and, therefore, was not able to respond to the aggregate dynamics of the interconnections of the banking system as a whole.

According to Brunnermeier et al. (2009), De Nicolo et al. (2012) and Cerutti et al. (2017a), the main sources of banking risk that justify the implementation of MPs are externalities that exist in the financial sector and market failures. These externalities can be associated with three essential factors: i) vulnerabilities that may arise due to strategic interaction of banks during a cycle of financial expansion; ii) deterioration of the accounting and collateral balance sheets due to a general fall in asset prices in periods of financial contraction cycles; and iii) the propagation of systemic shocks into the financial market due to its interconnectivity.

Therefore, a set of macroprudential policies was proposed to identify and minimize the risks to systemic stability. The need to infer the effectiveness of such policies is thus one of the critical challenges for policymakers and scholars. [1].

The works of Moreno (2011), Galati and Moessner (2013), Lim et al. (2011), Claessens et al. (2013), Claessens (2015) and Freixas et al. (2015) summarize the main policies implemented by both developing and developed countries, as well as their meanings and objectives towards mitigating systemic risk, arising from the procyclicality and interconnectivity between financial institutions.

In addition to this literature, whose objective was to present and describe the central macropru-

[1] In addition to the challenge of assessing the effectiveness of MPs, Altunbas et al. (2018) lists the challenge of understanding the nature and objectives of the different instruments and the challenge of dealing with systemic risk, which is generally endogenous.

dential policies, there is increasing literature regarding the impact of macroprudential regulation on the behavior of bank loans and financial stability. Here, one can separate this literature into three broad groups. The first group includes studies called cross-countries. In one of these studies, Lim et al. (2011) examined the links between macro-prudential policies and the development of the credit market, as well as bank leverage. They found evidence suggesting that policies limiting loan-to-value (LTV) and debt-to-income ratios (DTI), in addition to policies establishing capital reserve requirements and dynamic provisioning rules, are associated with reductions in credit and leverage procyclicality. Tabak et al. (2017) found positive effects of more significant capital reserves of banks on profitability, although these effects proved to be negative in cases where banks have excessive capital reserves.

Other cross-country studies include Claessens et al. (2013), who showed that the maximum limits of LTV, DTI and maximum limits for loans in foreign currency were effective in reducing the growth of bank leverage and asset prices; Zhang and Zoli (2016) who confirmed a high effect of the LTV measure in containing growth in property prices, credit, and bank leverage; Aiyar et al. (2014) and Gropp et al. (2018) who showed that in response to stricter capital requirements, regulated banks reduced borrowing, while unregulated banks even increased their amount borrowed; and lastly, Auer and Ongena (2016), who found that an additional capital requirement on real estate loans led to growth in the commercial lending channel.

In addition to this empirical evidence, Cerutti et al. (2017a), using an IMF survey of 12 MPs in 119 countries between 2000 and 2013, found that it was generally the emerging countries that most adopted such policies. Besides, policies such as DTI and LTV are associated with the decline in credit growth, especially real estate lending. The authors also confirmed that MPs help in managing the business cycle, but work less efficiently in recessive periods. Also noteworthy is the work of Jiménez et al. (2017), who investigated the impact of pro-cyclical banking regulation on lending to companies [2].

The second group of studies focuses on investigating the effect of one or a few MPs, but for specific countries. Among these studies we can highlight Igan and Kang (2011), who investigated the effectiveness of only the LTV and DTI instruments in South Korea. Wong et al. (2011) also

[2]Other cross-country studies investigating the effectiveness of a set of MPs are Akinci and Olmstead-Rumsey (2018), Aysan et al. (2015), Cizel et al. (2016), Crowe et al. (2013), Bruno et al. (2017) and Cerutti et al. (2017b).

used only LTV and DTI instruments, but investigated their effects on real estate credit and real estate prices in Hong Kong. Camors et al. (2014) investigated the effect of capital withdrawal in Uruguay in 2008, while Aiyar et al. (2014) confirmed a strong effect of capital requirement on loans for UK banks.

In line with our objective, Altunbas et al. (2018) investigated the effectiveness of MPs in mitigating the risk behavior of banks. Their evidence suggested that MPs have a significant impact on bank risk. Also, the authors also suggest that responses to changes in MPs differ between banks and are highly dependent on their specific characteristics. We contribute to this article by measuring the effectiveness of such policies on banks that are excessively risky, as well as develop an identification approach to deal with selection bias.

Among the main theoretical studies, we highlight Begenau (2016), who developed a general equilibrium model to analyze the effect of MPs on bank loans. Kashyap et al. (2014) presented a general equilibrium model and showed the effects of the capital requirement measure on bank risk. In this paper, the authors modify the Diamond and Dybvig (1983) bank run model. Lastly, Elenev et al. (2018) elaborated a macroeconomic model to estimate and evaluate how MPs impose restrictions on firms and bank leverage.

3. Macroprudential indicators

The database used to identify the adoption of macroprudential policies in different countries came from a survey of the International Monetary Fund (IMF) called the Global Macroprudential Policy Instruments (GMPI) conducted in 2013/2014 and 2016/2017. These data comprise a series of more than 100 detailed questions on the adoption of 17 different MPs that were answered by the central banks and monetary authorities of 140 IMF member countries. Cerutti et al. (2017a) used this survey and verified the consistency of the responses with an earlier version for 2011, in order to construct a database with binary indicators (dummy variables) on the use of 12 MPs between 2000 and 2013 for 120 different countries. Later, the authors updated the database to include observations from 2014 to 2017 and increased the list of countries to 160.

We combine the MPs database with banking and macroeconomic data for 1995 to 2000[3] for 45

[3]We need to use data for 1995 to 1999 for the calculation of the bank risk-taking measure known as Z -score, which

countries selected based on data availability[4].

The 12 MPs were classified as: (i) Countercyclical capital requirements (CTC); (ii) capital surcharges on systematically important banks (SIFI); (iii) Dynamic loan-loss provisions (DP); (iv) Leverage ratio (LEV); (v) Limits on domestic currency loans or credit growth limits (CG); (vi) Foreign and/or countercyclical reserve requirements (RR_REV); (vii) Limits on foreign currency loans (FC); (viii) Caps on loan-to-value ratio (LTV_CAP); (ix) Caps on debt-to-income ratio (DTI); (x) Concentration limits (CONC); (ix) Limits on interbank exposure (INTER); and (xii) Tax on financial institutions (TAX).

The instruments CTC, SIFI, DP, and LEV, rely on capital requirements, provisioning, and surcharges. The first case refers to countercyclical capital requirements, which aim to ensure that the capital requirements of the banking sector take into account the macroeconomic and financial environment in which banks operate. Thus, this instrument aims to protect the banking sector during periods of excess aggregate credit growth, which are usually associated with increased systemic risk. On the other hand, in periods of credit restriction, capital requirements may be lower, so as not to affect the performance of the real sector of the economy.

The second measure, SIFI, imposes a surcharge on the capital requirements for financial institutions that are considered systematically important. Therefore, the requirements are more significant for those banks that have greater importance in terms of systemic risk. This higher requirement makes it possible to minimize the probability of bankruptcy or liquidity problems associated with these banks[5].

The third measure, DP, is similar to CTC in terms of the dynamics of the operation of the instrument. However, it requires specific provisioning for defaults on loan agreements, allowing the creation of a financial reserve in periods of economic growth which can be used to cover defaults that occur in periods of recession[6]. The last capital-based measure is LEV, which prevents banks from exceeding a fixed minimum leverage ratio.

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will require a set of 5 initial annual observations. We discard these observations for the estimation of the final models, as described in section 4.

[4]We describe the steps to obtain our final sample, as well as the description of bank and macroeconomic data in section 5.

[5]Further details on the regulatory standards involving CTC and SIFI measures are available in BIS (2011).

[6]Further details on the implementation of the DP measure are available in Wezel et al. (2012).

The instruments CG, FC, and RR_REV, are asset-based and impose restrictions on financial sector balance sheets, assets, and liabilities. CG calls for limits on domestic currency loans, while FC limits foreign currency loans, reducing vulnerability to foreign-currency risks. Reserve requirements (RR_REV) are traditionally used in emerging countries, especially in Brazil, with the objective of controlling the multiplication of money through the imposition of compulsory deposits with the Central Bank of part of the demand deposits of financial institutions[7].

The instruments LTV_CAP and DTI are borrower-based and impose restrictions on the borrower, instrument or activity. LTV_CAP refers to a cap on the percentage of the value of an asset that can be financed by a bank loan to ensure a minimum collateral value for a loan, usually set at about 70% or 80%. The DTI ratio is an alternative instrument that imposes minimum levels on the expected capacity of borrowers to pay their debts, to control excessive borrowing by banks[8].

CONC and INTER are structural tools aimed at addressing vulnerabilities from interconnectedness and limiting contagion of the financial system. CONC limits the fraction of assets concentrated to a limited number of borrowers, while INTER limits the fraction of liabilities held by the banking sector or by individual banks. The last instrument, TAX, imposes taxes on the revenue of financial institutions in order to control credit growth, mitigate economic cycles or correct systemic externalities.

Although other MPs may be in use in some countries other than those discussed in this paper, an analysis of the effect of these 12 instruments on the risk attitude of banks provides a general understanding of the leading MPs currently in use in both developed and emerging countries[9].

4. Methods and identification strategy

In this paper, we evaluate the impact of each of the 12 MPs on bank stability individually. The decision to implement a macroprudential policy is not a random one and depends on the banking system characteristics, as well as the macroeconomic and institutional variables of each country. This decision usually generates a self-selection bias because countries that have banks with a higher probability of default will usually implement more MPs. In order to reduce this bias,

[7] A detailed study of the implementation and effects of compulsory reserves in Brazil are available in Glocker and Towbin (2015).

[8] Morgan et al. (2015) study the implementation of these policies in detail for Asian countries.

[9] For a general summary on the implementation and operation of MPs we recommend Claessens (2015).

we estimated our models in two stages. First, we performed a propensity score matching through nearest neighbor, thus obtaining one similar matched country for each treated one. Second, we ran a dynamic panel data regression with instruments (System-GMM) to estimate the effect of MPs on bank stability taking into account the autoregressive nature of the Z-score, as well as the time and fixed effects for individual banks.

The propensity score is the probability of a treatment being assigned conditional on observed baseline characteristics. It allows the design and analysis of an observational (nonrandomized) study so that it mimics the specific characteristics of a randomized controlled trial. Condition on the propensity score, the distribution of observed baseline covariates will be similar between treated and untreated subjects. In general, this method allows two countries to be compared, one in the control group and the other in the treatment group, with very similar observable characteristics, with the main factor that differentiates them is the implementation of the specific MP analyzed. This method has the potential to reduce or eliminate possible confounding factors and allows the estimation of the effect of each MP on bank risk-taking and stability.

We first estimate the probability of treatment (propensity scores) through a logit regression for each MP. To perform these first stage regressions we used one observation for each country. We take the mean of the accounting, macroeconomic and institutional variables across banks and years[10]. The dependent variable of these regressions was a dummy that identifies countries where the policy is under use in any year of the sample. After performing these regressions, we matched each treated country with an untreated one with a similar propensity score using a nearest neighbor algorithm. After these procedures done for each of the 12 MPs, we run the System-GMM regressions with bank-level data for only treated and matched countries.

We used three different strategies for the matching according to the macroprudential policy: i) CTC and SIFI were implemented only in 2013, so we were able to match countries based on pretreatment variables (from 2000 to 2012), and then we perform a 1:1 matching without replacement; ii) DP, DTI, LEV, CG, INTER, RR_REV, FC, and TAX is implemented throughout the entire period of analysis, so we used all years while performing the first stage regressions, and then performed a 1:1 matching without replacement; iii) LTV_CAP and CONC were the most implemented

[10]The variables used in the first stage regression are the same as the ones used in the final regressions. The description of the variables is in section 5

policies, and since we had a limited number of untreated countries we used all years in the first stage regressions and performed a 1:1 matching with replacement.

After the matching, we estimated dynamic panel regressions with instrumental variables (System-GMM) to obtain the effects of the 12 MPs on bank stability and, through interactions, we also evaluated how these effects change for variables such as the size of banks, liquidity, leverage, and concentration. We also used dummies to identify banks with excessive risk (first quintile of the Z-score) and higher stability (last quintile of the Z-score) interacting them with the treatment variable in order to assess the heterogeneity of the effect of the MPs across different risk-taking quintiles. Through this estimation, it was possible to identify which instruments had the most impact on the excessively risky banks, which had a higher probability of bankruptcy and which affected the systemic risk the most. Lastly, we also performed auxiliary estimates and robustness tests, which included the decomposition of the risk measure known as Z-score, as well as specification tests for the System-GMM model.

A fixed effect panel data model can have a significant correlation with the lagged dependent variable, so we use a System-GMM model instead, as proposed by Arellano and Bover (1995). With the inclusion of the instruments proposed by Blundell and Bond (1998), we reduce the endogeneity bias due to the presence of the lagged dependent variable in our regressions. This model also allows the use of lagged variables as instruments for the bank characteristics that are considered endogenous or predetermined. In order to ensure a proper specification of the models and reduce the problem of too many instruments (Roodman, 2009), we apply a principal component analysis (PCA) on the instrument matrix. We use the PCA scores as instruments for the System-GMM estimation, followingBontempi and Mammi (2012).

The risk-taking measure that we use as the dependent variable is the logarithm of the Z-score. We calculate the Z-score using the following formula:

$$\text{Z-score}_{ikt} = \frac{ROA_{ikt} + \text{Equity Ratio}_{ikt}}{\sigma_{ikt}(ROA)}, \tag{1}$$

where ROA_{ikt} and $\text{Equity Ratio}_{ikt}$ are the return on asset and equity over assets in period t for bank i and country k, respectively; and $\sigma_{ikt}(ROA)$ is the standard deviation of the return on asset.

Since we have annual data, the standard deviation of the return on asset is calculated through a rolling window using the five prior observations, which is why the data for the period from 1995 to 1999 (used to calculate the standard deviation of *ROA* in 2000) is not present in the estimation of the econometric models. This strategy for constructing the Z-score is similar to that adopted by Delis et al. (2012) and recommended for annual data in Li and Malone (2016). The Z-score is inversely proportional to a bank's probability of bankruptcy and has the interpretation of a measure of financial stability, or as the distance, a bank is from insolvency. Many studies in the literature have used the Z-score as a risk measure (Mercieca et al., 2007; Laeven and Levine, 2009; Houston et al., 2010; Demirgüç-Kunt and Huizinga, 2010; Fazio et al., 2015).

Since we used rolling windows to calculate the Z-score, we expected it to present a highly correlated structure. In order to remove this correlation, we included two lags of the dependent variable in all models. For each MP we estimate eight different System-GMM models: i) one baseline regression to evaluate the overall impact of the MP on bank stability; ii) four regressions where we interacted the dummy of the MP with either the size of banks, the liquidity ratio, the leverage ratio and the HHI loans concentration index, in order to assess how the effectiveness of the MPs changes according to these variables; iii) one regression where we interacted dummies that identified the excessively risky and higher stable banks with the MP, in order to assess the heterogeneity of the effect across different risk-taking quintiles; iv) two regressions where we used the baseline model but with the components of the Z-score as dependent variables, in order to understand how the policies affected the Z-score of the banks. Our baseline regression has the following specification:

$$\begin{aligned} \ln(\text{Z-score})_{ikt} &= \alpha_i + \beta_1 \ln(\text{Z-score})_{ik,t-1} + \beta_2 \ln(\text{Z-score})_{ik,t-2} + \beta_3 MP_{kt} \\ &+ \text{Bank Controls}'_{ikt}\beta_5 + \text{Macro Controls}'_{kt}\beta_6 + \varepsilon_{ikt} \end{aligned} \tag{2}$$

where the subscripts i, k and t refer to bank, country and year, respectively; $\ln(\text{Z-score})_{ikt}$ is a $N \times 1$ vector of the logarithm of the bank Z-score, considering we have a total of N observations in our sample; MP_{kt} is a $N \times 1$ vector with the dummy of the macroprudential policy; $\text{Bank Controls}'_{ikt}$ is a $N \times p$ matrix with p control variables for the bank characteristics; $\text{Macro Controls}'_{kt}$ is a $N \times q$

matrix with q macroeconomic and institutional control variables for the countries in the sample; α_i and β_j are the coefficients to be estimated; and ε_{ikt} is the error term. Our four regressions with interactions have the following base specification:

$$\begin{aligned} \ln(\text{Z-score})_{ikt} &= \alpha_i + \beta_1 \ln(\text{Z-score})_{ik,t-1} + \beta_2 \ln(\text{Z-score})_{ik,t-2} + \beta_3 MP_{kt} \\ &+ \beta_4 (MP_{kt} \cdot X_{ikt}) + \text{Bank Controls}'_{ikt}\beta_5 + \text{Macro Controls}'_{kt}\beta_6 + \varepsilon_{ikt} \end{aligned} \tag{3}$$

where X_{ikt} is a $N \times 1$ vector with the variable to be interacted with MP_{kt}, either size, liquidity, leverage or concentration. The other variables are the same as in equation 2. Our quintile regressions have the following specification:

$$\begin{aligned} \ln(\text{Z-score})_{ikt} &= \alpha_i + \beta_1 \ln(\text{Z-score})_{ik,t-1} + \beta_2 \ln(\text{Z-score})_{ik,t-2} + \beta_3 MP_{kt} \\ &+ \beta_4 (MP_{kt} \cdot \text{Higher risk}_{ikt}) + \beta_5 (MP_{kt} \cdot \text{Higher stability}_{ikt}) + \beta_6 \text{Higher risk}_{ikt} \\ &+ \beta_7 \text{Higher stability}_{ikt} + \text{Bank Controls}'_{ikt}\beta_8 + \text{Macro Controls}'_{kt}\beta_9 + \varepsilon_{ikt} \end{aligned} \tag{4}$$

where Higher risk_{ikt} and $\text{Higher stability}_{ikt}$ are dummies that identifies whether the bank has a Z-score in the first or last quintile, respectively. We interacted these dummies with the dummy of the macroprudential policy in order to investigate heterogeneity between different levels of risk-taking.

Finally, we also ran regressions with the same specification of equation 2 but with the components of the Z-score as a dependent variable: the logarithm of the risk-adjusted return on assets ($ROA/\sigma(ROA)$) and the logarithm of the risk-adjusted equity ratio (Equity Ratio/$\sigma(ROA)$). With these regressions, we were able to understand how MPs affect the bank Z-scores. We also report the Hansen test and the serial correlation tests of first and second order in each System-GMM regression to ensure a proper specification of the instruments.

5. Data description

The database used in this article comprised a sample of 16,255 banks in 45 different countries, including commercial, cooperative and savings banks in emerging and developed countries.

All accounting data used to calculate risk-taking, size, liquidity, leverage, concentration and other specific characteristics of banks are from BankScope, a financial database distributed by the BVD-IBCA. The data is converted into US dollars to ensure accounting uniformity across different countries. The information is annual and covers the period between 1995 and 2014. The first five years are used only for the calculation of the risk measure known as Z-score, and the 2000 to 2014 data are used to estimate the econometric models.

We added country-level data to the bank accounting data to reflect both the implementation of macroprudential regulation policies discussed in the previous section and the macroeconomic and institutional information. The macro-prudential policy database was obtained from Cerutti et al. (2017a) through the Global Macroprudential Policy Instruments (GMPI) survey, from the International Monetary Fund (IMF) in 2013/2014 and 2016/2017, while macroeconomic and institutional data were obtained from the database of the World Bank and Heritage Foundation, respectively.

Initially, the BankScope database contained more than 20,000 commercial banks, cooperative and savings banks from 201 different countries, while the Cerutti et al. (2017a) macroprudential policy database included 160 countries. After merging the two databases and removing countries without information on MPs, some filters and cutouts were used to eliminate outliers and countries with few banks, guaranteeing a representative sample of the banks in the countries analyzed.

First, we removed the consolidated balance sheets of the banks with unconsolidated balance sheets, in order to avoid duplication of observations in the data[11]. Banks with less than five balance sheets were then removed, as well as countries with less than ten different banks. The first choice is vital in order to ensure a sufficient number of observations to calculate the risk measure, Z-score. We choose countries with at least ten banks to avoid that specific characteristic of a bank could influence the results obtained for a particular country. Moreover, at the same time to select an appropriate group of emerging and developed countries. Finally, we remove missing values, and all of the accounting variables relevant to the study were winsorized at 1%, limiting the extreme values represented by the 1% and 99% percentiles, in order to reduce the effects of possible spurious

[11]The option to work with the unconsolidated balance sheets avoided the possibility of data duplication (if a Bank A owns a Bank B, the consolidated balance sheet reports the assets of both banks, requiring the identification and removal of the unbound balance sheet of Bank B from the database). In cases where there was no unconsolidated balance sheet, we use the consolidated balance sheets. This strategy follows the line of articles such as Micco et al. (2007).

outliers.

