TÜRKİYE CUMHURİYET MERKEZ BANKASI

WORKING PAPER NO: 17/13

Credit Cycles and Capital Flows: Effectiveness of the Macroprudential Policy Framework in Emerging Market Economies

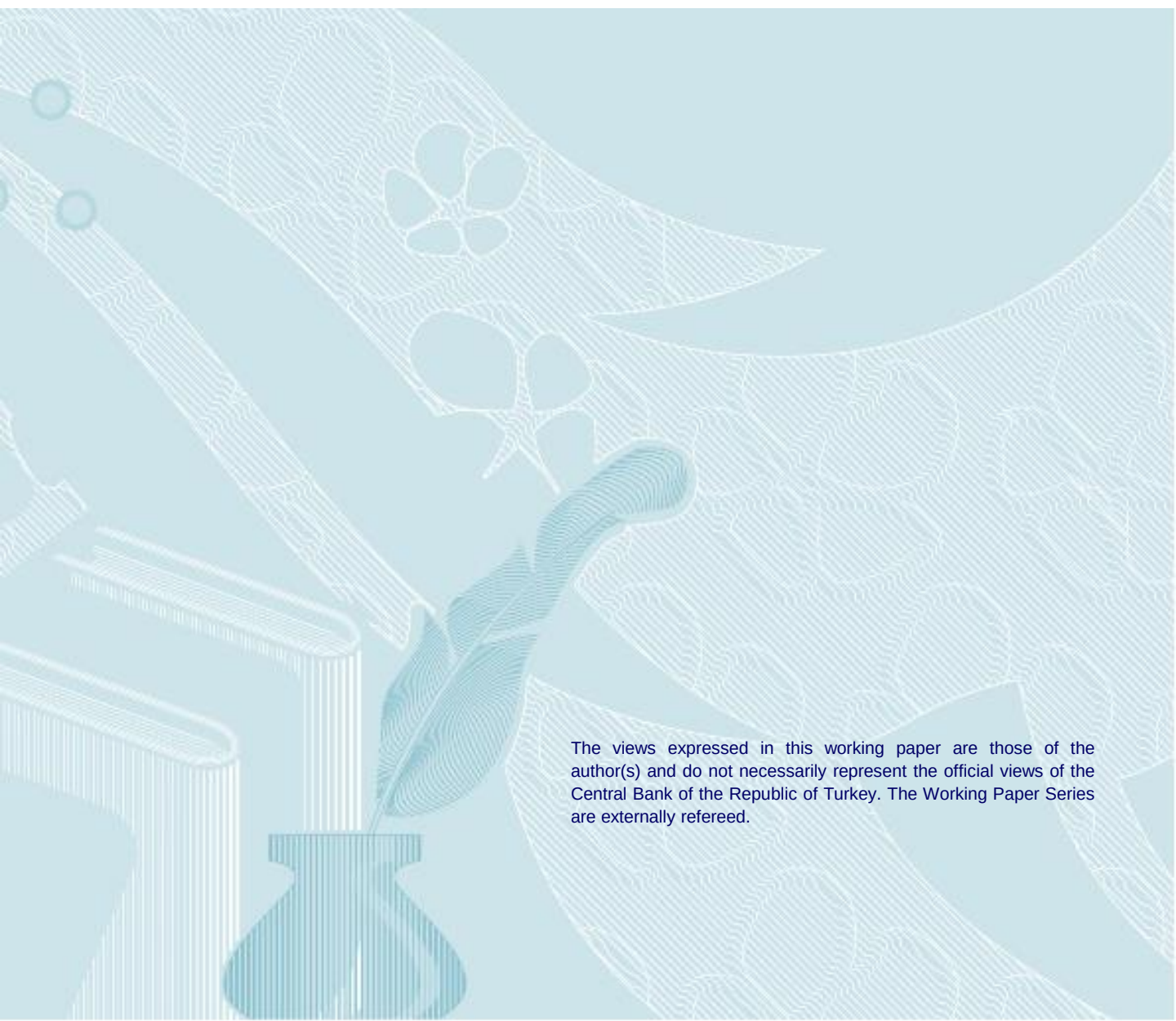
May 2017

Salih FENDOĞLU

Address:
Central Bank of the Republic of Turkey
Head Office
Structural Economic Research Department
İstiklal Caddesi No: 10
Ulus, 06050 Ankara, Turkey

Phone:
+90 312 507 80 04

Facsimile:
+90 312 507 57 33



Credit Cycles and Capital Flows: Effectiveness of the Macroprudential Policy Framework in Emerging Market Economies

Salih Fendoğlu*

Abstract

I assess the effectiveness of macroprudential policy tools in containing credit cycles per se or the impact of portfolio inflows on the cycles in major emerging market economies. The results show that borrower-based tools, measures with a domestic focus, and domestic reserve requirements are particularly effective. The findings are, in most cases, stronger for the recent period during which most of the macroprudential actions are undertaken, and generally hold for alternative definitions of credit cycle, the monetary policy stance, and portfolio inflows. Moreover, the analyses focusing on the recent period and the regional analyses suggest that foreign-currency based measures are effective. Still, these measures being implemented in a few countries or only recently makes it harder to draw general conclusions. Lastly, financial-institutions-based measures are found to be effective for Emerging Europe which has resorted to these policies relatively frequently. This result hints at the importance of building up experience in implementing macroprudential measures.

Keywords: Credit Cycles, Capital Flows, Macroprudential Policies, Reserve Requirements, Emerging Market Economies.

JEL Codes: E58; F32; G18; G28.

*Central Bank of the Republic of Turkey. I would like to thank the Editor, Geert Bekaert, Stijn Claessens, Luc Laeven, anonymous referees, and participants at various conferences and workshops for their helpful suggestions. The views expressed here are those of the author and should not be interpreted as reflecting the views of the Central Bank of the Republic of Turkey. The usual disclaimer applies.

Email address: salih.fendoglu@tcmb.gov.tr (Salih Fendoğlu)

Non-technical Summary

Last few decades have witnessed a dramatic increase in international financial integration and large cycles in global financial conditions. Against this backdrop, many emerging market economies have faced excessively volatile short-term capital flows during the recent era. And in response, they have increasingly implemented macroprudential policy tools with a broad goal of smoothing cycles in domestic credit market conditions. In this paper, I assess the effectiveness of macroprudential policies in emerging markets (taking credit cycles as the primary target).

Assessing the performance of the macroprudential policy framework in emerging markets is challenging. First, the impact of capital inflows on domestic credit market conditions should not be broadly interpreted as undesirable. On the contrary, capital inflows can be beneficial for the recipients, e.g. attracting funds to finance productive investment, fostering intertemporal trade and helping financial market deepening. It is mainly considered that it is the level of credit-to-GDP ratio relative to its long-run historical level that better reflects potential build-up of financial imbalances. Following these insights and in light of Basel accordances, I focus on credit cycles (under various definitions) –besides the usual metric of credit growth–.

Second, there are numerous types of macroprudential policies across countries and over time, and for each, the intensity of actions differs widely. Thus, measuring macroprudential policy stance across countries is challenging. Following the recent literature, I construct an index that reflects the policy direction –tightenings or easings– for widely-used tools and major emerging market economies for which detailed information on the policy actions is available.