With these procedures, an unbalanced panel data sample was obtained, comprised of 16,255 banks in 45 countries. In addition to the dummy variables that describe the implementation of MPs, which take value one after the implementation in a country in a given year, the econometric models included different variables to control for specific characteristics of the banks related to management and decision-making that could change over time. These variables include the logarithm of total assets (*Size*), the ratio of liquid assets to total assets (*Liquid Ratio*), the degree of leverage, measured by the debt to equity ratio (*Leverage*), the ratio of bank deposits to total assets (*Deposit Ratio*), an efficiency measure given by the ratio of total expenses to net bank loans (*Cost Ratio*), and the ratio of total loans to total assets (*Loan/Assets*). The first three variables were also interacted with the dummies of MPs to verify how their effect changed for banks with different sizes, liquidity, and leverage.

We also use the following macroeconomic and institutional variables, which vary over time and according to the country: GDP per capita growth; the ratio of total exports and imports to GDP; the concentration of the loan banking market, measured by the HHI index; the aggregate ratio of equity to assets; the aggregate ratio between loans and deposits; and the property rights index. The purpose of using these variables was to control the temporal changes in the specific macroeconomic and institutional characteristics of the countries in the dynamic panel models. The HHI index was also interacted with the dummies of MPs to verify how their effect changed according to different market structures.

Table 1 includes the descriptive statistics of the variables that we use in this study, including the two components of the Z-score: the return on assets (ROA) and the equity ratio. Table 2 lists the countries in our sample as well as the number of banks and MPs implemented in each country; the mean values of the logarithm of the Z-score and its components by country; and the mean values of the variables that we interact with the macroprudential dummies. Finally, Table 3 reports the percentage of countries in this sample that implemented each of the MPs described in section 3 between 2000 and 2014.

We can see from Table 1 that the sample includes countries with different institutional levels and stages of development. The property rights index, measured on a scale of 100, ranges from 0 to 95, while the annual GDP per capita growth of the countries varies between -14.79% to 16.23%.

The use of winsorized accounting variables made it possible to reduce extreme values in equity, liquidity, deposits, costs, and loan ratios. For a fair comparison of the accounting data, the mean value of certain selected variables for each country can be visualized in Table 2.

The three countries with the most significant number of sampled banks were the United States, Germany, and Russia, with China and Thailand standing out for having the largest banks on average as measured by the logarithm of total assets. The logarithm of the Z-score is a measure inversely proportional to the probability of bank failure, so a higher average value represents more bank stability in the country. Thus, countries such as Switzerland, Germany and the United Arab Emirates have banks with the lowest probability of bankruptcy, while Latvia, Argentina, and Romania have less stable banks.

Table 3 presents the percentage of implementation for each of the 12 MPs between 2000 and 2014, while Figure 1 refers to the number of countries that adopted each policy in at least one year of the sample. The most adopted policies were the borrower concentration limits (CONC) and the cap on loan-to-value ratio (LTV_CAP). CONC was adopted by 45.45% of the sampled countries in 2000, increasing to more than 50% of adoption after 2001, while LTV_CAP was adopted by almost 50% of the countries by the year 2014. Of the 45 countries, 37 and 22 countries implemented CONC and LTV_CAP in at least one year of the sample, respectively. Specific instruments, such as CTC and SIFI, were adopted only in recent years, making it possible to compare and design more adequate identification strategies, while other instruments were adopted by certain countries over the entire period of analysis, allowing only a comparison with banks of other countries.

6. Results

Before estimating the regressions of equations 2, 3 and 4, we first performed the propensity score matching for each MP in order to obtain a reduced sample of countries. Table 4 presents the list of countries that implemented each MP and their respective untreated matched country based on the estimations of the propensity scores and the algorithm of nearest neighbor discussed in section 4.

Several MPs, such as INTER, LTV_CAP, and DP, were implemented in many countries, whereas others, such as CTC and CG, only in a limited number of countries. In all cases, we used the best-matched country for each treated country. This strategy produces in having different matched

countries for the same treated country depending on the MP implemented. For example, Spain may be a better control country for China (SIFI), but since it is considered a treated country in LTV_CAP, the next available best match is Mexico. However, in the case of the LEV policy, Spain is not used as a control for China. We follow this procedure because the matching also seeks to predict the dependent variable as best as possible.

Figures 2 to 10 show the evolution of the logarithm of the Z-score for selected countries that implemented the MPs in the middle of the sample (in red) and their respective untreated matched country (in blue). As stated in section 4, we matched the countries with their nearest neighbor using the propensity scores. The vertical line shows the year of implementation. We present the number of countries that implemented each MP in Figure 1. In all cases, the common trends hypothesis seems to hold as there is a parallel trend before the implementation of the policy. In our view, these figures show that the quality of the matching procedure is relatively good.

In many cases, there was a similar trend for the Z-score for treated and matched countries before the intervention. The changes in the trend after the intervention may give us a clue about the effect of each MP, although we still need to control for the dynamics of the Z-score, fixed effects of banks, and many possible observed characteristics of banks and countries which may change over time. We do this in Tables 5 to 16, where we estimated the System-GMM models after the matching for each of the 12 MPs.

Tables 5 to 16 present the eight different specifications of the System-GMM models for each MP. In column one of each table, we show the results of the baseline model estimated through equation 2. In columns two to five, we show the results of the regressions in equation 3, where we interacted the MP dummy with the size of banks, the liquidity ratio, the leverage ratio, and the HHI loans concentration index. In column six we show the results of the regression estimated through equation 4, where we assessed the heterogeneous effects of the policies for different levels of bank risk-taking. Finally, in columns seven and eight we estimated the same regression for equation 2, but using the logarithm of the risk-adjusted return on assets and the logarithm of the risk-adjusted equity ratio as dependent variables, respectively. The variable X_t in the second line of the regressions refers to the variables interacted with the MP dummy, such as size, liquidity, leverage, HHI, and the dummy that identifies banks in the first quintile of the Z-score (Higher risk); the variables Y_{t-1} and Y_{t-2} refer to either the Z-score, the risk-adjusted ROA (in column 7) or

the risk-adjusted Equity Ratio (in column eight).

The number of observations and banks in each table changes according to the number of treated banks, since we performed propensity score matching before the estimation of the models for each MP. We also report p-values of the Hansen and serial correlation tests. As we can see, all regressions have the correct specification at the level of significance of 5% according to those tests. We included year dummies in all regressions, but the coefficients of the year dummies and the constant are not present in all tables due to space considerations.

The baseline regressions show a positive effect of structural and borrower based policies on bank stability, such as: SIFI, LTV_CAP, CONC, INTER (Tables 6, 12, 14, 15, respectively). When we check for the heterogeneous effects of these policies, we observe that SIFI has a higher effect for more liquid banks (column three of Table 6), that LTV_CAP has a higher effect for banks with more liquidity and leverage (columns three and four of Table 12), and that CONC has a higher effect for larger and more leveraged banks (columns two and four of Table 14). All of these three policies have a lower effect for more stable banks. We also find positive effects of DP for highly leveraged banks (column four of Table 7), LEV for concentrated markets (column five of Table 8), and DTI for banks with more size, liquidity and leverage, and for more concentrated markets (columns two, three, four and five of Table 13). DTI also show less effect for more stable banks (column six of Table 13).

These results are in line with the evidence that loan-to-value or debt-to-income limits can be useful in leaning against real estate booms, can help curb housing price growth (Hartmann, 2015; Zhang and Zoli, 2016; Kuttner and Shim, 2016) and help reduce excess volatility in the economy (Gelain et al., 2013).

Some of these policies, especially asset-based, show a significant negative effect on bank stability when considering the baseline regression, such as CG, RR_REV and FC (Tables 9, 10, 11, respectively). CG and FC have a more negative effect for banks with higher risk (column six of Tables 9 and 11). Although CG seems to have a negative effect on stability for all cases, RR_REV and FC have a positive effect for larger and more leveraged banks (columns two and four of Tables 10 and 11). The policy based on revenue taxes only has a negative effect on stability for very concentrated markets (column five of Table 16). Finally, CTC (Table 5) seems to have no significant effect on bank stability.

Our evidence has some similarities with the findings of Altunbas et al. (2018), since there was no significant effect of capital based policies on banking stability, such as CTC, DP, and LEV, except SIFI. Popoyan et al. (2017) also found that minimum capital requirements and counter-cyclical capital buffers are a practical regulatory framework, while Jiménez et al. (2017) found that dynamic provisioning smooths credit supply cycles and, in hard times, supports firm performance.

According to a survey conducted by Galati and Moessner (2018), many different studies found some evidence of borrower-targeted macroprudential policies having some effects on intermediate targets of these macroprudential policies, such as housing price growth and housing credit growth. By contrast, empirical evidence on the effects of macroprudential capital flow management tools is less conclusive and more mixed.

Similar to Brandao-Marques et al. (2018), we also ran the same regressions but with the components of the Z-score as dependent variables in columns 7 and 8 of Tables 5 to 16. The two components are the risk-adjusted return on assets and the risk-adjusted equity ratio. We use the latter as a proxy for leverage. We can see that while SIFI, LTV_CAP, RR_REV, and FC mainly affected the Z-score through the leverage channel, CG, CONC, and INTER also affected the Z-score through the return on assets.

Our results show that policies that impose limits on domestic and foreign currency loans, such as CG and FC, may hurt bank stability. Both types of policies hurt the equity ratio, which reflects the fact that banks reduce their equity when their loan operations diminish. Limits on loans granted domestically also seem to have a negative on the risk-return relation of banks, decreasing the risk-adjusted return on assets.

On the other hand, essential tools that aim to address vulnerabilities from interconnectedness and contagion of the financial system, such as CONC and INTER, have a positive effect on bank stability, increasing the risk-return relation of banks and the risk-adjusted equity ratio. Specific borrower-based instruments, such as LTV_CAP, also have a positive effect on bank stability, primarily through the leverage channel.

In tables 17 to 20 we grouped the MPs into four significant groups: capital based policies, such as CTC, SIFI, DP and LEV; asset-based policies, such as CG, RR_REV and FC; borrower-based policies, such as LTV_CAP and DTI; and structural policies, such as CONC and INTER. We then performed the same regressions for those groups, using a dummy variable that equaled one if any

of those policies are under use in the country. The dummy equals one whenever the policy is active.

The results support the findings of the previous regressions, since we found a positive and significant effect of structurally based instruments on banking stability, while asset-based instruments have a negative effect. We also found some evidence of a positive relationship between borrower based instruments and bank stability, which, as exposed in table 12, may be due to the positive effect of LTV_CAP. Finally, capital-based policies seem to have mixed effects on risk-taking, since CTC and LEV do not present significant effects, while SIFI and DP increase stability.

7. Conclusions

In this article, we studied the effects of the implementation of a set of 12 macroprudential policies on the risk-taking of banks for several countries using an identification approach that relied on a nearest neighbor matching with propensity scores and a system-GMM model. We found that macroprudential policies have considerably heterogeneous effects depending on bank characteristics and market structures. Variables such as concentration, size of banks, liquidity, leverage and different levels of risk are essential to explain how macroprudential policies may affect the risk-taking behavior of banks.

Our main results suggest that the most effective policies in terms of stability were structural-based, such as limits on the concentration of assets and interbank exposure. Borrower-based policies, such as loan-to-value and debt-to-income ratios, as well as capital surcharges on systematically important banks also have a positive effect on stability. The least effective policies seem to be those that impose limits on domestic and foreign currency loans. They hurt stability, especially for banks with excessive risk-taking.

There seem to be a more substantial effect through the leverage channel in most cases in which macroprudential policies are effective in reducing risk-taking. The risk-return relation of a bank is also essential to explain the negative effect of limits on domestic credit on bank stability.

This article adds to the literature that seeks to evaluate how different macroprudential policies affect the risk-taking incentives of banks. Our results support the application of these policies in countries with the most diverse institutional sets and financial market characteristics and also highlights the main measures to be taken to mitigate risk to most vulnerable banks.

Macroprudential policies do generally not take the different institutional, macroeconomic and

banking market characteristics of countries into account. Although some of those policies can substantially reduce the risk-taking of banks, they can also produce some unintended consequences. Gurrea-Martínez and Remolina (2019) found that higher capital requirements may reduce access to finance, especially in emerging markets, creating financial exclusion problems. It is essential to highlight that macroprudential policies that reduce risk-taking may also decrease credit growth and hamper economic growth. The opportunity cost of such policies may be a relevant topic for future research.

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Table 1: Descriptive statistics of the main accounting and macroeconomic variables

Variables	Mean	Standard Deviation	Minimum	Maximum
Ln(Zscore)	3.3831	1.1233	0.4094	6.4180
ROA	0.0115	0.0293	-0.6212	3.4020
Equity Ratio	0.1043	0.0575	0.0247	0.4112
Size	12.9912	1.7273	5.9253	21.8631
Liquid Ratio	0.1399	0.1376	0.0107	0.7369
Leverage	11.0052	6.1933	1.4321	39.5555
Deposit Ratio	0.8201	0.1275	0.2630	0.9547
Cost Ratio	0.0546	0.0483	0.0113	0.3655
Loan/Assets	0.6221	0.1775	0.0773	0.9367
GDP per capita growth	1.2287	2.4777	-14.7863	16.2257
Trade/GDP	46.1057	34.3753	19.7981	382.2915
HHI Loans	0.0637	0.0507	0.0186	0.3209
Country Equity/Assets	0.0774	0.0235	-0.0793	0.2387
Country Loan/Deposits	1.1010	0.5105	0.2345	4.1706
Property Rights Index	79.6113	19.0952	0	95

Note: This table presents descriptive statistics for the 16,255 sample banks, including the 45 selected countries. The balance sheets are annual and comprise the period from 2000 to 2014, and all monetary amounts are in US dollars. Data were obtained from Bankscope (BVD-IBCA), the World Bank and the Heritage Foundation. Further details on the calculation of the variables can be obtained in section 4.

Table 2: Mean values of selected variables by country

Countries	No. of banks	Ln(Zscore)	ROA	Equity Ratio	Size	Liquid Ratio	Leverage	HHI Loans	No. of MPs
ARGENTINA	79	2.082	0.022	0.181	12.947	0.263	6.892	0.084	5
AUSTRIA	251	3.373	0.007	0.086	13.591	0.239	14.053	0.129	4
BANGLADESH	31	2.541	0.023	0.079	13.539	0.167	15.085	0.070	4
BELGIUM	51	2.960	0.008	0.080	14.983	0.221	18.193	0.202	2
BRAZIL	150	2.273	0.023	0.167	14.059	0.305	7.938	0.103	5
BULGARIA	27	2.648	0.013	0.130	13.430	0.323	8.379	0.098	4
CHILE	36	3.155	0.017	0.147	14.556	0.210	8.744	0.119	7
CHINA	160	3.344	0.013	0.081	16.200	0.262	15.964	0.154	8
COLOMBIA	35	2.557	0.019	0.145	13.737	0.209	7.875	0.085	7
CROATIA	43	2.914	0.006	0.136	13.029	0.269	8.258	0.134	2
CZECH REPUBLIC	26	2.950	0.010	0.092	14.956	0.302	14.081	0.129	3
DENMARK	119	3.031	0.010	0.132	13.200	0.175	8.228	0.257	2
DOMINICAN REP.	62	2.838	0.021	0.174	11.199	0.224	6.773	0.207	3
EGYPT	28	3.038	0.014	0.098	14.767	0.335	11.460	0.145	0
FRANCE	328	3.558	0.010	0.093	15.364	0.254	14.212	0.078	3
GERMANY	1,910	3.697	0.006	0.068	13.682	0.140	15.724	0.033	3
HUNGARY	33	2.532	0.007	0.105	14.244	0.295	11.155	0.110	4
INDIA	84	3.015	0.013	0.077	15.360	0.099	15.507	0.055	3
INDONESIA	77	2.758	0.021	0.129	13.903	0.280	9.145	0.076	3
ITALY	701	3.451	0.008	0.112	13.403	0.188	9.397	0.049	3
JAPAN	606	2.993	0.002	0.055	15.132	0.196	20.139	0.037	2
KAZAKHSTAN	30	2.371	0.021	0.171	13.647	0.276	6.969	0.143	3
KENYA	36	2.974	0.025	0.168	12.102	0.249	6.024	0.106	1
LATVIA	22	1.951	0.008	0.103	13.350	0.403	10.742	0.177	3
LEBANON	45	3.455	0.010	0.091	14.225	0.338	12.160	0.093	5
LUXEMBOURG	115	3.047	0.009	0.068	14.979	0.506	21.232	0.064	1
MEXICO	50	2.425	0.009	0.145	14.540	0.316	8.699	0.120	3
NORWAY	142	3.592	0.010	0.095	13.502	0.071	10.683	0.146	4
PANAMA	76	2.979	0.019	0.115	13.163	0.238	10.673	0.084	2
POLAND	55	2.796	0.013	0.112	14.590	0.188	9.995	0.090	3
ROMANIA	28	2.219	0.003	0.144	13.752	0.302	7.577	0.140	5
RUSSIA	900	3.094	0.022	0.196	11.559	0.308	5.811	0.138	1
SLOVAKIA	17	2.815	0.009	0.095	14.619	0.239	10.642	0.147	2
SLOVENIA	23	2.986	0.004	0.090	14.311	0.175	12.106	0.144	2
SPAIN	199	3.562	0.007	0.087	14.940	0.166	13.870	0.086	4
SWEDEN	100	3.283	0.014	0.139	12.910	0.137	7.902	0.239	4
SWITZERLAND	379	3.987	0.009	0.094	13.096	0.206	19.432	0.149	4
THAILAND	26	2.505	0.013	0.122	15.905	0.130	10.931	0.093	3
TUNISIA	16	3.277	0.011	0.107	14.162	0.229	10.703	0.107	2
UKRAINE	58	2.324	0.005	0.139	13.375	0.216	7.856	0.081	4
UNITED ARAB EMIRATES	17	3.658	0.024	0.170	15.600	0.229	5.508	0.138	4
UNITED KINGDOM	113	3.024	0.008	0.144	14.317	0.415	10.318	0.152	1
UNITED STATES	8,888	3.433	0.013	0.107	12.369	0.086	9.168	0.048	3
VENEZUELA	42	2.307	0.031	0.122	14.105	0.249	9.077	0.098	0
VIETNAM	41	3.235	0.014	0.116	14.097	0.305	10.406	0.159	3
TOTAL	16,255	3.383	0.011	0.104	12.991	0.140	11.005	0.064	8

Note: This table shows the number of banks and the averages of the main variables by country, including all bank balance sheets for the country from 2000 to 2014. Data were obtained from Bankscope (BVD-IBCA). Further details on the calculation of the variables can be obtained in section 4.

Table 3: Macroprudential policy implementation percentages

Year	CTC	SIFI	DP	LEV	CG	RR_REV	FC	LTV_CAP	DTI	CONC	INTER	TAX
2000	0	0	4.55	4.55	2.27	11.36	6.82	9.09	6.82	45.45	15.91	9.09
2001	0	0	4.44	4.44	2.22	13.33	6.67	8.89	8.89	53.33	20	8.89
2002	0	0	4.44	4.44	2.22	13.33	6.67	8.89	8.89	55.56	20	8.89
2003	0	0	6.67	4.44	2.22	13.33	8.89	13.33	8.89	57.78	22.22	8.89
2004	0	0	8.89	4.44	4.44	13.33	13.33	20	13.33	57.78	22.22	8.89
2005	0	0	11.11	4.44	4.44	15.56	15.56	20	13.33	60	22.22	8.89
2006	0	0	11.11	4.44	4.44	15.56	15.56	20	13.33	62.22	22.22	8.89
2007	0	0	13.33	4.44	4.44	15.56	13.33	22.22	15.56	66.67	28.89	8.89
2008	0	0	13.33	6.67	4.44	13.33	13.33	22.22	15.56	68.89	28.89	11.11
2009	0	0	13.33	6.67	4.44	13.33	13.33	22.22	15.56	71.11	28.89	11.11
2010	0	0	15.56	6.67	4.44	13.33	15.56	28.89	22.22	73.33	31.11	15.56
2011	0	0	17.78	6.67	4.44	13.33	17.78	33.33	24.44	73.33	31.11	28.89
2012	0	0	17.78	8.89	6.67	13.33	17.78	35.56	24.44	73.33	33.33	28.89
2013	2.22	4.44	24.44	8.89	6.67	13.33	20	40	24.44	73.33	33.33	28.89
2014	4.44	8.89	26.67	6.67	6.67	13.64	20	48.89	24.44	82.22	42.22	26.67

Note: This table presents the percentage of countries that implemented each macroprudential policy from 2000 to 2014. Data were obtained from Cerutti et al. (2017a).