Using these policy indices, I then assess (i) whether macroprudential policy actions help smooth domestic credit cycles; and (ii) whether they help contain the impact of portfolio flows on the cycles. The results highlight that borrower-based tools, measures with a domestic focus and domestic reserve requirements are particularly effective and robust. The results also do lend support to foreign-currency based measures, though, these measures being implemented in a few countries or only recently makes it harder to draw general conclusions. Finally, financial-institutions-based measures are found to be effective for the region of countries that has taken the related actions more frequently, namely the Emerging Europe, potentially underlining the importance of building up experience in implementing macroprudential measures.

1. Introduction

Due to large and unprecedented quantitative easing policies and the prevailing policy uncertainty in advanced economies, many emerging market economies have faced excessively volatile short-term capital flows during the recent era. If not managed properly and in a timely manner, such flows can give rise to an amplified cycle of a steady appreciation of the currency, a strong rise in asset prices, easier credit conditions, and a build-up of balance sheet risks. This fragility may eventually trigger a sudden reversal of such flows (often called 'sudden stop'), leading to a large contraction in credit and output (Calvo, 1998; Mendoza, 2010; Bianchi, 2011; Korinek and Mendoza, 2013). In turn, to reduce the build-up of financial stability risks and contain 'excessive' cycles in credit market conditions, emerging market economies have increasingly utilized macroprudential policy tools.[1]

In this paper, I assess how macroprudential policy tools perform in 18 major emerging market economies. In particular, I first compile an *index of the macroprudential policy stance* for widely-used tools, using existing databases on macroprudential policy actions and country sources. I then study whether macroprudential policy actions help smooth domestic credit cycles, and particularly from the perspective of emerging market economies, whether they help contain the impact of portfolio flows on the cycles. The results suggest that an overall tightening in the macroprudential policy stance, particularly in borrower-based and domestic measures, and a tightening in domestic required reserves helps contain credit cycles.

Assessing the performance of the macroprudential policy framework in emerging markets is challenging: First, the impact of capital inflows on domestic credit market conditions should not be broadly interpreted as undesirable (Bonfiglioli, 2008; Bekaert *et al.*, 2011, Sahay *et al.*, 2015). For instance, Bekaert *et al.* (2011) show that financial openness is generally associated with future improvements in financial development, institutional quality, and macroeconomic policies. They show that excessive credit, as reflected in highly elevated levels of private credit to GDP, is associated with undesirable effects such as higher probabilities of a crisis. BCBS (2010) and others also show that a high credit-to-GDP ratio relative to its long-run historical level is a robust indicator for the build-up of financial imbalances (Borio and Lowe, 2002, 2004; Mendoza and Terrones, 2008, 2012; Drehmann *et al.*, 2011; Jorda *et al.*, 2011; IMF, 2011a,b; Dell'Ariccia *et al.*, 2012; Schularick and Taylor, 2012; Drehmann and Tsatsaronis, 2014). Following these insights, I focus on the credit cycles (under various definitions) rather than the credit growth per se.

A second challenge is that the type and the intensity of macroprudential policy actions differ significantly across countries and over time. Cross-country analyses infer the policy stance by either using the number of tools in place in a given year to cover as many tools and countries

[1] See Crockett (2000), Borio (2003) and Clement (2010) for early discussions on 'macroprudential' policy, Elliott *et al.* (2013), Kelber and Monnet (2014) and Brunnermeier and Schnabel (2015) for an early history of prudential regulations in the form of countercyclical financial regulatory practices; and Lim *et al.* (2011), Galati and Moessner (2013), Claessens (2014), Bruno *et al.* (2015) for the taxonomy of macroprudential policies and the review of recent literature.

as possible (Cerutti *et al.*, 2015), or by constructing an index that reflects the policy direction –tightenings or easings– for widely-used tools and major economies for which detailed data on the policy actions are available at higher frequencies (Kuttner and Shim, 2013; Akıncı and Olmstead-Rumsey, 2015; Bruno *et al.*, 2015; Vandenbussche *et al.*, 2015; Forbes *et al.*, 2015). I follow the latter approach mainly because it is better suited for analyzing the tools that are frequently used (e.g. countercyclical capital requirements or reserve requirements).

I construct macroprudential policy stance indices based on IMF's detailed survey on macroprudential policy actions provided by Lim *et al.* (2011, 2013), and further, cross-check with Shim *et al.* (2013), Cerutti *et al.* (2015), and country sources. I consider an aggregate measure of macroprudential policy stance (**MPI**) as well as four major categories of tools: borrower-based tools (**MaPP-Bw**), financial-institutions-based tools (**MaPP-FI**), or alternatively, measures with a domestic focus **MaPP-D**) and foreign-currency related measures (**MaPP-FX**, which can also be called currency-based capital flow management measures).[2] Moreover, I supplement the analysis with domestic or foreign currency reserve requirement policies (**RR-D** and **RR-FX**, respectively), which have also been used for macro-financial stability purposes during the recent era (Federico *et al.*, 2014). For each category, the index takes successively higher values for each tightening and successively lower values for each easing action.

Regarding the overall use of macroprudential policy tools, the indices show that (i) macroprudential policy actions have increased over time particularly after the global financial crisis; (ii) borrower-based measures and countercyclical capital requirements on financial institutions are used much more frequently than the other tools and are generally used to tighten credit market conditions; (iii) FX-related macroprudential tools have been used much more frequently after the global financial crisis; and (iv) domestic and foreign currency reserve requirements are used more frequently than the macroprudential measures, where the former is used mostly for cyclical purposes and the latter is tilted towards tightenings. Moreover, regional indices show that Emerging East Asian countries appear to have made more frequent use of macroprudential tools (with a particular emphasis on borrower-based tools), while Emerging European economies rely mostly on financial-institutions-related tools. Finally, compared to Emerging Asian countries, Emerging European and Latin American countries have taken reserve requirement policy actions more frequently.

With these measurements in hand, I then estimate the effect of macroprudential policy actions on credit cycles using a dynamic panel model with several control variables, including, importantly, portfolio flow measures. The empirical model is dynamic in the sense that the lagged value of the credit cycle is used as an additional control variable (to capture the potential effect of variables not included in the estimation, e.g. market structure).

The results suggest that (i) an overall tightening in the macroprudential policy stance (**MPI**) is effective in containing the credit cycles *per se* or the impact of portfolio inflows on the credit cycles. Borrower-based tools (**MaPP-Bw**) or measures with a domestic focus (**MaPP-D**) appear

[2] Similar classifications can also be found in FSB/IMF/BIS(2011), Claessens *et al.* (2013) and Cerutti *et al.* (2015).

more effective and robust. (ii) A tightening in financial-institutions-based measures (**MaPP-FI**) reduces the growth of the credit-to-GDP ratio. (iii) A tightening in domestic-currency reserve requirements appears strongly robust and significant in reducing the impact of portfolio inflows on credit cycles. (iv) Macroprudential policies during the recent period are generally effective in containing the impact of portfolio inflows, particularly cross-border banking inflows, on the probability of a credit boom. (v) There is encouraging evidence that the tools that are frequently used appear more effective in curbing the credit cycle (borrower-based tools for Emerging East Asia, financial-institutions-related tools for Emerging Europe, and reserve requirements for Emerging Europe and Latin America).