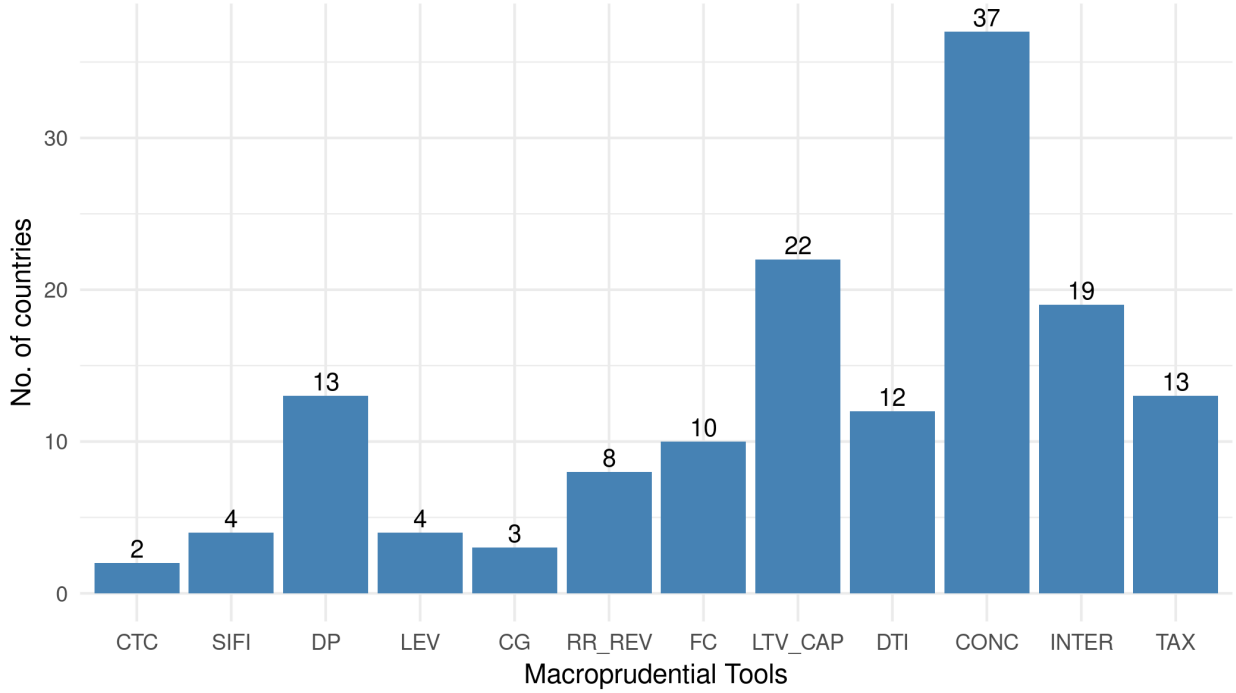

Figure 1: Number of countries adopting each macroprudential policies

Table 4: List of countries that implemented each macroprudential policy and its nearest neighbor

CTC		SIFI		LEV		CG	
Treated	*Control*	*Treated*	*Control*	*Treated*	*Control*	*Treated*	*Control*
Norway	Switzerland	Switzerland	Japan	Chile	Denmark	Argentina	Dominican
Sweden	Denmark	China	Spain	United States	Sweden	Bangladesh	Russia
		Bangladesh	Thailand	Switzerland	Kazakhstan	Vietnam	Venezuela
		Czech Rep.	Vietnam	China	UK		
DP		RR_REV		FC		DTI	
Treated	*Control*	*Treated*	*Control*	*Treated*	*Control*	*Treated*	*Control*
Brazil	Bangladesh	Brazil	Russia	Brazil	Bangladesh	Chile	Egypt
Spain	Czech Rep.	Kazakhstan	Slovakia	Colombia	Russia	Colombia	Venezuela
China	Argentina	Lebanon	Emirates	Tunisia	France	Tunisia	Thailand
Croatia	Poland	Ukraine	Croatia	Argentina	Bulgaria	Lebanon	Switzerland
Bulgaria	Sweden	Vietnam	China	Dominican	Poland	China	Ukraine
Colombia	Venezuela	Argentina	Romania	Ukraine	Egypt	Romania	Sweden
Dominican	Ukraine	Bulgaria	Panama	Romania	Mexico	Kenya	Russia
Chile	Indonesia	Indonesia	Egypt	Austria	Kenya	Hungary	India
Thailand	Slovakia			Hungary	Latvia	Norway	Latvia
Kazakhstan	Tunisia			China	India	Poland	Indonesia
Mexico	Italy					Emirates	Croatia
Vietnam	Russia					Kazakhstan	Bulgaria
Panama	Romania						
INTER		TAX		LTV_CAP		CONC	
Treated	*Control*	*Treated*	*Control*	*Treated*	*Control*	*Treated*	*Control*
Argentina	Brazil	Bangladesh	Vietnam	Austria	United States	*All sample*	Kenya
Chile	Bangladesh	Belgium	Dominican	Chile	Mexico	*except for:*	Kazakhstan
Colombia	Ukraine	Chile	Czech Rep.	Colombia	France	Egypt	Slovakia
France	Luxembourg	Colombia	Norway	Spain	Mexico	Hungary	Venezuela
Croatia	Tunisia	Sweden	China	Denmark	Slovenia	Kenya	Hungary
Italy	Kazakhstan	Germany	Egypt	Thailand	Mexico	Kazakhstan	
United States	Russia	Hungary	Mexico	Bangladesh	UK	Slovakia	
Emirates	Venezuela	Austria	Thailand	China	Mexico	Tunisia	
Mexico	Indonesia	France	Switzerland	Romania	UK	Venezuela	
Romania	Norway	Latvia	India	Latvia	United States	Vietnam	
Bulgaria	Thailand	Slovenia	Luxembourg	Lebanon	Vietnam		
Switzerland	Egypt	Slovakia	Tunisia	Hungary	Venezuela		
India	Austria	Ukraine	Poland	Norway	Mexico		
Germany	UK			Sweden	Mexico		
Lebanon	Kenya			India	Mexico		
China	Czech Rep.			Indonesia	Vietnam		
Spain	Slovenia			Emirates	United States		
Japan	Latvia			Brazil	France		
Poland	Panama			Czech Rep.	Mexico		

Note: This table presents the list of all countries that adopted each macroprudential policy and their respective matched country with a similar propensity score based on the nearest neighbor algorithm without replacement. Since we had a limited number of untreated countries in the sample for LTV_CAP and CONC we performed a 1:1 matching with replacement in those cases.

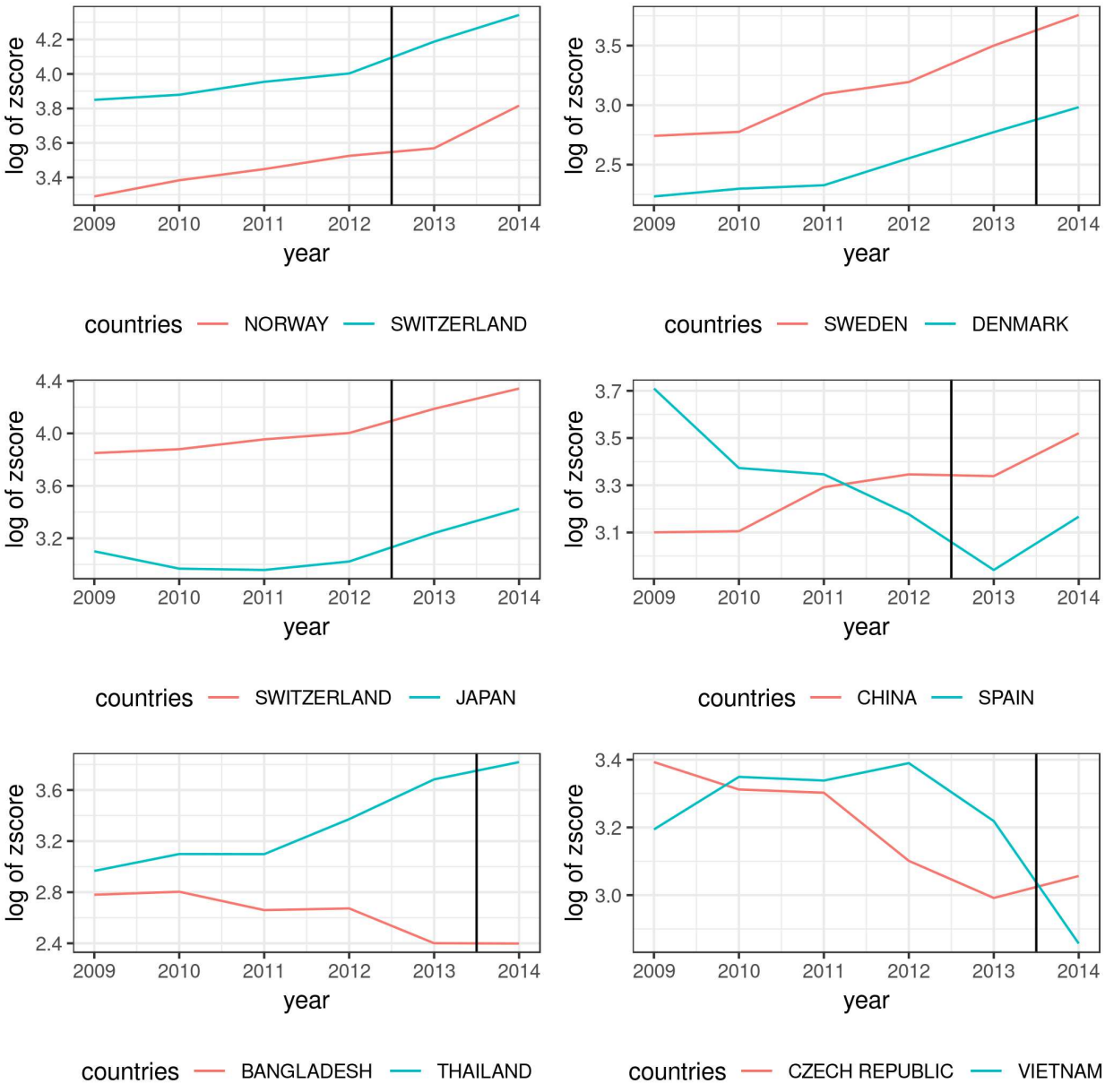

Figure 2: CTC and SIFI Matching

Countries that implemented the macroprudential policy are in red and their match in blue. Norway and Sweden implemented CTC while the other four countries implemented SIFI. The year of implementation is in the vertical line, which we move by half a year before implementation to facilitate visualization.

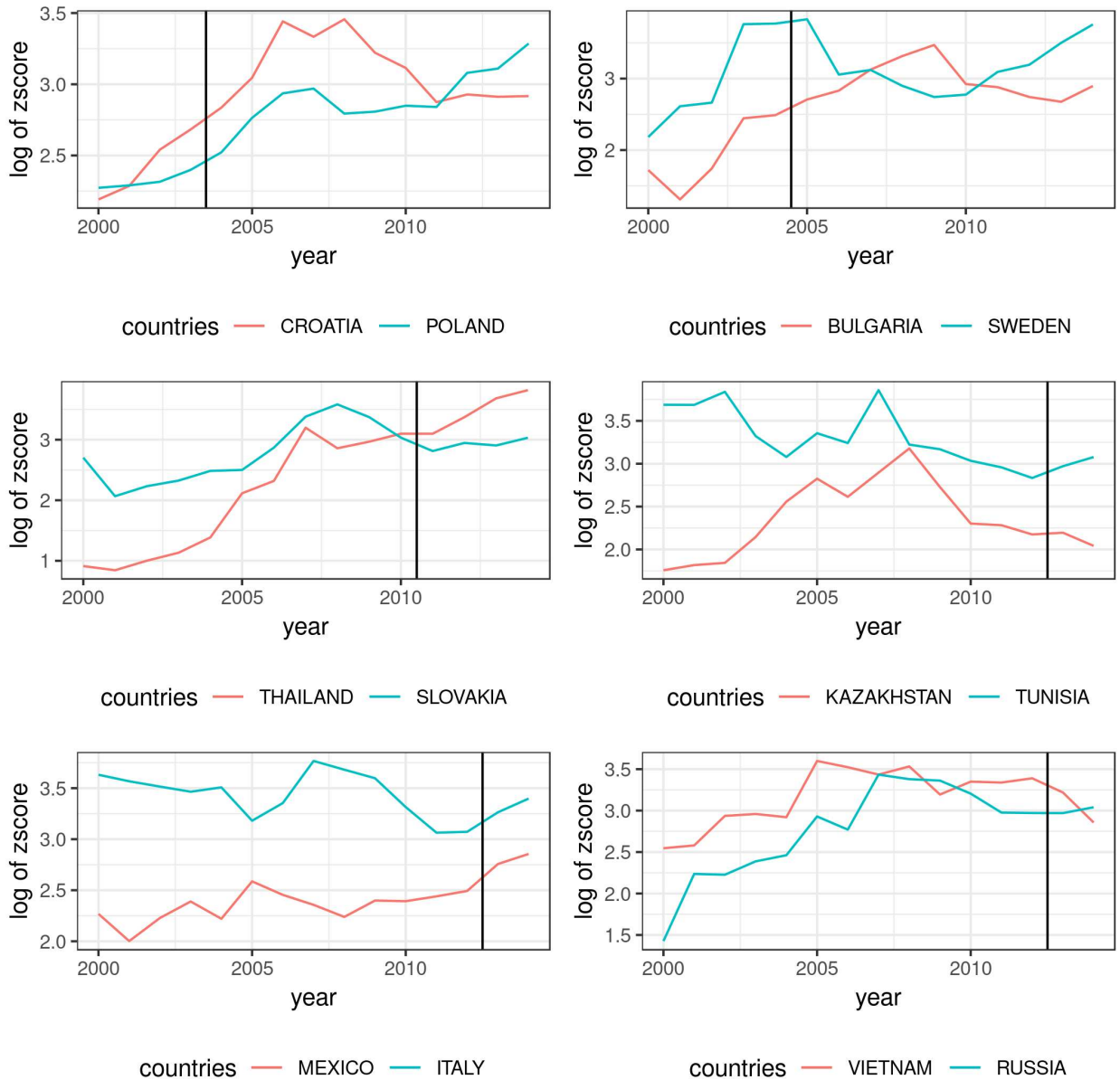

Figure 3: DP Matching

Countries that implemented the macroprudential policy are in red and their match in blue. In this graph, we show six selected countries from the 13 that implemented DP. The year of implementation is in the vertical line, which we move by half a year before implementation to facilitate visualization.

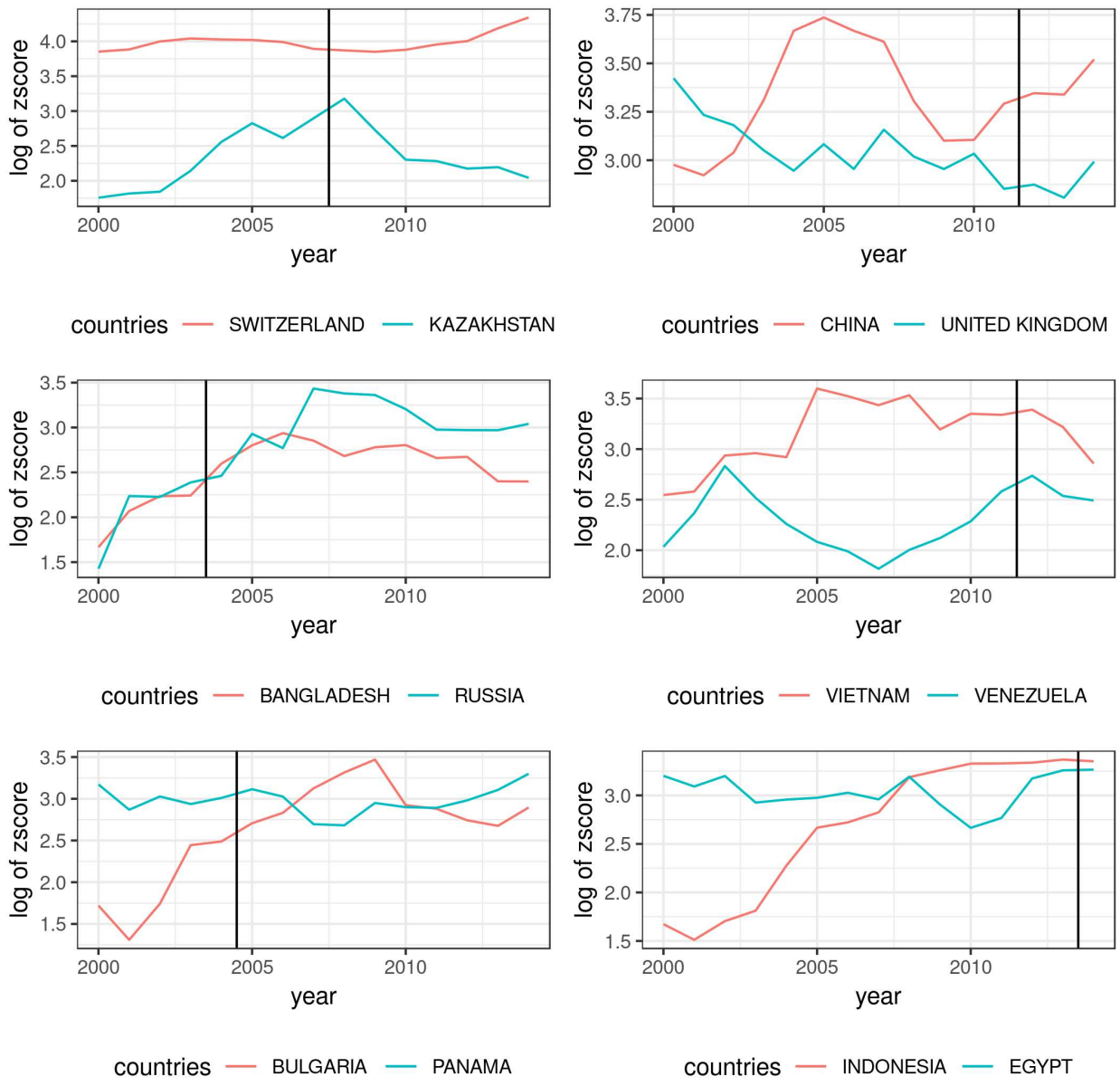

Figure 4: LEV, CG and RR_REV Matching

Countries that implemented the macroprudential policy are in red and their match in blue. Switzerland and China implemented LEV, while Bangladesh and Vietnam implemented CG. We choose the other two countries from those that implemented RR_REV. The year of implementation is in the vertical line, which we move by half a year before implementation to facilitate visualization.