The results should be interpreted with the following limitations in mind. First, my policy measures focus on widely-used tools for major economies and reflect the direction but not the intensity of policy actions. More granular approaches, necessarily focusing on fewer countries, or fewer measures, are possible (Igan and Kang, 2011; Dassatti-Camors and Peydro, 2014; Jacome and Mitra, 2015; Jimenez *et al.*, 2016). A second limitation is related to the difficulty in fully ruling out the potential endogeneity of macroprudential policy actions. To mitigate such concerns, my GMM estimation employs additional dynamic instruments in the empirical framework. Moreover, the measurement error in quantifying the intensity of policy actions and the difficulties in measuring whether policy actions are binding are likely to attenuate the estimated effect of macroprudential policies.

This paper is related to a large body of literature on the effectiveness of macroprudential tools. Leaving a detailed survey of this literature to Lim *et al.* (2011, 2013), Galati and Moessner (2013, 2014), Claessens (2014), IMF (2014), Bruno *et al.* (2015), here I would like to highlight a few studies particularly related to this paper.

Lim *et al.* (2011) use a large panel of countries for the period 2000-2010 and report that caps on loan-to-value and debt-to-income, loan/loss provisioning, restrictions on FX lending and reserve requirements can help dampen the procyclicality in credit and banking sector leverage. Ostry *et al.* (2012) find for the period 1995-2008 that capital controls and CFM-related macroprudential measures help decrease the share of FX loans in total loans in emerging market economies. Claessens *et al.* (2013) use bank-level data for advanced and developing countries for 2000-2010 and document that borrower-based measures, limits on credit growth and restrictions on foreign currency lending help reduce the share of non-core funding in total liabilities. Similarly, Zhang and Zoli (2014) emphasize caps on LTV, housing tax measures, and CFM-related measures as effective macroprudential tools in curbing credit growth, house price growth or bank leverage for a set of advanced and emerging market economies. Cerutti *et al.* (2015) show that while developing countries tend to implement CFM-related policies, advanced countries tend to rely more on borrower-based policies. Moreover, they indicate that macroprudential policies help reduce growth in real credit or in housing credit, emphasizing borrower and financial-institutions-related policies as particularly effective. Focusing on the housing market, Akıncı and Olmstead-Rumsey (2015) find that macroprudential tightening helps reduce bank credit growth, housing credit growth and house price inflation.

There is also a growing theoretical literature on the desirability of macroprudential policies. In essence, macroprudential policy tools are 'desirable' only if they mitigate certain externalities within the economy.[3] Given its empirical nature, this paper provides limited insights on this issue. Yet, since credit creation necessarily involves risk taking, it is plausible to think that a high credit-to-GDP ratio by historical standards may flag 'excessive' risk taking.

The paper proceeds as follows: Section 2 describes how I construct the indices of the macroprudential policy stance. Section 3 presents the data and the empirical methodology. Section 4 presents the empirical results. Section 5 concludes.

2. Construction of a Macroprudential Policy Index

I consider a panel of 18 major emerging market economies: Brazil, Bulgaria, Chile, Colombia, Croatia, Czech Republic, Hungary, Indonesia, Korea, Malaysia, Mexico, Philippines, Poland, Romania, Russia, South Africa, Thailand, and Turkey, for the period 2000Q1-2013Q2.[4] The choice for the country set and time span is mainly due to data availability. The list of countries presents substantial heterogeneity in the use of macroprudential measures, and thus, can provide an appropriate picture on the effectiveness of such measures. For instance, the list includes economies that have taken policy actions frequently (e.g. Croatia, Korea, Turkey) as well as those that only rarely implemented such measures (e.g. Czech Republic, Philippines, and South Africa).

I construct the database starting with the IMF's comprehensive surveys on macroprudential policy actions presented in Lim *et al.* (2011, 2013). I then supplement the database with Shim *et al.* (2013) which provides a granular list of (mostly housing-related) macroprudential policy actions. Finally, I cross-check the database against IMF (2014) and Cerutti *et al.* (2015) which are based on IMF's Global Macroprudential Policy Instruments (GMPI) database and country sources. Table A in the Appendix provides a summary of macroprudential policy actions (tightenings versus easings) that I have compiled based on these sources.

I employ a wide range of macroprudential policy measures. Classifying them into two, I analyze (i) borrower-related measures (caps on loan-to-value (LTV) ratio and caps on debt-to-income (DTI) ratio), and (ii) financial-institutions-related measures (countercyclical capital requirements (CCR), time-varying/dynamic loan-loss provisioning, restrictions on foreign currency lending, and limits on net open currency position (NOP)). Finally, I consider prudential taxes (e.g. capital gains taxes) and some 'other' measures such as limits on credit growth or limits on maturity mismatch. Table 1 summarizes how the categories of tools are defined.

Borrower-related Measures. Caps on the LTV ratio restrict funding available to a borrower to a certain fraction of the appraised value of the asset (typically residential property). By directly

[3] See, among others, Allen and Gale (2000), Caballero and Krishnamurthy (2003, 2004), Korinek (2007, 2011), Lorenzoni (2008), Fostel and Geanakoplos (2008), Bianchi (2011), Brunnermeier and Sannikov (2014), Korinek and Sandri (2015), Bianchi and Mendoza (2015), and for an early review, De Nicolo *et al.* (2012).

[4] Among these, Korea and Czech Republic are considered as developed (or newly developed) in recent classifications (e.g. IMF, 2015). Since the data set dates back to earlier years, I include them in the emerging country list.

Table 1: Macroprudential Policy Index (Definitions and Major Categories)

Category of Tools	Definition
MaPP-Bw (Borrower-related)	LTV + DTI
MaPP-FI (Financial-institutions-related)	CCR + Loan/Loss Prov. + Rest. FX Lending + Limits on NOP
MaPP-D (Domestic)	LTV^{D}+DTI^{D}+CCR^{D}+Loan/Loss Prov.^{D}
MaPP-FX (FX-related)	LTV^{FX}+DTI^{FX}+CCR^{FX}+Loan/Loss Prov.^{FX} + Rest. FX Lending + Limits on NOP
MPI (Aggregate)	**MaPP-Bw** + **MaPP-FI** + Tax + Other

Notes. LTV: Loan-to-Value cap; DTI: Debt-to-Income cap; CCR: Countercyclical capital requirements; NOP: Net open position. The superscripts D and FX denote domestic-currency related and foreign-currency related measures, respectively.

limiting funding available, the measure helps reduce credit demand and screens out risky borrowers. Moreover, by increasing the equity in the asset, the LTV cap can help increase borrowers' resilience to asset price movements. Caps on the DTI ratio limit borrowers' total debt to a fixed fraction of their income. Similar to the LTV cap, yet with direct emphasis on the affordability, the DTI cap can also help reduce credit demand and increase resilience of borrowers to adverse price developments. Moreover, unlike the LTV cap, the DTI cap might become binding earlier when asset prices grow faster than household income.

Financial-Institutions-related Measures. Countercyclical capital requirements include countercyclical capital buffers requiring banks to retain a certain share of profits and build up reserves during boom times, higher risk weights for certain types of loans (e.g. for short-term consumer loans) in calculating banks' regulatory capital and in meeting minimum capital adequacy requirements, and restrictions on profit distribution (e.g. limiting dividend payout based on capital adequacy). Time-varying/dynamic loan-loss provisioning requires banks to build up capital buffers in good times to provide a cushion during periods of stress. The size of required buffers can be calculated based on incurred or expected through-the-cycle loan losses. These tools, therefore, aim to reduce procyclicality of bank lending and can help constrain credit growth by increasing the cost of new loans. Restrictions on foreign currency lending include limiting foreign-currency denominated loans to only certain types of borrowers (e.g. limiting such credit to highly-rated or FX-earning borrowers), restricting maturity of such loans, or banning foreign currency lending for certain type of loans (e.g. mortgages). A rise in the cap, therefore, may restrain credit growth by limiting banks in extending such lines of credit. Finally, limits on the net open currency position include levies on banks non-deposit foreign currency liabilities, requiring banks not to exceed a certain level of mismatch between foreign currency assets and liabilities (including off-balance sheet items). This tool, then, can help reduce vulnerability to currency movements and in turn help smooth credit cycles.

For each of these policy tools, I also evaluate whether the type of policy action is domestic-currency-based (and therefore has a domestic focus) or is foreign-currency-based (i.e. in the spirit

of currency-based capital flow measures). For instance, changes in risk weights on foreign currency loans are classified as FX-related (CCR^{FX}). Similarly, all actions regarding restrictions on FX lending and limits on NOP are classified as FX-related. Domestic measures then include all non-FX policies, e.g. change in risk weights on domestic currency loans (CCR^{D}), or loan-loss provisioning for domestic currency loans ($Loan/LossProv.^{D}$).

I do not consider measures related to cross-sectional risks (e.g. limits on interbank exposures, capital surcharges on systemically important financial institutions, or concentration limits) due to lack of available data. Moreover, I do not study capital control measures since they are residency-based, indirectly target macro-financial aggregates, and conventionally not labeled as 'macroprudential'.

For each macroprudential tool, I construct an indicator variable (or index) that increases by a value 1 if the measure is used to tighten and -1 if the measure is used to loosen credit market conditions. No change is assigned if no policy action is taken in that quarter.[5] If a tool is used more than once within the same quarter, I reflect that on the index, e.g. a decrease in the LTV cap twice within the same quarter implies that the LTV index increases by two for that quarter. In sum, I obtain tightenings *net* of easings, a cumulative measure of macroprudential policy stance, for each policy tool.

Figure 1 presents the aggregate number of macroprudential tightenings versus easings. Caps on LTV and DTI, and countercyclical capital buffers appear to be the most frequently used tools. Moreover, for all the tools, policy actions are mostly steered towards tightening where most tightenings occur after 2008. Regarding the category of tools, Figure 2 shows that financial-institutions-based measures and domestic-currency related tools are used more frequently compared to borrower-related or FX-related tools. Moreover, there was a general tendency of easing the macroprudential stance during late 2008 and early 2009 at the onset of the global financial crisis. A sharp tightening phase unfolds after mid-2009.

Reserve Requirements.

One factor that makes emerging market economies unique in the use of macroprudential measures, is the concurrent use of reserve requirements. As discussed in detail by Federico, Vegh and Vuletin (2014), emerging market economies use reserve requirements over the business cycle much more 'actively' compared to advanced economies, mainly to ease the trade-off that small open economies face in managing capital flows.[6]

Similar to how I compiled the index on the macroprudential policy stance, I construct indices on domestic and foreign currency reserve requirements. In particular, tightening actions in domestic currency reserve requirements within a quarter is reflected by increasing the index by the number of tightening actions (and similarly for foreign currency reserve requirement policy actions). This

[5] For the initial period, 2000Q1, I set the index for each tool equal to zero. In this regard, the related index should be read relative to 2000Q1.

[6] The effectiveness of reserve requirement policies has been studied extensively in the literature (in different contexts). See Gray (2011), Montoro and Moreno (2011), Tovar *et al.* (2012), Kashyap and Stein (2012), and Glocker and Towbin (2015), among others.

is certainly a limitation, considering the heterogeneity in the use of reserve requirement policies (e.g. average versus marginal or maturity-based reserve requirements). For compatibility purposes with macroprudential policy indices, here I resort to a tightenings-net-of-easings-type of an index to gauge the reserve requirement policy stance.

Compared to macroprudential policies, reserve requirement policies are used much more frequently than the macroprudential tools (Figure 3). While domestic currency reserve requirements (**RR-D**) are used mostly for business cycle management (the number of instances towards tightenings and easings are close), foreign currency reserve requirement actions (**RR-FX**) are tilted towards tightenings.

A Tale of Two Countries.

Korea and Turkey differ noticeably in the timing and composition of policies (Figure 4). Korea started implementing macroprudential measures long before the global financial crisis and has used both domestic and FX-based policies intensively. In contrast, Turkey started implementing these measures mainly after the crisis and relied mostly on domestic measures.[7]

Korea started implementing macroprudential policies in the 2000s. Majority of policy actions had a domestic focus with almost no emphasis on FX-related measures. Suffering from procyclical short-term external debt after late 2008, however, Korea then aimed at reducing the dependence of the banking sector on global liquidity conditions and curtailing the leverage growth by implementing FX-related measures. Authorities put a cap on foreign exchange forward contracts as well as a limit on banks' foreign exchange derivative positions. Moreover, a 14 percent withholding tax on foreign purchases of treasury and monetary stabilization bonds was reintroduced in January 2011. In August 2011, a macroprudential stability levy, i.e. a tax on banks' non-core foreign exchange liabilities, was imposed to reduce FX mismatch and volatility risks arising from banks' dependence on short-term external financing (Bruno and Shin, 2014).

Turkey implemented macroprudential measures to a limited extent before the global financial crisis. In response to volatile capital flows during the recent era, various macroprudential measures have been adopted, ranging from caps on LTV, restrictions on foreign currency lending (including an outright ban on foreign currency mortgages) to higher risk weights for consumer loans and sectoral provisioning. In addition to borrower-based measures, FX-related measures are also implemented towards the end of the sample. Moreover, Turkey utilized domestic reserve requirements frequently and used **RR-FX** in tandem with other FX-related prudential measures (Kara, 2016). Similar to Korea, the framework is designed to contain the amplified effect of cross-border flows on the domestic credit cycles.

3. Data and Empirical Methodology

The empirical framework is the dynamic panel model given below:

[7]The difference in the timing of macroprudential policy actions should not be interpreted on normative grounds. One could expect Korea, a more open country than Turkey in terms of trade and financial flows, to start implementing such measures earlier.

$$Y_{i,t} = \rho Y_{i,t-1} + \beta_1 \Delta MaPP_{i,t} + \beta_2 \Delta PFLOWS_{i,t} \Delta MaPP_{i,t} + \beta_3 \Delta PFLOWS_{i,t} + \theta X_{i,t-1} + \mu_i + \upsilon_{it} \quad (1)$$

where $E[\mu_i] = E[\upsilon_{it}] = E[\mu_i \upsilon_{it}] = 0$, i denotes country and t denotes quarters. μ_i is the country fixed effect which captures country-specific time-invariant unobserved characteristics.

Dependent Variable(s).