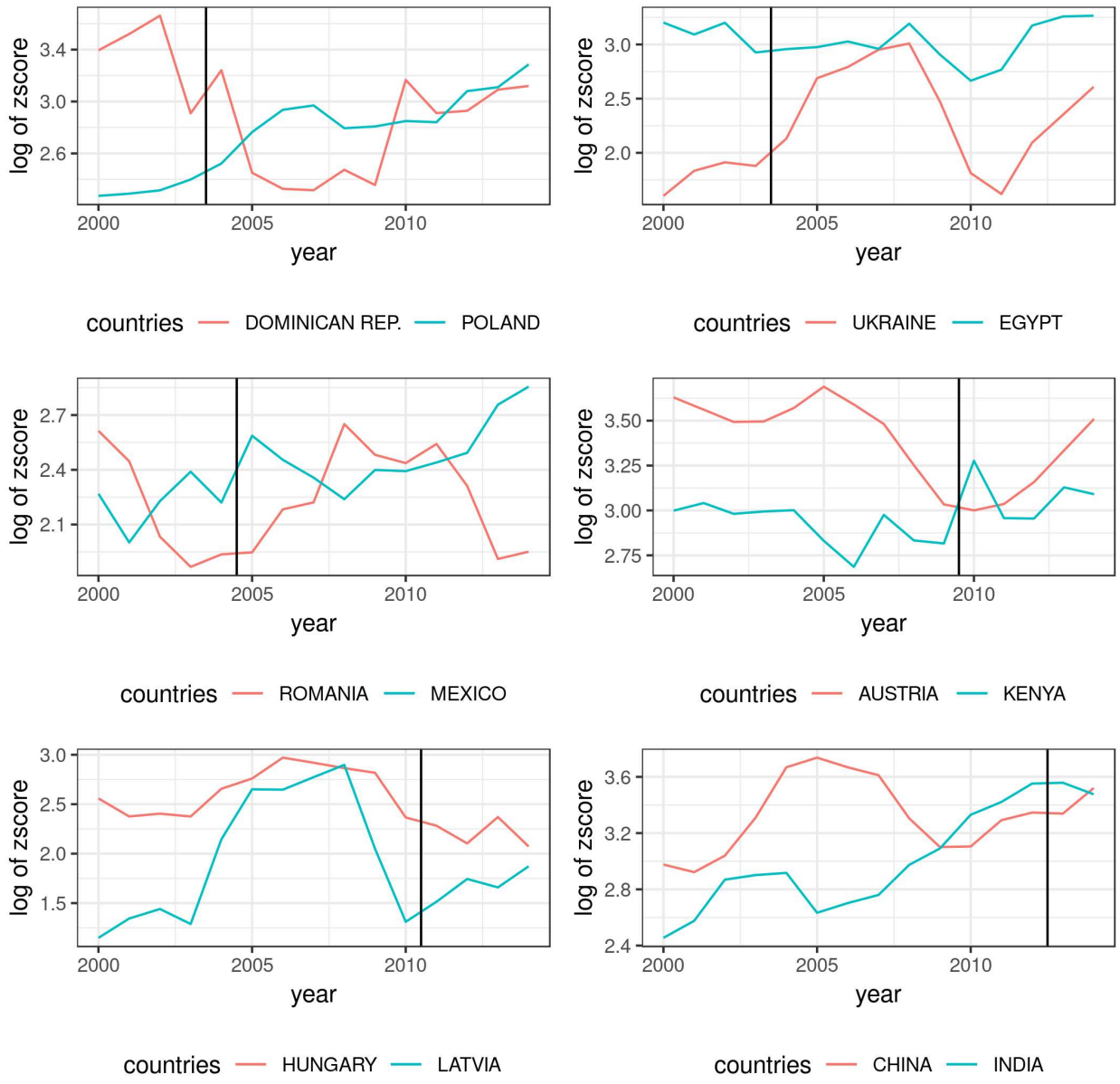

Figure 5: FC Matching

Countries that implemented the macroprudential policy are in red and their match in blue. In this graph, we show six selected countries from the ten that implemented FC. The year of implementation is in the vertical line, which we move by half a year before implementation to facilitate visualization.

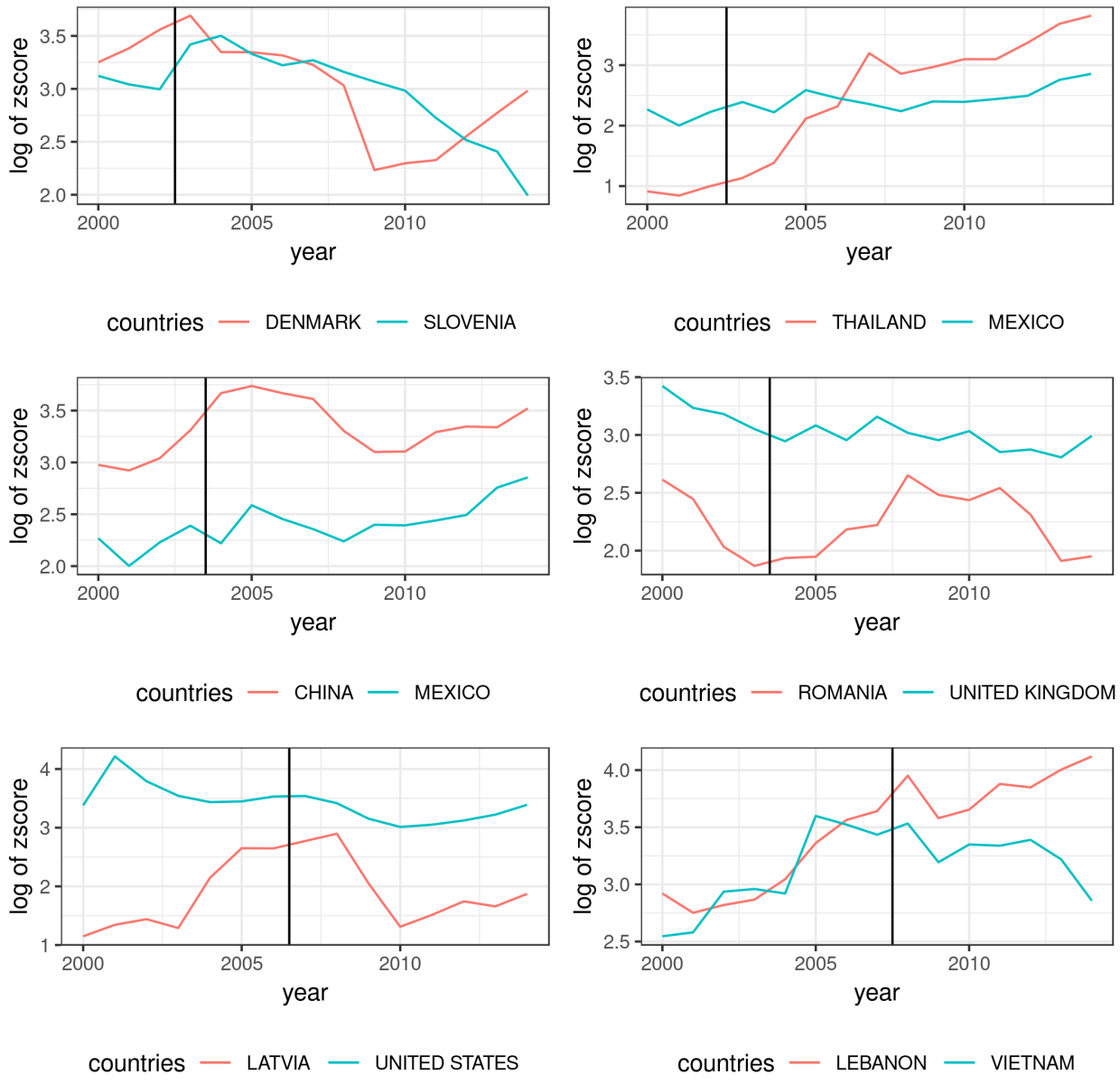

Figure 6: LTV_CAP Matching

Countries that implemented the macroprudential policy are in red and their match in blue. In this graph, we show six selected countries from the 22 that implemented LTV_CAP. We implement the matching with replacement. The year of implementation is in the vertical line, which we move by half a year before implementation to facilitate visualization.

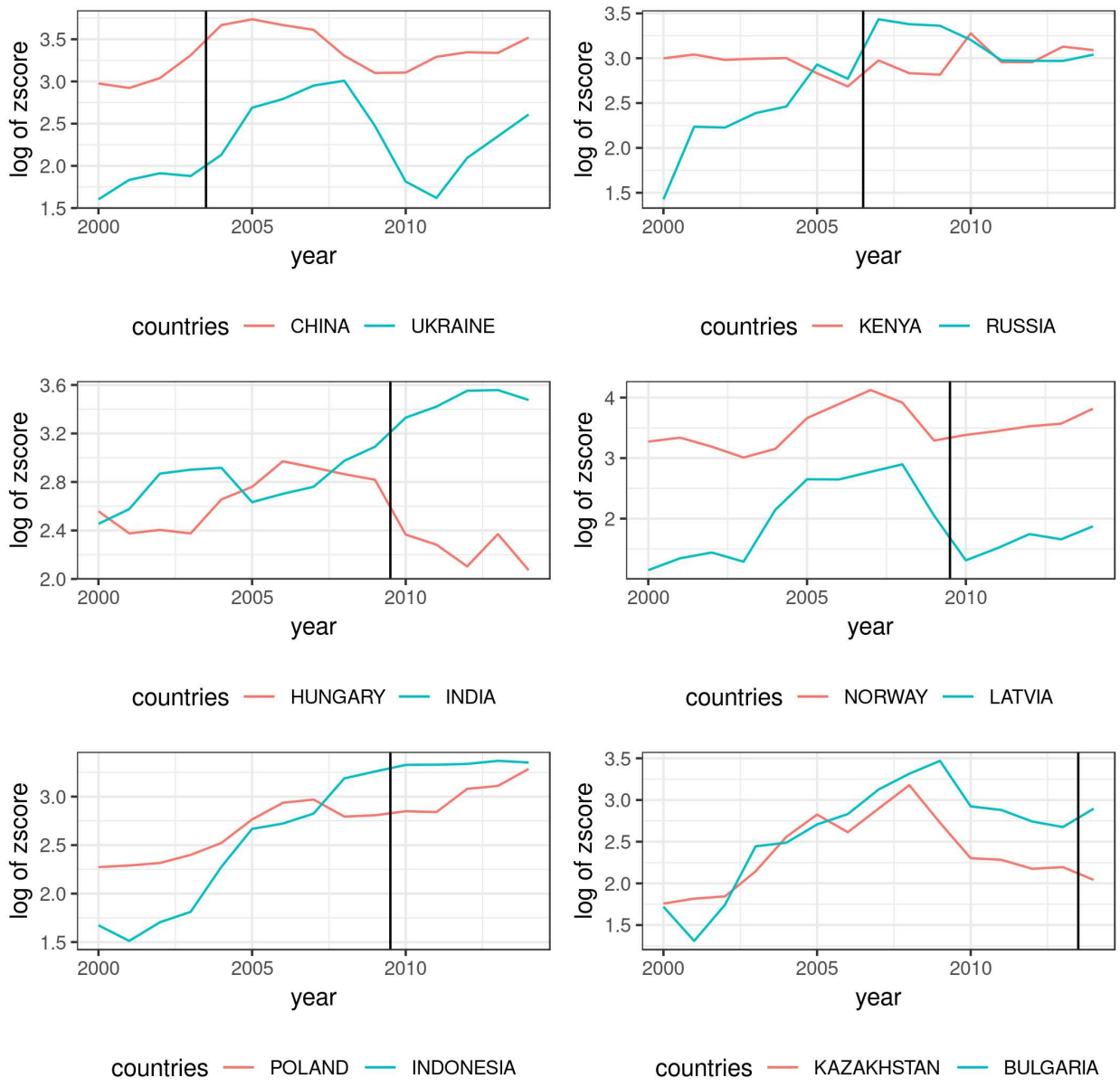

Figure 7: DTI Matching

Countries that implemented the macroprudential policy are in red and their match in blue. In this graph, we show six selected countries from the 12 that implemented DTI. The year of implementation is in the vertical line, which we move by half a year before implementation to facilitate visualization.

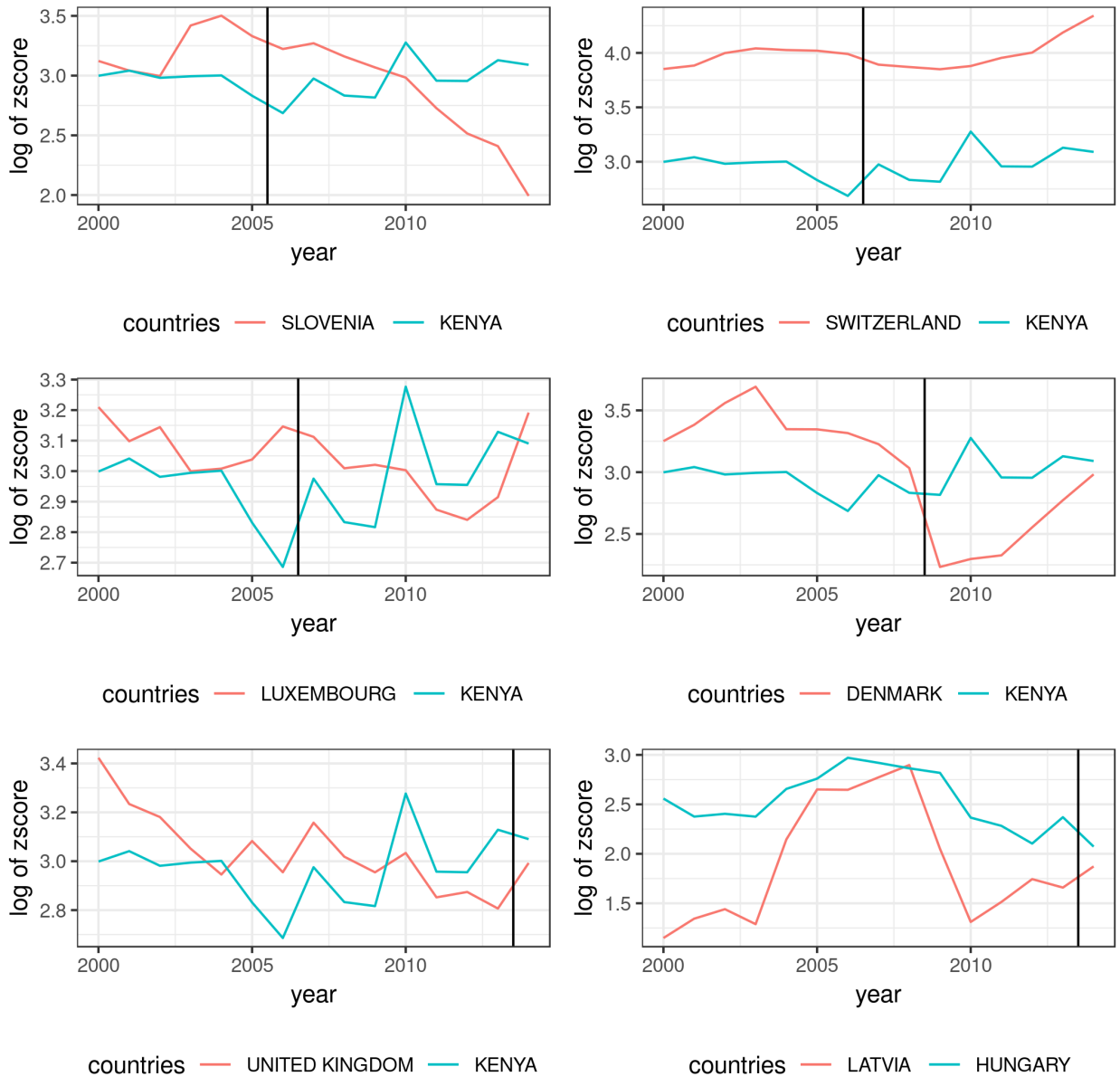

Figure 8: CONC Matching

Countries that implemented the macroprudential policy are in red and their match in blue. In this graph, we show six selected countries from the 37 that implemented CONC. We implement the matching with replacement. The year of implementation is in the vertical line, which we move by half a year before implementation to facilitate visualization.

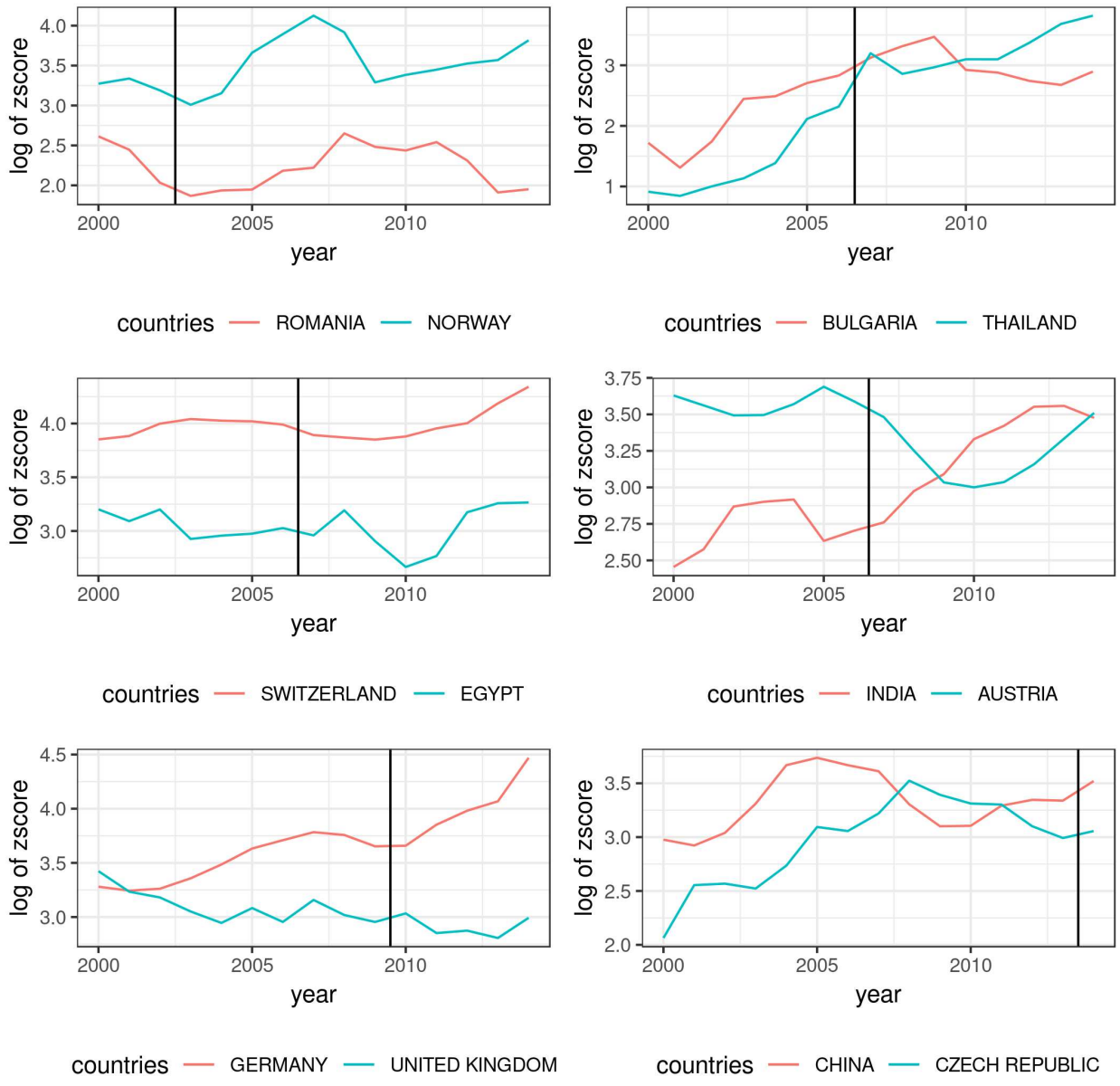

Figure 9: INTER Matching

Countries that implemented the macroprudential policy are in red and their match in blue. In this graph, we show six selected countries from the 19 that implemented INTER. The year of implementation is in the vertical line, which we move by half a year before implementation to facilitate visualization.