For Y, the macro-financial aggregate that macroprudential tools target, I take the credit-to-GDP gap (credit-to-GDP ratio relative to its recursive long-run trend). Credit is defined broadly, i.e. total domestic and foreign-currency claims on the private non-financial sector from both banks and non-bank financial institutions.[8] The motivation to use the broad definition is to account for potential leakages that the macroprudential tools may exhibit, e.g. borrowers may circumvent a measure by substituting bank credit with funding from unregulated financial institutions, or a tightening macroprudential action on domestic credit may spill over to foreign currency credit.[9] For GDP, I use seasonally adjusted nominal GDP.

Calculating the credit-to-GDP gap necessarily requires an appropriate estimation of the underlying 'fundamental' trend of credit-to-GDP. Because financial cycles might have greater amplitude and duration compared to real cycles (Claessens, Kose and Terrones, 2011; Drehmann and Tsatsaronis, 2014; Schuler *et al.*, 2015), a long-run trend seems appropriate. However, for economies going through a period of financial deepening, using a long-run trend may frequently incorrectly flag excessive levels of credit. Along these lines, I consider the credit-to-GDP gap under two different trend specifications (a long-run trend based on recursive Hodrick-Prescott (HP) filter with $\lambda = 400000$, and a medium-run trend that coincides with the frequency of conventional real business cycles; -recursive HP filter with $\lambda = 1600$-). To estimate the recursive trends, I initially take the first 24 quarters, and compute the trend function recursively (adding one quarter at a time) and apply it to the last quarter to estimate the trend for that quarter.

I enrich the analysis with alternative measures of excessive credit. First, I consider a simple metric, the change in the credit-to-GDP ratio. In essence, this measure addresses whether a macroprudential policy action helps contain credit as it arises, with no particular emphasis on the changes in long-run level of credit or on the desirability of such policy actions. Last, I follow Dell'Ariccia *et al.* (2012) and define an indicator variable for credit booms which takes a value 1 for a country i if either of the following two conditions is satisfied: (i) the credit-to-GDP gap is greater than 1.5 times its country-specific standard deviation and the annual growth rate of credit-to-GDP ratio exceeds 10 percent; or (ii) the annual growth rate of the credit-to-GDP ratio exceeds 20 percent. Condition (ii) captures episodes in which aggregate credit gains momentum

[8] For a similar measure of 'excessive' credit, see Borio and Lowe (2002, 2004), BCBS (2010), IMF (2014), and Drehmann and Tsatsaronis (2014), among many others.

[9] For empirical evidence on the leakages that macroprudential policies may exhibit, see Vinals and Nier (2014), Reinhardt and Sowerbutts (2015), Jacome and Mitra (2015), and Cizel *et al.* (2016).

very gradually but credit growth reaches levels that are well above those previously observed in the country.

In sum, for the dependent variable, I consider:

$$Y_{i,t} = \left\{ \texttt{Credit-to-GDP gap}_{i,t}; \texttt{Credit-to-GDP gap}_{i,t|\lambda=1600}; \Delta \left(\frac{\texttt{Credit}}{\texttt{GDP}} \right)_{i,t} ; \text{ or } \texttt{Credit Boom}_{i,t} \right\}$$

Figure 5 shows how the target variables have evolved over time. On average, emerging market market economies experienced a large positive credit-to-GDP gap during early 2009 and in early 2012, coinciding with the advanced economy central banks' quantitative easing policies. Similarly, more than half of the emerging market economies experienced a credit boom during these episodes. During the boom periods, average annual growth rate of credit-to-GDP ratio is 37% and average credit-to-GDP gap is 11.8% (8.91% excluding Korea) (Table 2). During the non-boom periods, they are -1.41% and -0.63%, respectively. Moreover, while target credit variables (averaged across the economies) evolve similarly, they are not very strongly correlated (Table 3). Credit cycles (the credit-to-GDP gap variables) are moderately contemporaneously correlated with the change in credit-to-GDP ratio and the indicator variable for the credit boom (around 0.25 to 0.57). As such, the set of target variables has the potential to provide alternative perspectives on the performance of macroprudential policies.

Focus Variable.

Achieving a single financial stability objective may require several instruments. In this regard, I consider several categories of tools. $MaPP$ denotes the macroprudential policy stance for borrower-related measures (**MaPP-Bw**), financial-institutions-related measures (**MaPP-FI**), domestic measures (**MaPP-D**), FX-related measures (**MaPP-FX**), or the overall macroprudential policy stance (**MPI**). As the benchmark, I use quarterly change in the respective index to reflect the change in the macroprudential policy stance.

Control Variables.

X is the vector of variables that reflect the monetary policy stance, aggregate demand conditions, balance sheet effects, and portfolio inflows:

- *Monetary policy stance.* I gauge the monetary policy stance by estimating a (backward-looking) Taylor-type rule (Taylor, 1993). I conjecture that monetary policy, on average, is governed by the following estimable rule: $R_{it} = \rho R_{it-1} + (1-\rho)\left(\varphi_\pi \pi_{it-1} + \varphi_Y \Delta Y_{it-1}\right) + \mu_i + \epsilon_{it}$ where R denotes the short-term policy rate, π denotes the annual CPI inflation rate, and ΔY denotes annual real GDP growth. ρ reflects policy persistence, φ_π and φ_Y denote the long-run reactions to inflation and output growth, respectively. μ_i is the country fixed effect that captures the country-specific long-run level of inflation that the monetary authority seeks to achieve. A positive value for ϵ_{it} would therefore mean that the monetary policy stance is 'unexpectedly' tight (above and beyond what inflation and output growth would imply).

The estimated coefficients are $\rho = 0.602(0.000)$, $\varphi_\pi = 1.163(0.000)$, and $\varphi_Y = 0.198(0.055)$, with the corresponding p-values in parantheses.[10]

- *Real GDP growth.* Annual growth in real GDP. Buoyant economic growth and favorable macroeconomic conditions may result in higher credit demand and a higher equilibrium level of credit.

- *Real Exchange Rate.* As capital inflows surge and the exchange rate appreciates steadily, domestic borrowers might experience improvement in their balance sheets (as foreign currency liabilities can now be matched with a lower level of domestic assets). This, in turn, might lead to easier borrowing constraints, and eventually, a higher equilibrium level of credit. I take the 4-quarter change in the real exchange rate since the balance sheet effect might take time to become effective.

- *Portfolio Inflows.* As a benchmark, I use the ratio of cross-border banking flows to banks and non-banks in individual countries in proportion to GDP. This choice is mainly due to Bruno and Shin (2014, 2015) who analytically show in a theoretical framework how cross-border bank-to-bank flows can give rise to domestic credit expansion. For robustness, I also use gross or net portfolio inflows, and net portfolio debt flows.[11]

Moreover, I include in the estimation the lagged dependent variable, $Y_{i,t-1}$, and unobservable time-invariant country characteristics, μ_i, mainly to control for other variables that can be relevant for explaining the target variable, e.g. credit market structure (market vs. bank-based), concentration in the financial system, economic or financial development, and various other institutional features such as institutional quality.

Tables 5 and 6 provide the descriptive statistics of the variables used in the empirical framework.

Methodology.

Since the empirical model is dynamic, within estimators are inconsistent (with an asymptotic bias of order $1/T$ as $N \to \infty$) (Nickell, 1981). Given the large T in the sample (at most 54 observations per country-variable), within estimates can be motivated as the baseline. However, an IV-based estimator is especially relevant in this context, since macroprudential policy measures ($MaPP$) may be set as a response to movements in credit cycles, creating a potential endogeneity problem. Moreover, any bias in the dynamic term may also contaminate the coefficient estimates for the independent variables. Accordingly, I employ an Arellano and Bond (1991) GMM estimator

[10] See Table 4 for the estimation details. The coefficient estimates are broadly inline with the related literature (Aizenmann *et al.*, 2008; Takats, 2012; McGettigan *et al.*, 2013). Including the real exchange rate in the estimation (column 2) and using the residuals from this specification as the monetary policy stance does not change the results.

[11] In particular, I use cross-border loans and deposits of BIS-reporting banks to bank and non-bank sectors in individual countries (BIS Table 7A). Net or gross portfolio inflows are from the IMF Balance of Payments Statistics (BOPS) database. Gross portfolio inflows are defined as portfolio investment liabilities, and net portfolio inflows are defined as portfolio investment liabilities minus portfolio investment assets. Net portfolio debt inflows are similarly defined, using debt instruments only.

(with two-step covariance estimates) that addresses the Nickell bias and ensures that the lagged dependent variable is orthogonal to the residuals. Besides the lags of the dependent variable, I also use lagged levels of macroprudential policy actions as instruments. For the credit boom, which is a 0-1 indicator variable, I continue to use the same empirical methodology to remain comparable.

I use a parsimonious set of instruments in the estimation, namely, one to three lags of the lagged dependent variable and the macroprudential policy actions. The instrument lag choice yields AR(2) p-values, the regression diagnostic statistics, above the 5% threshold. I do not use higher lags to avoid instrument proliferation.

4. Can macroprudential and reserve requirement policy tools help contain excessive credit cycles?

Tables 7 and 8 present the benchmark results, where I focus on the credit-to-GDP gap under the recursive long-run trend.

Table 7 suggests that an overall tightening in macroprudential policy stance is by and large effective in curbing credit cycles. In particular, a tightening in overall macroprudential policy stance is estimated to decrease the credit-to-GDP gap significantly by about 2 percentage points (roughly one-third of the standard deviation of the gap). Moreover, all the tools except the financial-institutions-based ones (**MaPP-Bw**, **MaPP-D** and **MaPP-FX**) appear effective in smoothing the credit-to-GDP gap (ranging from 2.5 to 4 percentage points). In terms of economic significance, a unit tightening in borrower-based measures stands out as the most effective in reducing the gap, by about 4 percentage points. I interpret this finding as borrower-based measures being generally well targeted and harder to circumvent. Moreover, among other measures, only the financial-institutions-related measures appear significantly effective in reducing the sensitivity of the gap to portfolio inflows (though for only the recent period and only mildly significantly). In economic terms, a one standard-deviation increase in **MaPP-FI** is estimated to reduce the sensitivity by about 56%. The FX-related macroprudential measures, **MaPP-FX**, do not appear significant in containing the impact of portfolio inflows on the credit gap.

Considering the control variables, I observe that they have the expected impact, at least in terms of direction. For the recent period, an unexpected increase in the short-term policy rate by 1 percentage point is estimated to decrease the gap by about 0.7 to 1 percentage points. Moreover, an improvement in aggregate demand conditions, e.g. a 1 percentage point rise in real GDP growth, leads to a rise in the gap by about 0.5 to 0.8 percentage points. Furthermore, a 10% annual appreciation in the RER is estimated to increase the credit gap by about 2-2.5 percentage points. Last, a one-percentage point increase in cross-border flows is estimated to increase the credit gap by about 0.5 to 1 percentage points.

I also consider other control variables such as inflation, fiscal balance and commodity prices that presumably affect credit cycles, and the results are by and large robust (available upon request). Moreover, the results are generally robust to estimate a standard fixed-effects panel regression (Table A1). Financial-institutions-related tools and domestic measures are effective in reducing

the sensitivity of credit cycles to portfolio inflows. Moreover, the within estimates show that the model has a strong power in explaining the fluctuations in the credit cycles (with an R^2 around 0.7).

Table 8 summarizes the results for alternative target credit variables. Further results emerge. First, a tightening in **MaPP-FI** appears helpful in containing the change in the credit-to-GDP ratio. This result suggests that the **MaPP-FI** class of tools do contain credit as it arises. Yet, the evidence is rather limited on whether the reduction in the credit *per se* can be comfortably regarded as desirable (as suggested by Table 7). Second, tighter macroprudential policy actions do not reduce the likelihood of a credit boom per se (in a statistically significant sense). Nonetheless, for the recent period, they help contain the impact of portfolio flows on the probability of a credit boom.

Reserve Requirements.

Tables 9 and 10 provide the main results for the effectiveness of reserve requirement policies. A tightening in domestic required reserves appears significantly helpful in reducing the sensitivity of credit-to-GDP gap to portfolio inflows. The sensitivity is estimated to decline by about 8% to 10% in response to a one-standard deviation tightening. For foreign required reserves, the effects are generally not significant. The last column of Table 10 further suggests that a tightening in foreign required reserves reduces the impact of portfolio flows on the probability of a credit boom (by about 67% for the recent period in response to a one-standard deviation tightening). Similarly, a tightening in domestic required reserves policy reduces the sensitivity of likelihood of a credit boom to portfolio inflows (by about 34%).

4.1. Regional Differences

In Figure 6, I plot the average macroprudential policy stance for each region: Emerging Europe, Emerging East Asia and Latin America. In all the regions, the macroprudential policy actions generally geared towards tightening, with a brief period of easing in late 2008 and early 2009. Still, there is noticeable heterogeneity in the use of macroprudential policy tools across the regions. On average, Emerging East Asian countries have made greater use of macroprudential tools and relied more frequently on borrower-based measures compared to other regions. Emerging European economies have used financial-institutions-related tools and reserve requirements more actively. Latin American countries have started to implement macroprudential tools later than the other regions, with a particular emphasis on financial-institutions-related measures and domestic reserve requirements.

In Table 11, I present the results based on the benchmark specification (as in Table 7). As the cross-sectional dimension becomes much lower (e.g. there are 4 Latin American countries in the sample), I report the results using the within estimator. In this regard, the results should be taken as suggestive. Table 11 shows that it is mainly the Emerging East Asian region that drives our benchmark result in Table 7 on the borrower-based tools. This might be merely due to the fact that the variability in the borrower-based macroprudential actions is higher for this region. Alternatively, Emerging East Asian economies might have benefited from taking frequent

attempts to re-calibrate the tools and make them more targeted. Similar inferences can be made for the European countries for financial-institutions-related tools. For Emerging Europe and Latin America, reserve requirement measures appear effective in containing the impact of portfolio flows on the credit cycles.