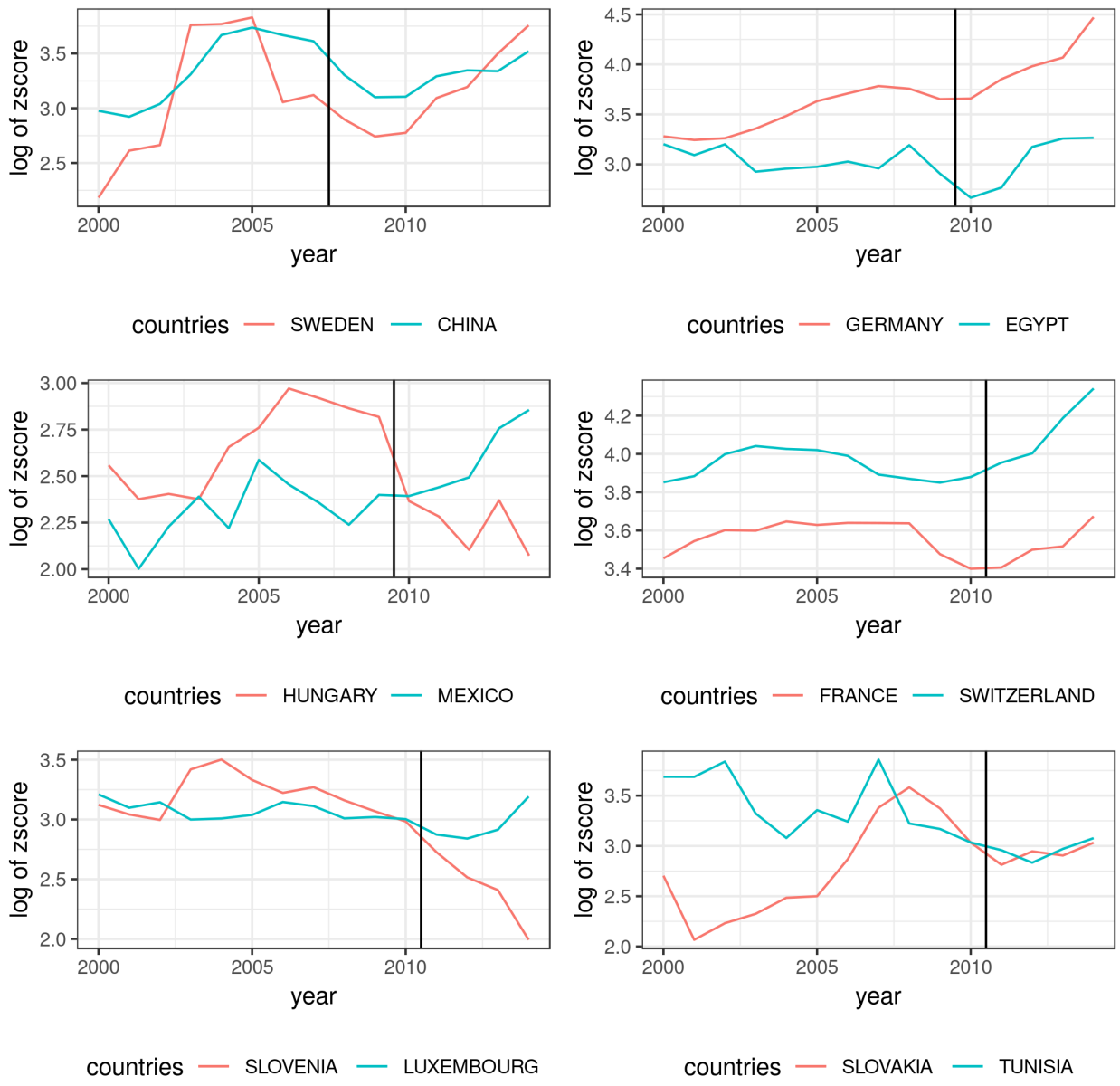

Figure 10: TAX Matching

Countries that implemented the macroprudential policy are in red and their match in blue. In this graph, we show six selected countries from the 13 that implemented TAX. The year of implementation is in the vertical line, which we move by half a year before implementation to facilitate visualization.

Table 5: Impact of CTC on banking stability

	Dependent Variable: Ln(Z-score)						*Z-score decomposition*	
	Baseline	Size	Liquidity	Leverage	HHI	Higher risk	ROA	Equity ratio
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
CTC	0.230	1.526	0.354	0.460	1.008*	0.041	-0.007	0.274
	(0.239)	(1.305)	(0.346)	(0.415)	(0.524)	(0.168)	(0.087)	(0.275)
CTC · X_t	—	-0.100	-1.445	-0.031	-5.093*	0.037	—	—
		(0.089)	(1.853)	(0.034)	(2.668)	(0.138)		
CTC · Higher stability	—	—	—	—	—	-0.247	—	—
						(0.155)		
Higher risk	—	—	—	—	—	-0.882***	—	—
						(0.262)		
Higher stability	—	—	—	—	—	0.969***	—	—
						(0.253)		
Ln(Y_{t-1})	0.406	0.337	0.320	0.325	0.298	-0.021	0.349	0.244
	(0.413)	(0.373)	(0.377)	(0.376)	(0.377)	(0.307)	(0.241)	(0.388)
Ln(Y_{t-2})	0.196	0.149	0.139	0.145	0.160	0.146	0.299	0.219
	(0.350)	(0.342)	(0.352)	(0.347)	(0.357)	(0.252)	(0.228)	(0.317)
Size	0.420*	0.381**	0.400**	0.395**	0.404**	0.331*	0.173*	0.454**
	(0.236)	(0.165)	(0.168)	(0.167)	(0.169)	(0.175)	(0.101)	(0.224)
Liquid Ratio	3.829	3.104	4.043	3.549	4.367	1.091	-0.185	4.480
	(4.781)	(3.834)	(4.086)	(3.913)	(4.203)	(3.872)	(1.606)	(5.918)
Leverage	-0.060***	-0.058***	-0.058***	-0.058***	-0.059***	-0.030*	-0.016	-0.054***
	(0.021)	(0.016)	(0.017)	(0.016)	(0.017)	(0.016)	(0.015)	(0.020)
Deposit Ratio	-1.053	-0.071	-0.470	-0.160	-0.599	0.327	1.907	0.124
	(2.728)	(2.465)	(2.590)	(2.464)	(2.588)	(1.891)	(1.386)	(2.845)
Cost Ratio	5.131	2.077	-0.306	0.268	0.039	9.080	17.439	5.201
	(12.674)	(12.681)	(13.475)	(13.239)	(13.888)	(11.395)	(12.752)	(15.716)
Loan/Assets	9.668*	8.474**	9.238**	8.789**	9.576**	5.893	3.932**	9.800
	(5.312)	(3.545)	(3.771)	(3.578)	(3.821)	(4.134)	(1.803)	(6.137)
GDP per capita growth	-0.045	-0.037	-0.041	-0.043	-0.032	-0.001	-0.037	-0.059
	(0.052)	(0.040)	(0.040)	(0.041)	(0.037)	(0.036)	(0.028)	(0.052)
Trade/GDP	0.023***	0.021***	0.021***	0.021***	0.022***	0.017***	0.018***	0.022***
	(0.006)	(0.005)	(0.005)	(0.005)	(0.005)	(0.004)	(0.004)	(0.006)
HHI Loans	12.067	8.579	9.747	9.197	9.982	0.246	4.468	12.315
	(9.187)	(6.452)	(6.759)	(6.532)	(6.835)	(7.541)	(4.314)	(9.564)
Country Equity/Assets	33.014	27.701	30.344	29.931	28.801	2.388	23.086*	37.653
	(25.128)	(18.333)	(18.730)	(18.765)	(18.280)	(19.851)	(11.813)	(25.384)
Country Loan/Deposits	-1.341	-1.197**	-1.248**	-1.246**	-1.218**	-0.673	-1.060**	-1.494*
	(0.819)	(0.605)	(0.617)	(0.614)	(0.604)	(0.584)	(0.442)	(0.765)
Property Rights Index	-0.073***	-0.068***	-0.070***	-0.068***	-0.072***	-0.035**	-0.055***	-0.065***
	(0.014)	(0.013)	(0.013)	(0.013)	(0.014)	(0.014)	(0.010)	(0.016)
Observations	5,040	5,040	5,040	5,040	5,040	5,040	5,040	5,040
Number of banks	675	675	675	675	675	675	675	675
Serial correlation AR(1)	0.439	0.417	0.430	0.424	0.491	0.271	0.327	0.489
Serial correlation AR(2)	0.375	0.499	0.487	0.491	0.453	0.310	0.118	0.268
Hansen test	0.145	0.105	0.164	0.138	0.177	0.289	0.109	0.190

Note: This table presents the results of the System-GMM model after matching countries through propensity score estimates. ROA and Equity Ratio are risk adjusted and in logarithm. The coefficients of the year dummies and the constant were omitted for space considerations. The values of the serial correlation and Hansen tests are p-values. Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 6: Impact of SIFI on banking stability

	Dependent Variable: Ln(Z-score)						*Z-score decomposition*	
	Baseline	Size	Liquidity	Leverage	HHI	Higher risk	ROA	Equity ratio
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
SIFI	0.218**	0.097	-0.208	-0.108	0.380*	0.252**	-0.053	0.205**
	(0.104)	(0.684)	(0.235)	(0.145)	(0.224)	(0.123)	(0.166)	(0.081)
SIFI · X_t	—	0.008	2.253**	0.014*	-1.039	0.026	—	—
		(0.044)	(1.013)	(0.008)	(1.343)	(0.138)		
SIFI · Higher stability	—	—	—	—	—	-0.279***	—	—
						(0.082)		
Higher risk	—	—	—	—	—	-0.658***	—	—
						(0.200)		
Higher stability	—	—	—	—	—	0.896***	—	—
						(0.149)		
Ln(Y_{t-1})	0.665***	0.676***	0.695***	0.678***	0.689***	0.372**	0.875	0.850***
	(0.193)	(0.191)	(0.220)	(0.202)	(0.196)	(0.188)	(0.637)	(0.222)
Ln(Y_{t-2})	0.160	0.141	-0.052	0.117	0.159	0.149	-0.479	-0.020
	(0.206)	(0.212)	(0.253)	(0.230)	(0.211)	(0.263)	(0.495)	(0.207)
Size	0.030	0.026	0.073	0.027	0.035	0.021	-0.061	0.005
	(0.084)	(0.083)	(0.078)	(0.080)	(0.085)	(0.069)	(0.164)	(0.082)
Liquid Ratio	-2.963	-2.943	-2.679	-4.119	-2.666	-0.850	-10.046	-1.891
	(2.808)	(2.805)	(2.646)	(2.608)	(2.813)	(3.436)	(7.947)	(2.372)
Leverage	-0.064***	-0.063***	-0.068***	-0.057***	-0.063***	-0.034**	0.019	-0.050***
	(0.012)	(0.012)	(0.011)	(0.010)	(0.012)	(0.016)	(0.019)	(0.012)
Deposit Ratio	2.577	2.529	4.240**	1.343	2.967	1.784	-2.188	1.716
	(2.554)	(2.534)	(2.070)	(2.337)	(2.658)	(2.779)	(4.191)	(2.435)
Cost Ratio	12.745	11.961	7.397	6.891	15.015	11.064	-32.339	6.976
	(12.831)	(12.935)	(12.171)	(13.131)	(13.258)	(15.212)	(21.922)	(9.301)
Loan/Assets	2.591	2.637	2.857	2.099	2.800	1.885	-4.077	1.997
	(2.023)	(2.005)	(1.942)	(1.918)	(2.022)	(1.763)	(4.056)	(1.670)
GDP per capita growth	-0.008	-0.008	0.013	-0.009	-0.009	-0.004	-0.013	-0.021*
	(0.013)	(0.014)	(0.016)	(0.014)	(0.014)	(0.016)	(0.032)	(0.011)
Trade/GDP	0.000	0.001	0.007	0.001	-0.000	-0.001	0.012	0.001
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.008)	(0.003)
HHI Loans	0.603	0.540	-0.847	0.614	0.687	2.250	2.636	0.538
	(1.287)	(1.271)	(1.976)	(1.383)	(1.601)	(1.587)	(2.561)	(1.182)
Country Equity/Assets	-4.982	-5.033	-12.885***	-5.157	-4.546	-2.959	-14.313	-5.180
	(4.582)	(4.570)	(4.727)	(4.595)	(4.758)	(3.552)	(9.296)	(4.068)
Country Loan/Deposits	-1.379***	-1.366***	-0.711	-1.353***	-1.436***	-0.521	0.753	-1.006***
	(0.469)	(0.471)	(0.552)	(0.478)	(0.476)	(0.457)	(0.721)	(0.387)
Property Rights Index	0.009	0.009	0.010*	0.005	0.010	0.010	-0.009	0.005
	(0.006)	(0.006)	(0.006)	(0.006)	(0.007)	(0.008)	(0.013)	(0.006)
Observations	9,710	9,710	9,710	9,710	9,710	9,710	9,710	9,710
Number of banks	1,273	1,273	1,273	1,273	1,273	1,273	1,273	1,273
Serial correlation AR(1)	0.0979	0.0886	0.0606	0.108	0.0960	0.198	0.207	0.0310
Serial correlation AR(2)	0.218	0.269	0.889	0.340	0.229	0.365	0.536	0.725
Hansen test	0.125	0.124	0.188	0.112	0.133	0.116	0.553	0.0921

Note: This table presents the results of the System-GMM model after matching countries through propensity score estimates. ROA and Equity Ratio are risk adjusted and in logarithm. The coefficients of the year dummies and the constant were omitted for space considerations. The values of the serial correlation and Hansen tests are p-values. Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 7: Impact of DP on banking stability

	Dependent Variable: Ln(Z-score)						*Z-score decomposition*	
	Baseline	Size	Liquidity	Leverage	HHI	Higher risk	ROA	Equity ratio
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
DP	0.291*	-2.955	0.809	-1.914***	0.012	0.232**	0.053	0.086
	(0.160)	(2.114)	(0.717)	(0.479)	(0.295)	(0.111)	(0.132)	(0.186)
DP · X_t	—	0.219	-2.668	0.205***	1.613	0.026	—	—
		(0.154)	(3.040)	(0.048)	(2.527)	(0.089)		
DP · Higher stability	—	—	—	—	—	-0.081	—	—
						(0.063)		
Higher risk	—	—	—	—	—	-0.188	—	—
						(0.288)		
Higher stability	—	—	—	—	—	0.486***	—	—
						(0.153)		
Ln(Y_{t-1})	1.422***	0.817**	0.804**	0.606*	0.987**	0.814***	1.639***	1.019***
	(0.378)	(0.331)	(0.406)	(0.338)	(0.441)	(0.289)	(0.536)	(0.292)
Ln(Y_{t-2})	-0.592*	-0.005	0.081	0.112	-0.047	-0.134	-0.475	-0.341
	(0.328)	(0.305)	(0.375)	(0.283)	(0.384)	(0.223)	(0.336)	(0.241)
Size	0.062	0.079	0.153	0.129	0.153	0.025	0.023	-0.016
	(0.145)	(0.175)	(0.164)	(0.125)	(0.178)	(0.115)	(0.073)	(0.100)
Liquid Ratio	-4.658***	-3.439***	-3.150**	-1.542	-3.734***	-2.689**	0.420	-2.757
	(1.682)	(1.250)	(1.398)	(1.004)	(1.377)	(1.060)	(1.181)	(2.194)
Leverage	-0.189***	-0.205***	-0.209***	-0.251***	-0.199***	-0.143***	0.003	-0.120*
	(0.040)	(0.052)	(0.057)	(0.057)	(0.061)	(0.054)	(0.027)	(0.072)
Deposit Ratio	-0.440	0.149	0.098	-0.373	0.237	0.073	-0.213	1.530
	(1.434)	(0.718)	(0.783)	(0.661)	(0.900)	(0.638)	(1.314)	(1.157)
Cost Ratio	1.198	0.953	1.007	0.474	1.511	1.392*	-0.781	1.431*
	(1.294)	(1.170)	(1.203)	(0.998)	(1.265)	(0.844)	(0.992)	(0.831)
Loan/Assets	-0.808	0.099	-0.147	0.449	0.050	-0.187	0.698	0.087
	(1.909)	(1.263)	(1.364)	(1.238)	(1.531)	(0.994)	(1.279)	(1.240)
GDP per capita growth	0.029***	0.014	0.018**	0.002	0.020**	0.021***	-0.010	0.027
	(0.008)	(0.009)	(0.009)	(0.007)	(0.009)	(0.006)	(0.013)	(0.017)
Trade/GDP	0.003	0.002	0.002	0.003	0.002	0.003	0.004	-0.009
	(0.003)	(0.003)	(0.003)	(0.002)	(0.004)	(0.002)	(0.009)	(0.014)
HHI Loans	-3.030**	-2.780*	-2.673*	-3.125**	-2.540	-3.371***	0.972	-4.349***
	(1.373)	(1.469)	(1.586)	(1.312)	(2.306)	(0.956)	(2.544)	(0.772)
Country Equity/Assets	-10.608***	-9.407***	-10.636***	-8.690***	-9.540***	-9.595***	1.982	-7.191***
	(2.235)	(2.590)	(2.898)	(2.385)	(3.022)	(1.686)	(2.858)	(2.364)
Country Loan/Deposits	0.010	-0.008	0.015	-0.112*	0.028	0.016	0.032	0.055
	(0.085)	(0.078)	(0.075)	(0.060)	(0.077)	(0.053)	(0.098)	(0.059)
Property Rights Index	-0.007*	-0.007	-0.009*	-0.005	-0.008	-0.003	-0.005*	0.000
	(0.004)	(0.005)	(0.005)	(0.004)	(0.007)	(0.005)	(0.003)	(0.003)
Observations	16,682	16,682	16,682	16,682	16,682	16,682	16,682	16,682
Number of banks	2,776	2,776	2,776	2,776	2,776	2,776	2,776	2,776
Serial correlation AR(1)	0.00712	0.149	0.298	0.336	0.207	0.0470	0.0354	0.00951
Serial correlation AR(2)	0.403	0.462	0.360	0.264	0.573	0.783	0.239	0.441
Hansen test	0.119	0.300	0.239	0.120	0.256	0.0758	0.0567	0.0568

Note: This table presents the results of the System-GMM model after matching countries through propensity score estimates. ROA and Equity Ratio are risk adjusted and in logarithm. The coefficients of the year dummies and the constant were omitted for space considerations. The values of the serial correlation and Hansen tests are p-values. Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 8: Impact of LEV on banking stability

	Dependent Variable: Ln(Z-score)						*Z-score decomposition*	
	Baseline	Size	Liquidity	Leverage	HHI	Higher risk	ROA	Equity ratio
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
LEV	0.334	-32.300	0.295	-0.460	-4.972***	0.249	-0.064	-0.151
	(0.320)	(35.812)	(1.366)	(0.576)	(1.225)	(0.280)	(0.118)	(0.113)
LEV · X_t	—	2.221	0.578	0.037	32.206***	0.088	—	—
		(2.519)	(5.945)	(0.045)	(7.766)	(0.144)		
LEV · Higher stability	—	—	—	—	—	-0.148	—	—
						(0.305)		
Higher risk	—	—	—	—	—	-0.751***	—	—
						(0.259)		
Higher stability	—	—	—	—	—	0.687**	—	—
						(0.329)		
Ln(Y_{t-1})	0.849	0.979	0.966**	0.687	0.057	0.709	1.066***	0.486**
	(0.542)	(0.818)	(0.440)	(0.516)	(0.291)	(0.463)	(0.237)	(0.234)
Ln(Y_{t-2})	-0.273	-0.002	-0.444	0.132	0.358	-0.372	-0.308	0.127
	(0.724)	(0.639)	(0.572)	(0.590)	(0.334)	(0.578)	(0.235)	(0.235)
Size	-0.348	-2.478	-0.351	-0.484	0.103	-0.340*	-0.129*	-0.014
	(0.242)	(2.763)	(0.299)	(0.336)	(0.140)	(0.205)	(0.078)	(0.104)
Liquid Ratio	-11.152***	-5.541	-11.357*	-12.044***	-10.672***	-8.482***	-3.528	-5.277***
	(4.248)	(6.693)	(6.669)	(4.251)	(2.753)	(3.246)	(2.207)	(1.692)
Leverage	-0.018	0.095	-0.041	0.072	-0.079**	0.018	0.006	-0.037
	(0.103)	(0.189)	(0.110)	(0.086)	(0.040)	(0.081)	(0.024)	(0.024)
Deposit Ratio	-4.164	-20.106	-2.336	-12.176	-0.885	-4.952	-3.196	-3.910
	(12.161)	(26.288)	(12.590)	(11.100)	(5.809)	(9.638)	(3.630)	(3.575)
Cost Ratio	-0.718	-27.008	-1.538	0.823	5.609	-2.620	2.593	9.484
	(13.016)	(28.312)	(14.200)	(13.925)	(10.024)	(10.359)	(7.575)	(9.231)
Loan/Assets	-12.098**	-3.876	-13.319**	-9.951*	-5.849**	-9.658*	-4.292**	-4.838**
	(6.126)	(6.858)	(5.258)	(5.281)	(2.954)	(5.083)	(2.123)	(2.127)
GDP per capita growth	-0.068**	0.161	-0.063*	-0.086**	0.002	-0.042	0.024	0.027
	(0.034)	(0.289)	(0.033)	(0.036)	(0.026)	(0.029)	(0.027)	(0.028)
Trade/GDP	0.025	0.001	0.032	-0.006	0.032**	0.018	-0.002	0.004
	(0.035)	(0.050)	(0.035)	(0.030)	(0.015)	(0.028)	(0.010)	(0.010)
HHI Loans	10.818	-18.121	9.419	20.329*	-31.004***	6.220	0.306	-4.865
	(8.949)	(29.232)	(12.637)	(12.122)	(7.610)	(8.113)	(4.267)	(4.396)
Country Equity/Assets	19.566	40.909	18.888	29.868*	-7.766**	11.538	-8.913	-19.331***
	(12.189)	(48.079)	(17.853)	(16.948)	(3.835)	(11.093)	(7.391)	(6.717)
Country Loan/Deposits	-2.713*	1.693	-2.787*	-2.989*	0.629	-1.811	-0.463	-0.304
	(1.487)	(5.143)	(1.686)	(1.615)	(0.759)	(1.199)	(0.605)	(0.715)
Property Rights Index	-0.004	-0.063	-0.001	-0.010	0.014	-0.004	0.004	0.005
	(0.017)	(0.070)	(0.017)	(0.015)	(0.010)	(0.014)	(0.009)	(0.011)
Observations	66,279	66,279	66,279	66,279	66,279	66,279	66,279	66,279
Number of banks	8,850	8,850	8,850	8,850	8,850	8,850	8,850	8,850
Serial correlation AR(1)	0.375	0.424	0.183	0.469	0.841	0.260	0.00513	0.263
Serial correlation AR(2)	0.899	0.690	0.645	0.472	0.141	0.708	0.418	0.311
Hansen test	0.195	0.246	0.223	0.107	0.503	0.241	0.153	0.0847