4.2. Further Discussions and Robustness Analyses

Endogeneity. The panel GMM methodology is widely used in the related literature (e.g. Cerutti *et al.*, 2016; Akinci and Olmstead-Rumsey, 2015, and others) as it is suitable for independent variables that are not strictly exogenous, and as argued, the use of lagged macroprudential policy actions as dynamic instruments may mitigate the potential endogeneity of macroprudential policies. Consider, however, a data generating process where the target credit variable simply mean reverts to its long-run value when it is excessive, and where macroprudential policies, although they are ineffective to curb credit, react contemporaneously to the credit variable. Then, a researcher who regresses future values of credit variable to contemporaneous macroprudential policy actions may spuriously find a negative coefficient estimate. That is, he/she may frequently encounter a false-positive, rejecting the null hypothesis of macroprudential policies being ineffective although it is true.[12]

To shed light on this issue, first, I estimate the degree of mean reversion in the target credit variables by estimating $\Delta Y_{i,t+1} = \kappa(Y_{it} - Y_i^*) + \eta_i + e_{i,t+1}$ where η_i is the country fixed effect, Y_i^* is the sample average of Y for country i. The estimates for κ are presented in Table 12. The results suggest that credit cycles (particularly the benchmark target variable) exhibit a weak degree of mean reversion and a significantly lower mean reversion rate compared to other target variables, and in turn, are less prone to encountering such potential false-positives.

Second, I assess the degree of 'reverse causality' by estimating a fixed effects regression of $\Delta MaPP_{i,t} = \sum_{s=0}^{T=3} \alpha_{1,s} Y_{i,t+s} + \eta_i + e_{it}$, where η_is are the country fixed effects.[13] For brevity in the discussion, I use the overall macroprudential policy index, **MPI**, for the $MaPP$. The results are presented in Table 13, showing that the reaction coefficients are insignificant for all the cases.

Third, consider also the possibility that domestic credit cycles merely follow cycles in global financial conditions, and further, tighter macroprudential policies, although ineffective to curb credit, are implemented mostly at the end of a financial boom. In such a case, macroprudential policies would erroneously appear effective in curbing credit. Including portfolio flows in the estimation framework helps account for such a potential false-positive. Indeed, if I had excluded portfolio flows from the empirical model, the estimated degree of effectiveness would be higher (by about 5 to 30 percentage, depending on the specification) (not shown for brevity).

Taking into account cumulative changes in the macroprudential policy index. In the benchmark analyses, I have focused on one-quarter change in the macroprudential policy stance, i.e.

[12] I would like to thank the Editor for emphasizing this point.

[13] I also consider variants of these regressions, e.g. $T = 0$, 1, or 2, using other categories of $MaPP$, or estimating the regression with current or future values of real GDP growth, real exchange rate, or portfolio flows. The results are broadly robust to these specifications. Bruno *et al.* (2016) also follow a similar approach and regress policy variables on the target variables to gauge potential endogeneity.

macroprudential policy action currently undertaken. This may overshadow the true effect of policy actions as it might take time for the policies to become effectively binding or that a policy action might further warrant subsequent policy accommodation to become effectively binding. Along these lines, I consider cumulative four-quarter change in the policy stance, i.e.$\Delta^4 MaPP$ (Table A2). **MaPP-FX** and **MPI** now appear statistically significant in reducing the impact of portfolio inflows on the credit cycles (and **MaPP-FI** loses its statistical significance).

Alternative definitions for monetary policy. To gauge the monetary policy stance, I have used estimated residuals from a standard Taylor-type rule. Note however that several emerging market economies have been using multiple tools to conduct their monetary policy. Moreover, the monetary transmission channel in emerging markets may not be as clear as for most advanced economies due to their different stages of growth. Therefore, I consider alternative measures of monetary policy stance: changes in the policy rate or changes in the M2-to-GDP ratio. The results are largely robust (Tables A3 and A4), except that M2-to-GDP ratio appears statistically significant for a broader set of specifications. Moreover, while all the categories of tools appear significant in reducing the credit cycles per se, only the measures with a domestic focus (**MaPP-D**) appear significantly effective in reducing the impact of portfolio inflows on the credit cycles.

Using different definitions for portfolio flows. I have considered cross-border banking inflows as the benchmark variable for portfolio flows. This may over-state the role of macroprudential policies in containing the impact of portfolio flows on the credit cycles. Accordingly, I have estimated the benchmark empirical specification using alternative definitions for portfolio flows: gross/net portfolio inflows and net portfolio debt flows, in proportion to nominal GDP. The results are reported in Tables A5 - A10. Changes in borrower-related measures (**MaPP-Bw**), measures with a domestic focus (**MaPP-D**), and overall macroprudential policy stance (**MPI**) appear significant in reducing the sensitivity of the credit cycle to portfolio inflows. On the other hand, tightening actions in financial-institutions-related measures may lead to unintended consequences (such as increasing the sensitivity of the credit cycle to portfolio inflows). Finally, among other tools, domestic currency required reserves stand out as effective in containing the impact of portfolio inflows on the probability of a credit boom.

Using a two-sided HP filter to calculate the credit-to-GDP gap. The results are generally stronger when I use a two-sided HP filter. For brevity, I only report the results for the benchmark specification (Table A11). A tightening in borrower-related measures (**MaPP-Bw**), measures with a domestic focus (**MaPP-D**) as well as overall macroprudential policy stance continues to be effective in reducing the credit cycles per se. Moreover, it contains the impact of portfolio inflows on the credit cycles. This might be because the two-sided filtering implies an excessively looser credit-to-GDP gap in the run up to the global financial crisis during which some of these economies had already started to implement tighter macroprudential measures (see Figure A1 for the target credit variables under recursive versus two-sided filtering).

5. Conclusion

Emerging market economies have experienced significant financial stability challenges during the recent era. Facing unprecedentedly large and volatile cross-border capital inflows and in turn the risk of excessive swings in domestic credit cycles, policy makers have actively used various macroprudential and reserve requirement policy measures. In this paper, I assess the effectiveness of these measures in containing 'excessive' cycles in credit or in reducing the impact of portfolio inflows on the credit cycles.

Using a large set of control variables and conducting thorough robustness analyses, the results suggest that macroprudential policy tools, most notably borrower-based measures, domestic currency-based measures, and domestic reserve requirements are helpful in smoothing the credit cycles in an economically and statistically significant way.

Moreover, the analyses focusing on the recent period and the regional analyses suggest that foreign-currency based measures are effective. Still, these measures being implemented in a few countries or only recently makes it harder to draw general conclusions. In addition, financial-institutions-based measures appear effective for Emerging Europe which has resorted to these policies relatively frequently. This result hints at the importance of building up experience in implementing macroprudential policies.

Assessing the effectiveness of macroprudential policy actions has many facets that one can further explore. For instance, FX-related macroprudential measures in a country may have spillovers on other economies, a phenomenon emphasized for residency-based capital controls (Forbes *et al.* 2012). Moreover, I focus on the time-series dimension of macroprudential measures, leaving aside the cross-sectional dimension that particularly targets 'excessive' interconnectedness. Furthermore, one can assess the effectiveness of macroprudential policies on alternative financial targets, e.g. bank versus non-bank credit, reliance on non-core funding in total funding. Using alternative financial targets can shed light on the effect of macroprudential policy actions on the immediate intended targets, but bears the risk of overlooking potential unintended consequences (e.g. tighter FX-related macroprudential policies may lead to higher domestic currency loans). A rigorous analysis, however, requires an explicit empirical investigation. Furthermore, banks that operate internationally can be large transmitters of global financial shocks to emerging market economies. Assessing how macroprudential measures affect such banks' dynamic behavior would also be an important contribution to the literature.