Note: This table presents the results of the System-GMM model after matching countries through propensity score estimates. ROA and Equity Ratio are risk adjusted and in logarithm. The coefficients of the year dummies and the constant were omitted for space considerations. The values of the serial correlation and Hansen tests are p-values. Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 9: Impact of CG on banking stability

	Dependent Variable: Ln(Z-score)					*Z-score decomposition*		
	Baseline	Size	Liquidity	Leverage	HHI	Higher risk	ROA	Equity ratio
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
CG	-0.852**	-2.306*	-1.218	-1.549**	-1.474*	-0.538**	-0.313**	-1.130**
	(0.434)	(1.358)	(1.159)	(0.624)	(0.880)	(0.236)	(0.155)	(0.483)
CG · X_t	—	0.109	1.321	0.071*	7.345	-0.187**	—	—
		(0.098)	(4.129)	(0.040)	(6.663)	(0.083)		
CG · Higher stability	—	—	—	—	—	-0.020	—	—
						(0.075)		
Higher risk	—	—	—	—	—	-0.794***	—	—
						(0.106)		
Higher stability	—	—	—	—	—	0.858***	—	—
						(0.084)		
Ln(Y_{t-1})	0.578*	0.581*	0.564*	0.540*	0.526	0.235	1.149***	0.539*
	(0.316)	(0.311)	(0.303)	(0.301)	(0.324)	(0.162)	(0.124)	(0.297)
Ln(Y_{t-2})	-0.184	-0.210	-0.162	-0.193	-0.156	-0.018	-0.275**	-0.147
	(0.226)	(0.226)	(0.231)	(0.220)	(0.223)	(0.109)	(0.108)	(0.174)
Size	-0.020	-0.021	-0.017	-0.019	-0.018	0.004	0.026	0.003
	(0.063)	(0.062)	(0.064)	(0.062)	(0.061)	(0.033)	(0.029)	(0.062)
Liquid Ratio	-3.492*	-3.273*	-3.832*	-3.321*	-3.371*	-1.415	-1.165*	-3.761*
	(2.050)	(1.955)	(2.222)	(2.015)	(1.999)	(1.151)	(0.610)	(1.934)
Leverage	-0.149***	-0.147***	-0.150***	-0.157***	-0.149***	-0.068***	-0.023**	-0.159***
	(0.044)	(0.043)	(0.045)	(0.045)	(0.044)	(0.025)	(0.010)	(0.049)
Deposit Ratio	1.721	1.757	1.828	1.903	1.773	0.420	0.576	1.984
	(1.386)	(1.409)	(1.367)	(1.353)	(1.370)	(0.668)	(0.555)	(1.306)
Cost Ratio	3.145*	3.212*	3.252*	2.606	3.183*	1.709**	0.243	3.005*
	(1.679)	(1.679)	(1.691)	(1.812)	(1.656)	(0.841)	(0.684)	(1.599)
Loan/Assets	-1.351	-1.232	-1.406	-1.199	-1.147	-0.547	-1.564**	-1.741
	(1.879)	(1.848)	(1.905)	(1.919)	(1.880)	(0.959)	(0.645)	(1.748)
GDP per capita growth	0.023	0.022	0.026*	0.016	0.025*	0.017**	0.006	0.024*
	(0.014)	(0.014)	(0.014)	(0.014)	(0.014)	(0.007)	(0.006)	(0.014)
Trade/GDP	0.003	0.003	0.004	0.004	0.003	0.006***	-0.000	0.005**
	(0.002)	(0.003)	(0.003)	(0.002)	(0.002)	(0.001)	(0.001)	(0.002)
HHI Loans	-7.773	-7.548	-8.495	-8.941*	-7.859	-3.628	-1.481	-11.030**
	(5.165)	(5.148)	(5.170)	(4.968)	(4.927)	(2.702)	(1.737)	(5.473)
Country Equity/Assets	-11.709***	-11.600***	-12.475***	-10.068***	-12.015***	-6.883***	-4.625***	-12.992***
	(4.115)	(4.155)	(4.551)	(3.662)	(4.047)	(2.195)	(1.463)	(4.445)
Country Loan/Deposits	0.063	0.068	0.074	0.074	0.054	0.065	0.065	0.077
	(0.113)	(0.112)	(0.109)	(0.114)	(0.111)	(0.056)	(0.051)	(0.111)
Property Rights Index	-0.004	-0.003	-0.001	-0.001	-0.003	0.002	0.003	0.010
	(0.012)	(0.011)	(0.013)	(0.012)	(0.012)	(0.006)	(0.005)	(0.012)
Observations	5,758	5,758	5,758	5,758	5,758	5,758	5,758	5,758
Number of banks	1,091	1,091	1,091	1,091	1,091	1,091	1,091	1,091
Serial correlation AR(1)	0.0795	0.0720	0.0694	0.0788	0.103	0.00422	3.84e-07	0.0491
Serial correlation AR(2)	0.805	0.722	0.858	0.736	0.886	0.508	0.0623	0.697
Hansen test	0.138	0.119	0.107	0.118	0.127	0.0580	0.0926	0.201

Note: This table presents the results of the System-GMM model after matching countries through propensity score estimates. ROA and Equity Ratio are risk adjusted and in logarithm. The coefficients of the year dummies and the constant were omitted for space considerations. The values of the serial correlation and Hansen tests are p-values. Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 10: Impact of RR_REV on banking stability

	Dependent Variable: Ln(Z-score)						*Z-score decomposition*	
	Baseline	Size	Liquidity	Leverage	HHI	Higher risk	ROA	Equity ratio
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
RR_REV	-0.583***	-11.802**	-1.281***	-2.089***	-1.400**	-0.500***	0.052	-0.564***
	(0.170)	(5.330)	(0.355)	(0.508)	(0.566)	(0.073)	(0.095)	(0.148)
RR_REV · X_t	—	0.790**	2.765**	0.167***	7.827*	-0.102	—	—
		(0.379)	(1.267)	(0.060)	(4.282)	(0.073)		
RR_REV · Higher stability	—	—	—	—	—	-0.033	—	—
						(0.060)		
Higher risk	—	—	—	—	—	-1.037***	—	—
						(0.156)		
Higher stability	—	—	—	—	—	0.996***	—	—
						(0.115)		
Ln(Y_{t-1})	0.608	0.939*	0.615	0.828	0.686	0.117	1.427***	0.486
	(0.428)	(0.547)	(0.595)	(0.586)	(0.459)	(0.243)	(0.309)	(0.410)
Ln(Y_{t-2})	-0.238	-0.575	-0.145	-0.421	-0.425	-0.061	-0.284	-0.076
	(0.373)	(0.436)	(0.399)	(0.481)	(0.383)	(0.211)	(0.200)	(0.356)
Size	-0.042	-0.190	-0.041	-0.077	-0.123	-0.056	0.078	0.056
	(0.138)	(0.183)	(0.156)	(0.165)	(0.136)	(0.075)	(0.072)	(0.133)
Liquid Ratio	-1.735	-1.191	-1.659	-1.689	-1.070	-1.174	-0.237	-1.765
	(1.879)	(2.301)	(2.533)	(2.250)	(2.007)	(0.907)	(0.842)	(1.710)
Leverage	-0.141***	-0.126***	-0.106**	-0.187***	-0.146***	-0.046**	0.009	-0.130***
	(0.036)	(0.032)	(0.046)	(0.054)	(0.038)	(0.022)	(0.016)	(0.033)
Deposit Ratio	3.074*	3.385*	2.525	2.984	3.749*	2.110***	-0.294	2.658*
	(1.797)	(2.021)	(1.561)	(2.079)	(2.083)	(0.779)	(0.803)	(1.545)
Cost Ratio	2.443	2.043	2.521	2.196	2.465	1.819***	-0.213	2.998**
	(1.607)	(1.998)	(1.990)	(1.895)	(1.792)	(0.628)	(1.112)	(1.331)
Loan/Assets	1.394	4.742	1.621	1.559	2.098	-0.657	0.507	0.764
	(2.393)	(2.955)	(3.555)	(3.070)	(2.585)	(1.259)	(0.788)	(2.149)
GDP per capita growth	-0.014	-0.026**	-0.012	-0.009	-0.014	-0.008*	-0.003	-0.017*
	(0.010)	(0.012)	(0.013)	(0.013)	(0.012)	(0.005)	(0.004)	(0.009)
Trade/GDP	-0.020**	-0.037***	-0.018*	-0.021**	-0.020**	-0.006	-0.001	-0.018**
	(0.009)	(0.011)	(0.009)	(0.010)	(0.009)	(0.005)	(0.001)	(0.008)
HHI Loans	-1.890	-5.014	-2.329	-2.764	-1.233	1.392	-3.642***	-2.622
	(3.224)	(3.462)	(2.818)	(4.224)	(3.723)	(1.867)	(1.144)	(2.705)
Country Equity/Assets	-9.156**	-9.543*	-7.051	-11.355**	-9.234*	-4.176*	0.899	-7.077*
	(4.315)	(4.890)	(5.845)	(5.564)	(4.714)	(2.355)	(1.877)	(4.242)
Country Loan/Deposits	-0.218*	-0.483***	-0.235*	-0.288*	-0.259*	-0.035	0.087	-0.163
	(0.119)	(0.163)	(0.125)	(0.156)	(0.136)	(0.072)	(0.106)	(0.112)
Property Rights Index	-0.016**	-0.031***	-0.014*	-0.013	-0.013	-0.008*	-0.003	-0.016**
	(0.008)	(0.011)	(0.008)	(0.009)	(0.008)	(0.005)	(0.003)	(0.007)
Observations	9,498	9,498	9,498	9,498	9,498	9,498	9,498	9,498
Number of banks	1,626	1,626	1,626	1,626	1,626	1,626	1,626	1,626
Serial correlation AR(1)	0.205	0.0958	0.384	0.203	0.124	0.0168	0.00377	0.329
Serial correlation AR(2)	0.834	0.454	0.952	0.624	0.502	0.739	0.286	0.892
Hansen test	0.126	0.177	0.103	0.347	0.211	0.0536	0.0941	0.0684

Note: This table presents the results of the System-GMM model after matching countries through propensity score estimates. ROA and Equity Ratio are risk adjusted and in logarithm. The coefficients of the year dummies and the constant were omitted for space considerations. The values of the serial correlation and Hansen tests are p-values. Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 11: Impact of FC on banking stability

	Dependent Variable: Ln(Z-score)						*Z-score decomposition*	
	Baseline	Size	Liquidity	Leverage	HHI	Higher risk	ROA	Equity ratio
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
FC	-0.355***	-5.079***	-0.452	-1.649***	-0.629*	-0.321***	-0.048	-0.342***
	(0.125)	(1.584)	(0.337)	(0.226)	(0.364)	(0.073)	(0.086)	(0.108)
FC · X_t	—	0.336***	0.385	0.135***	1.511	-0.171**	—	—
		(0.107)	(1.217)	(0.019)	(2.814)	(0.068)		
FC · Higher stability	—	—	—	—	—	0.033	—	—
						(0.049)		
Higher risk	—	—	—	—	—	-1.047***	—	—
						(0.143)		
Higher stability	—	—	—	—	—	0.917***	—	—
						(0.094)		
Ln(Y_{t-1})	0.199	0.185	0.249	0.142	-0.734	0.140	0.972***	0.254
	(0.274)	(0.275)	(0.257)	(0.264)	(0.916)	(0.179)	(0.160)	(0.224)
Ln(Y_{t-2})	-0.146	-0.035	-0.178	0.055	0.691	-0.172	-0.328**	-0.180
	(0.219)	(0.191)	(0.216)	(0.206)	(0.796)	(0.163)	(0.148)	(0.162)
Size	-0.219*	-0.189	-0.242*	-0.089	0.036	-0.170*	-0.049	-0.203*
	(0.132)	(0.122)	(0.137)	(0.116)	(0.313)	(0.089)	(0.072)	(0.111)
Liquid Ratio	2.278	3.175*	1.640	2.766	0.236	2.119*	0.965	2.381
	(1.707)	(1.828)	(1.801)	(1.748)	(1.783)	(1.091)	(0.823)	(1.552)
Leverage	-0.132***	-0.125***	-0.130***	-0.160***	-0.136***	-0.061***	-0.007	-0.128***
	(0.021)	(0.020)	(0.021)	(0.022)	(0.038)	(0.018)	(0.013)	(0.019)
Deposit Ratio	2.431	1.324	2.558	1.247	4.976*	1.578	0.063	2.260
	(1.900)	(1.587)	(1.922)	(1.603)	(2.639)	(1.209)	(1.137)	(1.646)
Cost Ratio	0.744	0.014	0.847	0.689	6.063	0.334	-1.050	0.820
	(1.667)	(1.651)	(1.660)	(1.617)	(4.048)	(1.102)	(1.020)	(1.503)
Loan/Assets	2.906*	3.822**	2.848*	3.348**	1.317	2.049*	0.455	2.355
	(1.642)	(1.806)	(1.630)	(1.572)	(2.155)	(1.134)	(0.667)	(1.454)
GDP per capita growth	0.041***	0.034***	0.041***	0.037***	0.037***	0.034***	0.004	0.034***
	(0.010)	(0.008)	(0.010)	(0.009)	(0.013)	(0.006)	(0.008)	(0.009)
Trade/GDP	-0.008	-0.007	-0.009	-0.007	-0.019	-0.006	0.007	-0.006
	(0.011)	(0.010)	(0.011)	(0.010)	(0.016)	(0.007)	(0.005)	(0.010)
HHI Loans	-5.961**	-6.567***	-5.592**	-6.272***	0.020	-2.867	-4.069***	-5.876**
	(2.448)	(2.341)	(2.355)	(2.294)	(3.198)	(1.828)	(1.405)	(2.291)
Country Equity/Assets	-16.108***	-13.576***	-15.851***	-14.978***	-8.083	-11.656***	-7.619***	-15.442***
	(2.929)	(2.760)	(2.894)	(2.674)	(6.009)	(2.159)	(2.429)	(2.836)
Country Loan/Deposits	0.030	-0.090	0.023	-0.083	0.182	0.083	0.065	0.025
	(0.073)	(0.080)	(0.073)	(0.072)	(0.141)	(0.056)	(0.051)	(0.066)
Property Rights Index	0.014	0.011	0.014	0.009	0.028**	0.013**	-0.003	0.015
	(0.010)	(0.009)	(0.010)	(0.009)	(0.014)	(0.006)	(0.006)	(0.009)
Observations	13,891	13,891	13,891	13,891	13,891	13,891	13,891	13,891
Number of banks	2,200	2,200	2,200	2,200	2,200	2,200	2,200	2,200
Serial correlation AR(1)	0.372	0.484	0.256	0.580	0.850	0.000411	8.98e-06	0.175
Serial correlation AR(2)	0.874	0.327	0.985	0.222	0.299	0.644	0.119	0.916
Hansen test	0.220	0.230	0.200	0.243	0.124	0.0510	0.382	0.154

Note: This table presents the results of the System-GMM model after matching countries through propensity score estimates. ROA and Equity Ratio are risk adjusted and in logarithm. The coefficients of the year dummies and the constant were omitted for space considerations. The values of the serial correlation and Hansen tests are p-values. Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 12: Impact of LTV_CAP on banking stability

	Dependent Variable: Ln(Z-score)						*Z-score decomposition*	
	Baseline (1)	Size (2)	Liquidity (3)	Leverage (4)	HHI (5)	Higher risk (6)	ROA (7)	Equity ratio (8)
LTV_CAP	0.121***	0.948	-0.521**	-0.538*	-0.496	0.077***	0.030	0.088**
	(0.041)	(1.670)	(0.240)	(0.277)	(0.318)	(0.029)	(0.283)	(0.037)
LTV_CAP · X_t	—	-0.057	3.543***	0.060**	5.002*	0.066	—	—
		(0.116)	(1.347)	(0.027)	(2.683)	(0.064)		
LTV_CAP · Higher stability	—	—	—	—	—	-0.216***	—	—
						(0.049)		
Higher risk	—	—	—	—	—	-0.876***	—	—
						(0.100)		
Higher stability	—	—	—	—	—	1.002***	—	—
						(0.080)		
Ln(Y_{t-1})	0.826***	0.842***	0.791***	0.855***	0.754***	0.455***	0.826***	0.942***
	(0.225)	(0.226)	(0.222)	(0.227)	(0.218)	(0.168)	(0.188)	(0.223)
Ln(Y_{t-2})	-0.372	-0.385	-0.326	-0.438*	-0.296	-0.277	0.148	-0.333
	(0.266)	(0.268)	(0.264)	(0.266)	(0.252)	(0.179)	(0.197)	(0.249)
Size	0.107	0.107	0.070	0.096	0.106	0.118*	-0.044	-0.041
	(0.095)	(0.113)	(0.094)	(0.095)	(0.100)	(0.062)	(0.093)	(0.092)
Liquid Ratio	-6.527***	-6.672***	-6.995***	-6.071***	-6.973***	-3.825***	-2.075***	-4.704***
	(0.939)	(0.931)	(1.042)	(0.943)	(1.057)	(0.696)	(0.789)	(0.949)
Leverage	-0.073***	-0.071***	-0.054**	-0.086***	-0.063***	-0.043**	0.028*	-0.050**
	(0.022)	(0.022)	(0.021)	(0.028)	(0.023)	(0.018)	(0.014)	(0.022)
Deposit Ratio	-4.930***	-4.949***	-5.349***	-4.620***	-5.419***	-2.706***	-3.976***	-3.788***
	(1.023)	(1.047)	(1.059)	(1.016)	(1.048)	(0.684)	(1.316)	(1.025)
Cost Ratio	-2.731	-2.356	1.252	-3.044	-2.332	-9.394***	2.284	7.098
	(5.317)	(5.463)	(5.017)	(5.274)	(5.429)	(3.546)	(3.021)	(5.651)
Loan/Assets	-2.987*	-3.088*	-3.851**	-2.975*	-3.167*	-0.841	-0.209	-4.814***
	(1.729)	(1.782)	(1.604)	(1.691)	(1.772)	(1.065)	(0.589)	(1.724)
GDP per capita growth	0.030***	0.032***	0.027**	0.033***	0.026**	0.009	-0.011	0.026**
	(0.012)	(0.012)	(0.012)	(0.012)	(0.011)	(0.007)	(0.008)	(0.010)
Trade/GDP	0.012***	0.012***	0.012***	0.012***	0.011***	0.005***	-0.002	0.010***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.002)	(0.014)	(0.003)
HHI Loans	-7.456**	-7.648**	-7.484**	-8.531***	-7.701**	-4.415**	4.070*	-5.960**
	(2.918)	(3.072)	(2.988)	(2.874)	(3.219)	(1.828)	(2.289)	(2.512)
Country Equity/Assets	-15.941***	-16.193***	-16.516***	-15.943***	-15.795***	-8.943***	-0.859	-13.941***
	(3.593)	(3.549)	(3.705)	(3.696)	(3.664)	(2.358)	(2.534)	(3.074)
Country Loan/Deposits	-0.605*	-0.607*	-0.499*	-0.449	-0.773**	-0.420**	-0.910	-0.028
	(0.317)	(0.330)	(0.303)	(0.313)	(0.330)	(0.208)	(0.599)	(0.275)
Property Rights Index	0.007**	0.007*	0.009***	0.007**	0.006*	0.004*	0.003	0.009**
	(0.003)	(0.004)	(0.003)	(0.003)	(0.003)	(0.002)	(0.005)	(0.004)
Observations	78,476	78,476	78,476	78,476	78,476	78,476	78,476	78,476
Number of banks	10,623	10,623	10,623	10,623	10,623	10,623	10,623	10,623
Serial correlation AR(1)	0.00945	0.00848	0.0125	0.00649	0.0130	0.00127	0.0474	0.00685
Serial correlation AR(2)	0.455	0.438	0.538	0.317	0.613	0.598	0.218	0.413
Hansen test	0.438	0.428	0.289	0.270	0.411	0.172	0.0665	0.156

Note: This table presents the results of the System-GMM model after matching countries through propensity score estimates. ROA and Equity Ratio are risk adjusted and in logarithm. The coefficients of the year dummies and the constant were omitted for space considerations. The values of the serial correlation and Hansen tests are p-values. Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 13: Impact of DTI on banking stability

	Dependent Variable: Ln(Z-score)						*Z-score decomposition*	
	Baseline	Size	Liquidity	Leverage	HHI	Higher risk	ROA	Equity ratio
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
DTI	0.076	-4.456***	-0.827***	-0.767***	-0.952**	0.226**	-0.012	0.040
	(0.088)	(1.354)	(0.183)	(0.214)	(0.375)	(0.111)	(0.048)	(0.090)
DTI · X_t	—	0.310***	4.565***	0.078***	9.107***	-0.137	—	—
		(0.096)	(0.850)	(0.019)	(3.185)	(0.085)		
DTI · Higher stability	—	—	—	—	—	-0.193**	—	—
						(0.086)		
Higher risk	—	—	—	—	—	-0.985***	—	—
						(0.201)		
Higher stability	—	—	—	—	—	0.967***	—	—
						(0.165)		
Ln(Y_{t-1})	0.385	0.411*	0.305	0.351	0.693***	0.122	1.321***	0.346
	(0.243)	(0.231)	(0.252)	(0.239)	(0.268)	(0.207)	(0.237)	(0.269)
Ln(Y_{t-2})	0.031	0.022	0.038	0.027	-0.320	-0.072	-0.310**	0.071
	(0.199)	(0.194)	(0.200)	(0.199)	(0.217)	(0.142)	(0.136)	(0.212)
Size	-0.223*	-0.212*	-0.236*	-0.199	-0.433***	-0.245***	0.014	-0.149
	(0.122)	(0.112)	(0.128)	(0.123)	(0.131)	(0.092)	(0.059)	(0.132)
Liquid Ratio	-3.460*	-3.669**	-3.513*	-3.530**	-2.901	-1.001	0.579	-3.316*
	(1.792)	(1.729)	(1.803)	(1.800)	(1.914)	(1.172)	(1.086)	(1.734)
Leverage	-0.048***	-0.040**	-0.053***	-0.045***	-0.062***	0.000	-0.017	-0.043**
	(0.018)	(0.018)	(0.018)	(0.017)	(0.020)	(0.021)	(0.013)	(0.019)
Deposit Ratio	-5.436***	-6.084***	-4.782***	-5.984***	-5.934***	-3.727***	-0.040	-4.748***
	(1.194)	(1.198)	(1.313)	(1.232)	(1.349)	(0.959)	(0.794)	(1.360)
Cost Ratio	-3.929**	-4.277**	-3.485*	-4.148**	-7.591***	-2.682*	-1.882*	-2.446
	(1.816)	(1.824)	(1.928)	(1.851)	(2.135)	(1.559)	(0.991)	(2.066)
Loan/Assets	2.057	1.798	2.652*	2.479	3.128*	1.588	0.226	1.899
	(1.550)	(1.507)	(1.502)	(1.582)	(1.746)	(1.187)	(0.745)	(1.644)
GDP per capita growth	0.010*	-0.003	0.007	0.003	0.001	0.005	-0.001	0.006
	(0.005)	(0.006)	(0.005)	(0.005)	(0.007)	(0.006)	(0.003)	(0.005)
Trade/GDP	0.007**	0.005**	0.005*	0.006**	0.004	0.003	0.000	0.007***
	(0.003)	(0.003)	(0.002)	(0.003)	(0.003)	(0.005)	(0.002)	(0.003)
HHI Loans	-4.637**	-3.900*	-5.129**	-5.026**	-5.931**	-3.892**	-0.654	-5.384**
	(2.231)	(2.177)	(2.233)	(2.342)	(2.905)	(1.682)	(1.269)	(2.243)
Country Equity/Assets	-12.372***	-8.863***	-11.644***	-10.361***	-4.909	-7.282**	-1.095	-11.617***
	(2.164)	(1.557)	(2.161)	(1.899)	(4.440)	(2.841)	(1.601)	(2.053)
Country Loan/Deposits	-0.566***	-0.605***	-0.527***	-0.609***	-0.753***	-0.398***	0.084	-0.481***
	(0.128)	(0.132)	(0.142)	(0.134)	(0.128)	(0.090)	(0.111)	(0.140)
Property Rights Index	-0.016***	-0.013***	-0.012***	-0.015***	-0.017***	-0.004	-0.001	-0.013***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.002)	(0.005)
Observations	14,070	14,070	14,070	14,070	14,070	14,070	14,070	14,070
Number of banks	2,225	2,225	2,225	2,225	2,225	2,225	2,225	2,225
Serial correlation AR(1)	0.0890	0.0605	0.128	0.0753	0.00547	0.00203	5.00e-05	0.165
Serial correlation AR(2)	0.123	0.114	0.148	0.110	0.612	0.0818	0.104	0.114
Hansen test	0.117	0.147	0.118	0.255	0.183	0.112	0.157	0.106

Note: This table presents the results of the System-GMM model after matching countries through propensity score estimates. ROA and Equity Ratio are risk adjusted and in logarithm. The coefficients of the year dummies and the constant were omitted for space considerations. The values of the serial correlation and Hansen tests are p-values. Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 14: Impact of CONC on banking stability

	Dependent Variable: Ln(Z-score)						*Z-score decomposition*	
	Baseline	Size	Liquidity	Leverage	HHI	Higher risk	ROA	Equity ratio
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
CONC	0.558***	-4.059**	1.926**	-0.745	1.071***	0.419***	0.791**	0.796**
	(0.206)	(2.056)	(0.851)	(0.764)	(0.399)	(0.084)	(0.357)	(0.322)
CONC · X_t	—	0.336**	-6.300	0.111**	-7.312	0.012	—	—
		(0.150)	(4.626)	(0.055)	(5.198)	(0.037)		
CONC · Higher stability	—	—	—	—	—	-0.110***	—	—
						(0.035)		
Higher risk	—	—	—	—	—	-0.608***	—	—
						(0.098)		
Higher stability	—	—	—	—	—	0.730***	—	—
						(0.075)		
Ln(Y_{t-1})	0.960***	0.705***	0.985***	0.404	0.978***	0.880***	0.471	0.484
	(0.253)	(0.184)	(0.301)	(0.292)	(0.308)	(0.195)	(0.311)	(0.469)
Ln(Y_{t-2})	-0.300	-0.101	-0.308	0.111	-0.378	-0.361***	0.013	0.176
	(0.187)	(0.148)	(0.213)	(0.217)	(0.270)	(0.137)	(0.174)	(0.309)
Size	-0.158**	-0.359***	-0.193***	-0.206**	-0.171**	-0.228***	0.121*	-0.081
	(0.069)	(0.139)	(0.067)	(0.094)	(0.075)	(0.045)	(0.069)	(0.123)
Liquid Ratio	-5.869***	-2.964*	3.552	-2.890	-6.764***	-4.318***	-3.959***	-2.480
	(1.079)	(1.731)	(4.803)	(2.332)	(2.502)	(1.040)	(1.507)	(2.170)
Leverage	-0.051***	-0.080***	-0.063***	-0.123**	-0.044**	-0.028**	0.054***	0.003
	(0.017)	(0.020)	(0.021)	(0.058)	(0.019)	(0.014)	(0.019)	(0.032)
Deposit Ratio	-3.485***	-2.288**	-1.562*	-3.878**	-5.266***	-2.812***	-4.932***	-6.112***
	(0.622)	(1.081)	(0.892)	(1.832)	(1.587)	(0.563)	(1.098)	(2.333)
Cost Ratio	1.542	6.656***	4.790**	5.665*	6.539***	0.417	4.609***	19.923***
	(0.965)	(1.868)	(1.964)	(3.118)	(2.346)	(0.788)	(1.626)	(3.040)
Loan/Assets	-4.279***	-0.389	-1.863	-3.340**	-1.918	-2.883***	-0.917	-0.393
	(0.781)	(1.275)	(1.228)	(1.501)	(1.335)	(0.641)	(0.708)	(1.217)
GDP per capita growth	-0.007	-0.006	-0.021***	-0.018	0.006	-0.008**	0.018**	0.003
	(0.005)	(0.007)	(0.006)	(0.012)	(0.009)	(0.004)	(0.008)	(0.013)
Trade/GDP	0.016***	0.020***	0.024***	0.023***	0.020***	0.015***	0.006	0.016***
	(0.003)	(0.003)	(0.004)	(0.006)	(0.005)	(0.002)	(0.004)	(0.006)
HHI Loans	2.744**	-5.360*	-2.553	-0.777	2.517	2.922***	-6.347*	-8.084***
	(1.222)	(2.879)	(3.755)	(4.048)	(5.667)	(0.877)	(3.495)	(1.963)
Country Equity/Assets	-11.127***	-13.258***	-12.129***	-8.767***	-18.154***	-8.813***	-8.976**	-15.729***
	(2.821)	(3.538)	(3.676)	(3.311)	(4.760)	(2.525)	(3.845)	(3.818)
Country Loan/Deposits	-0.429***	-0.480***	-0.390***	-0.607***	-0.743***	-0.373***	-0.310***	-1.409***
	(0.117)	(0.111)	(0.113)	(0.184)	(0.167)	(0.096)	(0.101)	(0.266)
Property Rights Index	0.002	0.004	0.004	0.014***	-0.001	0.001	0.011**	0.018**
	(0.005)	(0.004)	(0.004)	(0.004)	(0.006)	(0.003)	(0.006)	(0.009)
Observations	107,337	107,337	107,337	107,337	107,337	107,337	107,337	107,337
Number of banks	14,427	14,427	14,427	14,427	14,427	14,427	14,427	14,427
Serial correlation AR(1)	0.00571	0.00839	0.0126	0.384	0.0168	0.000122	0.188	0.326
Serial correlation AR(2)	0.273	0.954	0.320	0.368	0.410	0.0450	0.470	0.219
Hansen test	0.110	0.110	0.113	0.121	0.397	0.626	0.159	0.180

Note: This table presents the results of the System-GMM model after matching countries through propensity score estimates. ROA and Equity Ratio are risk adjusted and in logarithm. The coefficients of the year dummies and the constant were omitted for space considerations. The values of the serial correlation and Hansen tests are p-values. Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 15: Impact of INTER on banking stability

	Dependent Variable: Ln(Z-score)						*Z-score decomposition*	
	Baseline	Size	Liquidity	Leverage	HHI	Higher risk	ROA	Equity ratio
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
INTER	0.417**	-1.318	1.197	-0.184	0.251	0.352***	0.495**	0.364**
	(0.176)	(2.187)	(0.919)	(1.201)	(0.281)	(0.126)	(0.241)	(0.175)
INTER · X_t	—	0.106	-3.473	0.022	1.750	-0.166**	—	—
		(0.137)	(4.062)	(0.047)	(4.386)	(0.077)		
INTER · Higher stability	—	—	—	—	—	-0.166***	—	—
						(0.062)		
Higher risk	—	—	—	—	—	-0.715***	—	—
						(0.124)		
Higher stability	—	—	—	—	—	0.974***	—	—
						(0.100)		
Ln(Y_{t-1})	0.635*	0.636*	0.312	0.564	0.739**	0.517**	0.550***	0.748***
	(0.348)	(0.372)	(0.566)	(0.401)	(0.370)	(0.231)	(0.203)	(0.275)
Ln(Y_{t-2})	-0.116	-0.130	0.163	-0.092	-0.118	-0.209	0.114	-0.126
	(0.284)	(0.300)	(0.477)	(0.341)	(0.291)	(0.168)	(0.140)	(0.223)
Size	-0.160	-0.213	-0.136	-0.126	-0.237**	-0.162***	0.008	-0.184*
	(0.104)	(0.182)	(0.121)	(0.124)	(0.113)	(0.063)	(0.042)	(0.109)
Liquid Ratio	-8.619***	-8.932***	-5.908	-8.585***	-6.028**	-5.212***	-3.280***	-8.147***
	(1.862)	(2.232)	(3.756)	(2.312)	(2.632)	(1.423)	(1.110)	(1.815)
Leverage	-0.017	-0.026	0.003	-0.032	-0.018	-0.010	0.060***	0.007
	(0.021)	(0.021)	(0.035)	(0.023)	(0.021)	(0.014)	(0.016)	(0.021)
Deposit Ratio	-6.824***	-7.707***	-8.012***	-8.101***	-6.396***	-3.403***	-5.004***	-7.496***
	(1.731)	(2.074)	(2.525)	(3.095)	(1.959)	(1.116)	(1.004)	(1.768)
Cost Ratio	4.404**	4.338**	4.294*	4.836**	13.132***	1.136	6.688***	6.485***
	(1.999)	(2.200)	(2.319)	(2.195)	(4.150)	(1.172)	(2.276)	(1.890)
Loan/Assets	-4.968***	-4.565***	-5.046***	-4.682***	-2.650*	-3.010***	-1.235**	-4.205***
	(0.992)	(1.049)	(1.187)	(1.090)	(1.358)	(0.648)	(0.602)	(1.023)
GDP per capita growth	-0.009	0.001	-0.023	-0.000	-0.003	-0.008	0.007*	-0.014
	(0.012)	(0.008)	(0.022)	(0.010)	(0.009)	(0.007)	(0.004)	(0.011)
Trade/GDP	0.015***	0.010***	0.016***	0.009***	0.017***	0.012***	0.002**	0.013***
	(0.005)	(0.002)	(0.006)	(0.003)	(0.004)	(0.003)	(0.001)	(0.005)
HHI Loans	4.730**	3.583	5.361**	3.871	-1.914	4.734***	-2.727*	2.962
	(1.896)	(2.611)	(2.349)	(2.982)	(6.471)	(1.189)	(1.632)	(1.894)
Country Equity/Assets	-6.129	-7.635	-5.398	-5.708	-11.103**	-3.902	-8.135**	-6.286
	(4.088)	(4.665)	(4.840)	(4.743)	(4.534)	(2.765)	(3.184)	(4.449)
Country Loan/Deposits	-1.047***	-1.160**	-1.306**	-1.134*	-1.360***	-0.440*	-0.614***	-1.365***
	(0.345)	(0.479)	(0.526)	(0.613)	(0.377)	(0.234)	(0.130)	(0.350)
Property Rights Index	0.001	0.003	0.003	0.008	0.003	0.003	0.004	-0.001
	(0.008)	(0.009)	(0.010)	(0.008)	(0.007)	(0.005)	(0.003)	(0.008)
Observations	105,084	105,084	105,084	105,084	105,084	105,084	105,084	105,084
Number of banks	14,115	14,115	14,115	14,115	14,115	14,115	14,115	14,115
Serial correlation AR(1)	0.133	0.135	0.588	0.204	0.114	0.0137	0.0610	0.0309
Serial correlation AR(2)	0.906	0.917	0.540	0.851	0.875	0.664	0.126	0.883
Hansen test	0.126	0.115	0.117	0.117	0.282	0.0517	0.0642	0.228

Note: This table presents the results of the System-GMM model after matching countries through propensity score estimates. ROA and Equity Ratio are risk adjusted and in logarithm. The coefficients of the year dummies and the constant were omitted for space considerations. The values of the serial correlation and Hansen tests are p-values. Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 16: Impact of TAX on banking stability

	Dependent Variable: Ln(Z-score)						*Z-score decomposition*	
	Baseline	Size	Liquidity	Leverage	HHI	Higher risk	ROA	Equity ratio
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
TAX	0.555	0.180	-1.406	1.448*	1.560**	-0.053	0.297	0.400
	(0.367)	(3.330)	(2.280)	(0.875)	(0.626)	(0.211)	(0.279)	(0.289)
TAX · X_t	—	0.051	16.113	-0.070	-11.763***	-0.152	—	—
		(0.254)	(18.485)	(0.045)	(4.373)	(0.118)		
TAX · Higher stability	—	—	—	—	—	-0.173	—	—
						(0.137)		
Higher risk	—	—	—	—	—	-1.244***	—	—
						(0.275)		
Higher stability	—	—	—	—	—	1.371***	—	—
						(0.221)		
Ln(Y_{t-1})	-0.352	-0.335	0.391	-0.017	-0.064	-0.497	0.765	0.041
	(0.774)	(0.996)	(1.496)	(0.619)	(0.637)	(0.441)	(0.503)	(0.611)
Ln(Y_{t-2})	0.730	0.674	-0.124	0.475	0.519	0.290	-0.058	0.436
	(0.503)	(0.560)	(1.155)	(0.362)	(0.396)	(0.320)	(0.384)	(0.478)
Size	0.323***	0.295**	0.154	0.200**	0.414***	0.135*	0.111	0.267**
	(0.104)	(0.127)	(0.256)	(0.088)	(0.115)	(0.071)	(0.111)	(0.121)
Liquid Ratio	-1.269	-0.398	-6.088	-1.286	-1.040	1.307	0.947	-1.501
	(3.502)	(3.960)	(7.476)	(3.428)	(3.332)	(1.887)	(1.037)	(2.305)
Leverage	-0.090***	-0.083***	-0.067*	-0.083***	-0.074***	-0.005	-0.026**	-0.083***
	(0.020)	(0.028)	(0.037)	(0.018)	(0.022)	(0.023)	(0.013)	(0.016)
Deposit Ratio	1.368	1.439	-1.954	-0.064	1.614	0.554	0.466	-0.147
	(2.985)	(3.211)	(5.593)	(2.448)	(2.542)	(2.153)	(1.806)	(2.769)
Cost Ratio	-2.342	5.424	-19.354	4.298	-2.571	4.133	-14.857	-4.917
	(13.540)	(16.256)	(31.027)	(13.861)	(10.517)	(9.446)	(9.856)	(10.884)
Loan/Assets	1.553	2.067	-0.208	1.093	2.096	3.110**	0.754	1.363
	(2.577)	(2.818)	(4.666)	(2.364)	(2.441)	(1.375)	(0.812)	(1.880)
GDP per capita growth	-0.030	-0.023	-0.057	-0.013	-0.057**	0.015	-0.035	-0.030*
	(0.022)	(0.030)	(0.057)	(0.022)	(0.024)	(0.015)	(0.022)	(0.016)
Trade/GDP	-0.001	0.001	0.005	0.003	0.002	-0.000	-0.008*	-0.001
	(0.005)	(0.008)	(0.010)	(0.005)	(0.006)	(0.004)	(0.004)	(0.005)
HHI Loans	-0.582	0.364	-0.891	-0.244	1.485	-1.084	-1.613	-1.562
	(2.354)	(3.264)	(3.892)	(2.209)	(2.604)	(1.576)	(1.578)	(2.266)
Country Equity/Assets	-1.075	-6.705	0.211	-10.670	-17.688	-11.253**	8.865	-0.542
	(8.332)	(10.217)	(14.773)	(10.561)	(19.492)	(5.247)	(6.441)	(5.539)
Country Loan/Deposits	-1.492**	-1.210	-1.218	-1.029	-0.679	-0.671	-1.040*	-1.426**
	(0.678)	(0.815)	(1.221)	(0.637)	(0.909)	(0.530)	(0.620)	(0.596)
Property Rights Index	0.019*	0.018	-0.000	0.012	0.003	0.018**	0.009	0.015
	(0.011)	(0.014)	(0.028)	(0.009)	(0.018)	(0.007)	(0.007)	(0.010)
Observations	28,498	28,498	28,498	28,498	28,498	28,498	28,498	28,498
Number of banks	3,578	3,578	3,578	3,578	3,578	3,578	3,578	3,578
Serial correlation AR(1)	0.881	0.907	0.761	0.965	0.967	0.0104	0.295	0.999
Serial correlation AR(2)	0.121	0.203	0.998	0.155	0.172	0.102	0.990	0.295
Hansen test	0.113	0.204	0.537	0.145	0.130	0.322	0.0980	0.0797

Note: This table presents the results of the System-GMM model after matching countries through propensity score estimates. ROA and Equity Ratio are risk adjusted and in logarithm. The coefficients of the year dummies and the constant were omitted for space considerations. The values of the serial correlation and Hansen tests are p-values. Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 17: Impact of capital-based instruments on banking stability

	Dependent Variable: Ln(Z-score)						*Z-score decomposition*	
	Baseline	Size	Liquidity	Leverage	HHI	Higher risk	ROA	Equity ratio
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Capital	0.034	3.674	-1.331***	-2.401**	-0.429***	0.062	0.296	-0.140
	(0.214)	(4.726)	(0.494)	(1.170)	(0.141)	(0.138)	(0.522)	(0.236)
Capital · X_t	—	-0.259	8.391***	0.161**	2.682	0.017	—	—
		(0.331)	(2.596)	(0.079)	(2.032)	(0.078)		
Capital · Higher stability	—	—	—	—	—	-0.035	—	—
						(0.047)		
Higher risk	—	—	—	—	—	-0.943***	—	—
						(0.260)		
Higher stability	—	—	—	—	—	0.966***	—	—
						(0.179)		
Ln(Y_{t-1})	0.659	0.470	1.156**	1.249***	1.126***	0.333	2.596**	1.145***
	(0.509)	(0.580)	(0.558)	(0.427)	(0.236)	(0.401)	(1.303)	(0.401)
Ln(Y_{t-2})	0.011	0.087	-0.327	-0.502	-0.315*	-0.001	-1.158	-0.290
	(0.399)	(0.392)	(0.426)	(0.343)	(0.186)	(0.261)	(0.821)	(0.312)
Size	-0.116	0.055	-0.264**	-0.283**	-0.115	-0.135*	-0.654	-0.219*
	(0.103)	(0.269)	(0.126)	(0.110)	(0.075)	(0.071)	(0.544)	(0.125)
Liquid Ratio	-9.544***	-11.532***	-10.607***	-6.907***	-6.567***	-7.002***	1.089	-7.135***
	(2.380)	(3.933)	(2.499)	(2.254)	(1.509)	(1.790)	(4.478)	(2.133)
Leverage	0.055	0.103	-0.003	-0.150	-0.010	0.075	-0.251	0.019
	(0.069)	(0.106)	(0.064)	(0.097)	(0.024)	(0.050)	(0.230)	(0.069)
Deposit Ratio	-10.887***	-14.083**	-9.256***	-4.714	-4.497***	-8.383***	6.200	-8.176**
	(3.366)	(5.976)	(3.098)	(3.357)	(1.123)	(2.049)	(8.080)	(3.182)
Cost Ratio	16.567**	15.953*	21.461***	3.445	3.744**	9.222**	-6.948	15.152**
	(7.610)	(8.673)	(8.217)	(7.292)	(1.901)	(4.570)	(11.066)	(7.316)
Loan/Assets	-2.624	-4.335	-1.372	-2.470*	-2.512***	-2.168*	-1.706	-1.294
	(1.721)	(3.127)	(1.885)	(1.287)	(0.910)	(1.231)	(2.142)	(1.402)
GDP per capita growth	0.023**	0.035*	0.014*	0.003	0.008*	0.019***	-0.075	0.014
	(0.010)	(0.020)	(0.009)	(0.012)	(0.004)	(0.007)	(0.068)	(0.010)
Trade/GDP	0.007***	0.007***	0.008***	0.003	0.004***	0.004**	0.033	0.006***
	(0.002)	(0.003)	(0.002)	(0.003)	(0.001)	(0.002)	(0.028)	(0.002)
HHI Loans	-6.144	-5.712	-7.251	4.437	-0.372	-3.179	17.832	-3.336
	(4.854)	(5.317)	(4.966)	(5.438)	(2.296)	(2.811)	(17.657)	(4.789)
Country Equity/Assets	-16.528***	-14.335**	-20.033***	-19.649***	-7.242**	-10.192**	-13.102	-17.315***
	(5.288)	(6.912)	(5.826)	(4.312)	(3.445)	(4.036)	(9.762)	(4.581)
Country Loan/Deposits	-1.650***	-1.659**	-1.922***	-1.113**	-0.625***	-1.040***	-0.131	-1.584***
	(0.576)	(0.676)	(0.624)	(0.433)	(0.216)	(0.377)	(0.453)	(0.524)
Property Rights Index	0.005	0.008	0.005	-0.000	-0.001	0.007	-0.022	0.001
	(0.007)	(0.009)	(0.007)	(0.005)	(0.003)	(0.005)	(0.021)	(0.006)
Observations	108,006	108,006	108,006	108,006	108,006	108,006	108,006	108,006
Number of banks	14,508	14,508	14,508	14,508	14,508	14,508	14,508	14,508
Serial correlation AR(1)	0.161	0.163	0.0668	0.0221	0.00115	0.0741	0.113	0.0182
Serial correlation AR(2)	0.503	0.370	0.942	0.384	0.302	0.306	0.196	0.925
Hansen test	0.0911	0.213	0.277	0.281	0.0945	0.245	0.627	0.0542

Note: This table presents the results of the System-GMM model after matching countries through propensity score estimates. ROA and Equity Ratio are risk adjusted and in logarithm. The coefficients of the year dummies and the constant were omitted for space considerations. The values of the serial correlation and Hansen tests are p-values. Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 18: Impact of asset-based instruments on banking stability

	Dependent Variable: Ln(Z-score)						*Z-score decomposition*	
	Baseline	Size	Liquidity	Leverage	HHI	Higher risk	ROA	Equity ratio
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Asset	-0.430***	-6.019**	-2.019***	-1.333***	-0.963*	-0.269**	-0.131	-0.594**
	(0.162)	(2.345)	(0.485)	(0.514)	(0.519)	(0.112)	(0.175)	(0.260)
Asset · X_t	—	0.393**	5.849***	0.087**	4.672	-0.306***	—	—
		(0.158)	(1.785)	(0.039)	(3.828)	(0.109)		
Asset · Higher stability	—	—	—	—	—	-0.215**	—	—
						(0.086)		
Higher risk	—	—	—	—	—	-0.932***	—	—
						(0.199)		
Higher stability	—	—	—	—	—	0.971***	—	—
						(0.150)		
Ln(Y_{t-1})	0.849*	0.898*	0.758**	0.909*	0.995**	0.298	0.710**	0.390
	(0.472)	(0.480)	(0.357)	(0.481)	(0.420)	(0.358)	(0.352)	(0.447)
Ln(Y_{t-2})	-0.126	-0.186	-0.187	-0.180	-0.228	0.025	-0.027	0.111
	(0.403)	(0.413)	(0.279)	(0.413)	(0.346)	(0.249)	(0.236)	(0.337)
Size	-0.168	-0.212	-0.116	-0.190	-0.186	-0.111*	0.050	-0.011
	(0.129)	(0.142)	(0.096)	(0.134)	(0.123)	(0.066)	(0.073)	(0.125)
Liquid Ratio	-9.511***	-9.609***	-9.665***	-9.488***	-10.116***	-6.677***	-7.832**	-10.726***
	(2.574)	(2.609)	(2.141)	(2.573)	(2.771)	(1.807)	(3.243)	(3.695)
Leverage	0.063	0.065	-0.008	0.058	0.067	0.070*	0.059*	0.001
	(0.067)	(0.068)	(0.030)	(0.068)	(0.067)	(0.041)	(0.031)	(0.045)
Deposit Ratio	-10.358***	-10.689***	-8.593***	-10.395***	-10.325***	-7.707***	-6.604***	-8.232**
	(3.126)	(3.213)	(1.861)	(3.129)	(3.207)	(1.818)	(2.364)	(3.203)
Cost Ratio	15.648*	15.927*	6.548	15.631*	14.192*	9.369**	0.992	3.369
	(8.563)	(8.671)	(4.752)	(8.570)	(7.323)	(4.411)	(1.791)	(2.534)
Loan/Assets	-2.743*	-2.609	-4.358***	-2.559	-3.212**	-1.968*	-1.945	-2.252
	(1.664)	(1.692)	(1.331)	(1.691)	(1.592)	(1.184)	(1.232)	(1.627)
GDP per capita growth	0.022**	0.021*	0.009	0.021*	0.020*	0.017***	0.008	-0.015
	(0.011)	(0.011)	(0.007)	(0.011)	(0.011)	(0.007)	(0.012)	(0.021)
Trade/GDP	0.007***	0.007***	0.008***	0.007***	0.007***	0.004**	0.002	0.017**
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.005)	(0.008)
HHI Loans	-4.939	-4.459	1.836	-4.313	-3.431	-3.478	-2.009	-7.075**
	(5.009)	(5.030)	(3.162)	(5.065)	(4.021)	(2.524)	(2.608)	(2.928)
Country Equity/Assets	-15.221***	-16.198***	-6.753	-16.044***	-14.239***	-8.925**	-5.188	-7.877
	(5.450)	(5.703)	(5.413)	(5.743)	(5.465)	(4.072)	(3.981)	(6.204)
Country Loan/Deposits	-1.662***	-1.763***	-1.198***	-1.716***	-1.608***	-1.024***	-0.688**	-1.361***
	(0.609)	(0.636)	(0.348)	(0.614)	(0.588)	(0.358)	(0.327)	(0.444)
Property Rights Index	0.001	-0.000	0.003	-0.001	-0.001	0.006	-0.005	-0.015
	(0.008)	(0.009)	(0.006)	(0.009)	(0.007)	(0.005)	(0.006)	(0.009)
Observations	108,006	108,006	108,006	108,006	108,006	108,006	108,006	108,006
Number of banks	14,508	14,508	14,508	14,508	14,508	14,508	14,508	14,508
Serial correlation AR(1)	0.0964	0.0836	0.0595	0.0852	0.0431	0.0686	0.0780	0.229
Serial correlation AR(2)	0.762	0.848	0.987	0.848	0.932	0.261	0.628	0.332
Hansen test	0.112	0.149	0.111	0.120	0.103	0.225	0.0666	0.0684

Note: This table presents the results of the System-GMM model after matching countries through propensity score estimates. ROA and Equity Ratio are risk adjusted and in logarithm. The coefficients of the year dummies and the constant were omitted for space considerations. The values of the serial correlation and Hansen tests are p-values. Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 19: Impact of borrower-based instruments on banking stability

	Dependent Variable: Ln(Z-score)						*Z-score decomposition*	
	Baseline	Size	Liquidity	Leverage	HHI	Higher risk	ROA	Equity ratio
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Borrower	0.607*	0.675	-0.639	0.438	-0.058	0.419**	0.088	0.073
	(0.322)	(1.895)	(0.482)	(0.707)	(0.358)	(0.208)	(0.115)	(0.227)
Borrower · X_t	—	-0.006	6.690**	0.012	3.487	-0.113*	—	—
		(0.125)	(3.054)	(0.046)	(4.460)	(0.066)		
Borrower · Higher stability	—	—	—	—	—	-0.228***	—	—
						(0.061)		
Higher risk	—	—	—	—	—	-0.938***	—	—
						(0.216)		
Higher stability	—	—	—	—	—	0.966***	—	—
						(0.162)		
Ln(Y_{t-1})	0.600	0.657	0.738	0.645	1.028**	0.306	0.711**	0.408
	(0.501)	(0.469)	(0.506)	(0.489)	(0.437)	(0.384)	(0.360)	(0.465)
Ln(Y_{t-2})	0.054	0.002	0.022	0.007	-0.256	0.018	-0.029	0.106
	(0.410)	(0.389)	(0.422)	(0.403)	(0.357)	(0.266)	(0.242)	(0.347)
Size	-0.149	-0.163	-0.171	-0.160	-0.231*	-0.155*	0.044	-0.038
	(0.117)	(0.117)	(0.136)	(0.120)	(0.135)	(0.081)	(0.075)	(0.133)
Liquid Ratio	-9.986***	-9.833***	-9.992***	-9.770***	-10.463***	-7.232***	-8.053**	-11.123***
	(2.586)	(2.638)	(3.181)	(2.597)	(3.003)	(1.940)	(3.397)	(3.882)
Leverage	0.069	0.060	0.097	0.056	0.059	0.079*	0.062*	0.008
	(0.066)	(0.066)	(0.088)	(0.065)	(0.068)	(0.047)	(0.033)	(0.048)
Deposit Ratio	-11.750***	-11.496***	-11.562***	-11.426***	-10.617***	-8.681***	-6.888***	-9.062***
	(3.354)	(3.310)	(4.178)	(3.110)	(3.448)	(2.171)	(2.589)	(3.458)
Cost Ratio	17.771**	17.303**	17.891*	17.112**	11.817*	9.477**	0.967	3.477
	(7.873)	(7.818)	(9.974)	(7.211)	(6.498)	(4.794)	(1.754)	(2.544)
Loan/Assets	-3.129*	-3.032*	-3.227*	-3.017*	-3.776**	-2.445**	-2.045	-2.371
	(1.719)	(1.654)	(1.789)	(1.696)	(1.536)	(1.187)	(1.297)	(1.746)
GDP per capita growth	0.021**	0.021*	0.017	0.020**	0.017*	0.017**	0.009	-0.014
	(0.010)	(0.011)	(0.011)	(0.010)	(0.010)	(0.007)	(0.011)	(0.020)
Trade/GDP	0.006**	0.006***	0.005**	0.006***	0.006***	0.003*	0.002	0.017**
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.005)	(0.008)
HHI Loans	-6.881	-6.518	-5.199	-6.434	-1.761	-3.205	-2.068	-6.846**
	(4.569)	(4.485)	(5.465)	(4.199)	(3.628)	(2.713)	(2.723)	(3.227)
Country Equity/Assets	-16.343***	-17.217***	-13.312**	-17.272***	-15.103***	-9.766**	-5.314	-8.747
	(5.857)	(5.707)	(5.940)	(6.255)	(5.695)	(4.526)	(3.920)	(6.175)
Country Loan/Deposits	-1.758***	-1.740***	-1.748**	-1.726***	-1.530**	-1.082***	-0.693**	-1.381***
	(0.620)	(0.614)	(0.751)	(0.569)	(0.598)	(0.403)	(0.336)	(0.458)
Property Rights Index	0.008	0.007	0.009	0.007	0.000	0.009	-0.004	-0.011
	(0.009)	(0.008)	(0.009)	(0.008)	(0.007)	(0.006)	(0.006)	(0.009)
Observations	108,006	108,006	108,006	108,006	108,006	108,006	108,006	108,006
Number of banks	14,508	14,508	14,508	14,508	14,508	14,508	14,508	14,508
Serial correlation AR(1)	0.165	0.126	0.148	0.149	0.0502	0.0714	0.0787	0.215
Serial correlation AR(2)	0.425	0.480	0.541	0.486	0.974	0.260	0.629	0.325
Hansen test	0.120	0.108	0.0702	0.113	0.0889	0.298	0.0682	0.0821

Note: This table presents the results of the System-GMM model after matching countries through propensity score estimates. ROA and Equity Ratio are risk adjusted and in logarithm. The coefficients of the year dummies and the constant were omitted for space considerations. The values of the serial correlation and Hansen tests are p-values. Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 20: Impact of structural-based instruments on banking stability

	Dependent Variable: Ln(Z-score)					*Z-score decomposition*		
	Baseline	Size	Liquidity	Leverage	HHI	Higher risk	ROA	Equity ratio
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Structural	0.352**	1.113	-0.984	0.636	0.324	0.413***	-0.076***	-0.078**
	(0.177)	(5.165)	(1.286)	(0.515)	(0.570)	(0.132)	(0.029)	(0.033)
Structural · X_t	—	-0.054	5.733	-0.023	0.258	-0.006	—	—
		(0.363)	(5.429)	(0.040)	(5.605)	(0.049)		
Structural · Higher stability	—	—	—	—	—	-0.102**	—	—
						(0.041)		
Higher risk	—	—	—	—	—	-0.520***	—	—
						(0.116)		
Higher stability	—	—	—	—	—	0.681***	—	—
						(0.100)		
Ln(Y_{t-1})	1.150***	1.156***	1.064***	1.233***	1.151***	0.931***	1.105***	0.948***
	(0.277)	(0.285)	(0.324)	(0.332)	(0.333)	(0.234)	(0.141)	(0.132)
Ln(Y_{t-2})	-0.421*	-0.429*	-0.389	-0.490*	-0.424*	-0.376**	-0.241**	-0.154
	(0.228)	(0.238)	(0.257)	(0.275)	(0.258)	(0.169)	(0.110)	(0.105)
Size	-0.225**	-0.177	-0.178	-0.233**	-0.224**	-0.218***	0.013	0.033
	(0.096)	(0.334)	(0.116)	(0.102)	(0.103)	(0.069)	(0.038)	(0.047)
Liquid Ratio	-9.081***	-9.052***	-15.888**	-9.871***	-9.018***	-6.090***	-3.455***	-4.473***
	(2.236)	(2.253)	(6.889)	(2.700)	(2.326)	(2.034)	(0.717)	(0.913)
Leverage	-0.037*	-0.036	-0.041*	-0.018	-0.037*	-0.028*	0.002	-0.004
	(0.021)	(0.022)	(0.024)	(0.038)	(0.021)	(0.015)	(0.011)	(0.017)
Deposit Ratio	-5.891***	-5.877***	-6.847***	-6.312***	-5.864***	-3.947***	-2.673***	-3.758***
	(1.674)	(1.682)	(2.037)	(1.891)	(1.639)	(1.437)	(0.456)	(0.567)
Cost Ratio	1.130	1.037	1.020	0.732	1.089	0.287	1.920**	1.704*
	(1.587)	(1.723)	(1.687)	(1.820)	(1.605)	(1.177)	(0.837)	(1.013)
Loan/Assets	-5.025***	-4.972***	-4.416***	-5.026***	-4.993***	-3.800***	-0.483	-1.192*
	(1.270)	(1.341)	(1.509)	(1.328)	(1.347)	(0.992)	(0.478)	(0.659)
GDP per capita growth	-0.010	-0.011	0.004	-0.008	-0.010	-0.010	0.003	0.004
	(0.011)	(0.012)	(0.018)	(0.012)	(0.010)	(0.008)	(0.002)	(0.003)
Trade/GDP	0.015***	0.015***	0.014***	0.015***	0.014***	0.013***	0.003***	0.004***
	(0.004)	(0.006)	(0.005)	(0.004)	(0.004)	(0.003)	(0.001)	(0.001)
HHI Loans	5.069**	5.080**	1.824	4.618*	4.703	5.534***	-1.521*	-1.755*
	(2.278)	(2.298)	(4.058)	(2.523)	(8.090)	(1.610)	(0.877)	(1.007)
Country Equity/Assets	-12.611***	-12.399***	-12.887***	-13.492***	-12.583***	-9.805***	-5.185***	-5.353***
	(3.951)	(4.193)	(4.421)	(4.472)	(4.503)	(3.229)	(1.514)	(1.683)
Country Loan/Deposits	-0.791***	-0.794***	-0.891***	-0.864***	-0.786***	-0.483**	-0.301***	-0.336***
	(0.280)	(0.282)	(0.313)	(0.317)	(0.270)	(0.236)	(0.068)	(0.083)
Property Rights Index	-0.005	-0.005	-0.009	-0.008	-0.005	0.001	-0.002	-0.000
	(0.006)	(0.007)	(0.008)	(0.009)	(0.006)	(0.005)	(0.002)	(0.002)
Observations	108,006	108,006	108,006	108,006	108,006	108,006	108,006	108,006
Number of banks	14,508	14,508	14,508	14,508	14,508	14,508	14,508	14,508
Serial correlation AR(1)	0.00271	0.00330	0.00740	0.00670	0.00982	0.00115	3.08e-07	4.68e-06
Serial correlation AR(2)	0.259	0.265	0.528	0.249	0.298	0.124	0.181	0.644
Hansen test	0.169	0.0984	0.240	0.144	0.0764	0.201	0.0841	0.0700

Note: This table presents the results of the System-GMM model after matching countries through propensity score estimates. ROA and Equity Ratio are risk adjusted and in logarithm. The coefficients of the year dummies and the constant were omitted for space considerations. The values of the serial correlation and Hansen tests are p-values. Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1