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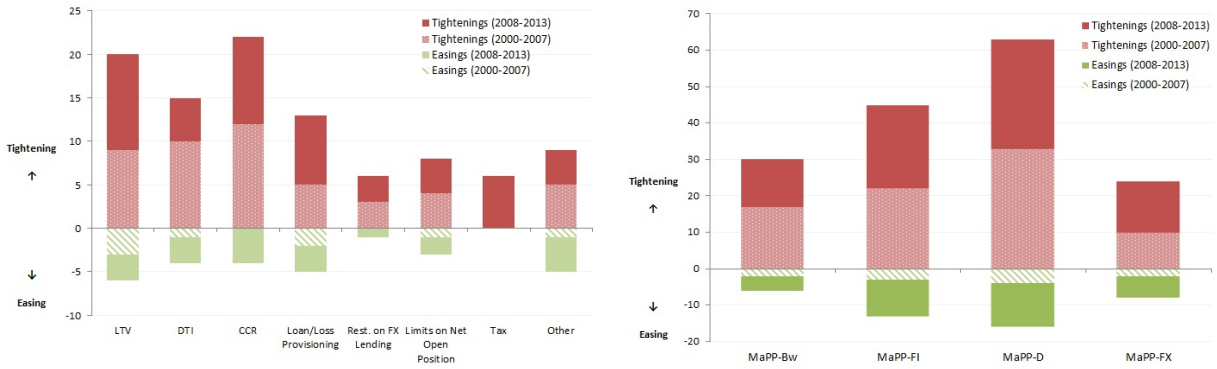
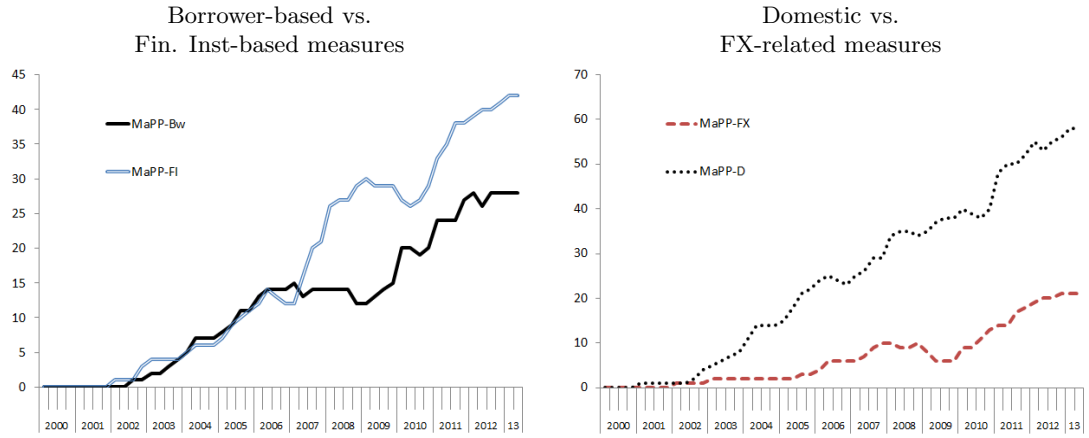
6. Figures and Tables

FIGURE 1: MACROPRUDENTIAL POLICY ACTIONS (CATEGORY OF TOOLS)



Notes. Aggregate number of tightenings versus easings for each policy tool and each category of policy tools. Source: Author's calculations based on Lim *et al.* (2011, 2013), Shim *et al.* (2013), IMF (2014) and Cerutti *et al.* (2015), and country sources. The sample includes 18 major emerging market economies for the period 2000Q1-2013Q2.

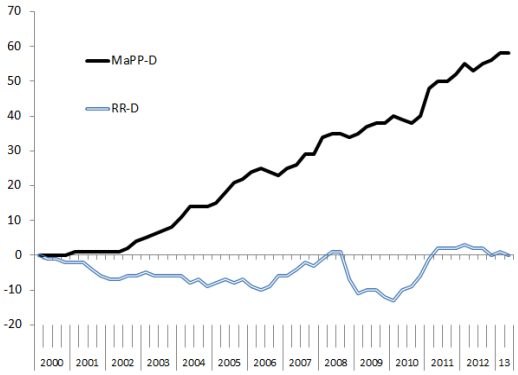
FIGURE 2: MACROPRUDENTIAL POLICY STANCE FOR EMERGING MARKET ECONOMIES



Notes. The cumulative sum of macroprudential policy index (for each category of tools).

FIGURE 3: RESERVE REQUIREMENTS AND MACROPRUDENTIAL POLICY STANCE OVER TIME.

Domestic macroprudential measures vs. Domestic currency reserve requirements



FX-related macroprudential measures vs. Foreign currency reserve requirements

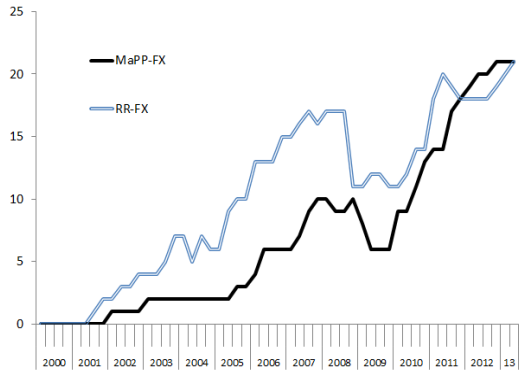


FIGURE 5: TARGET CREDIT VARIABLES

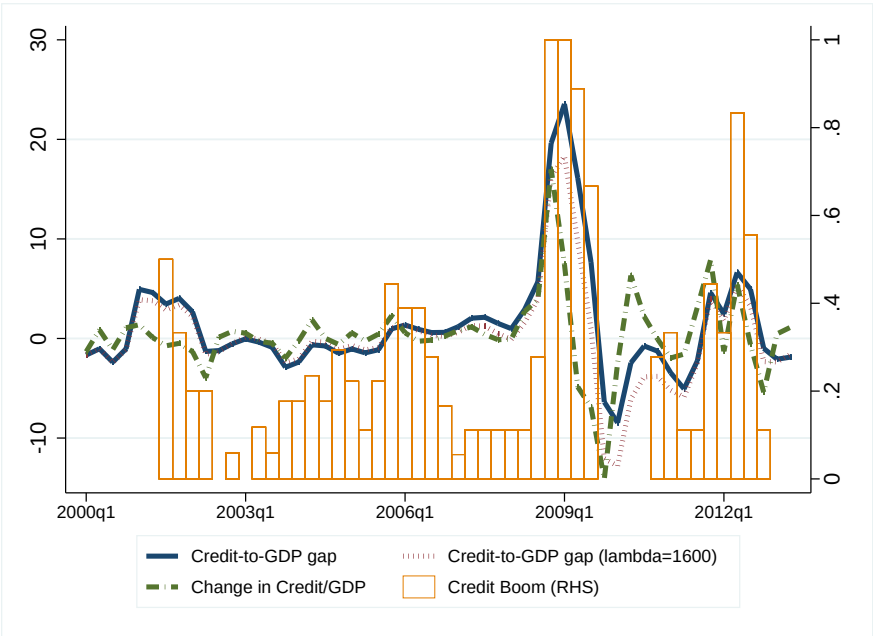


FIGURE 4: MACROPRUDENTIAL POLICY STANCE OVER TIME. EXAMPLES: KOREA AND TURKEY

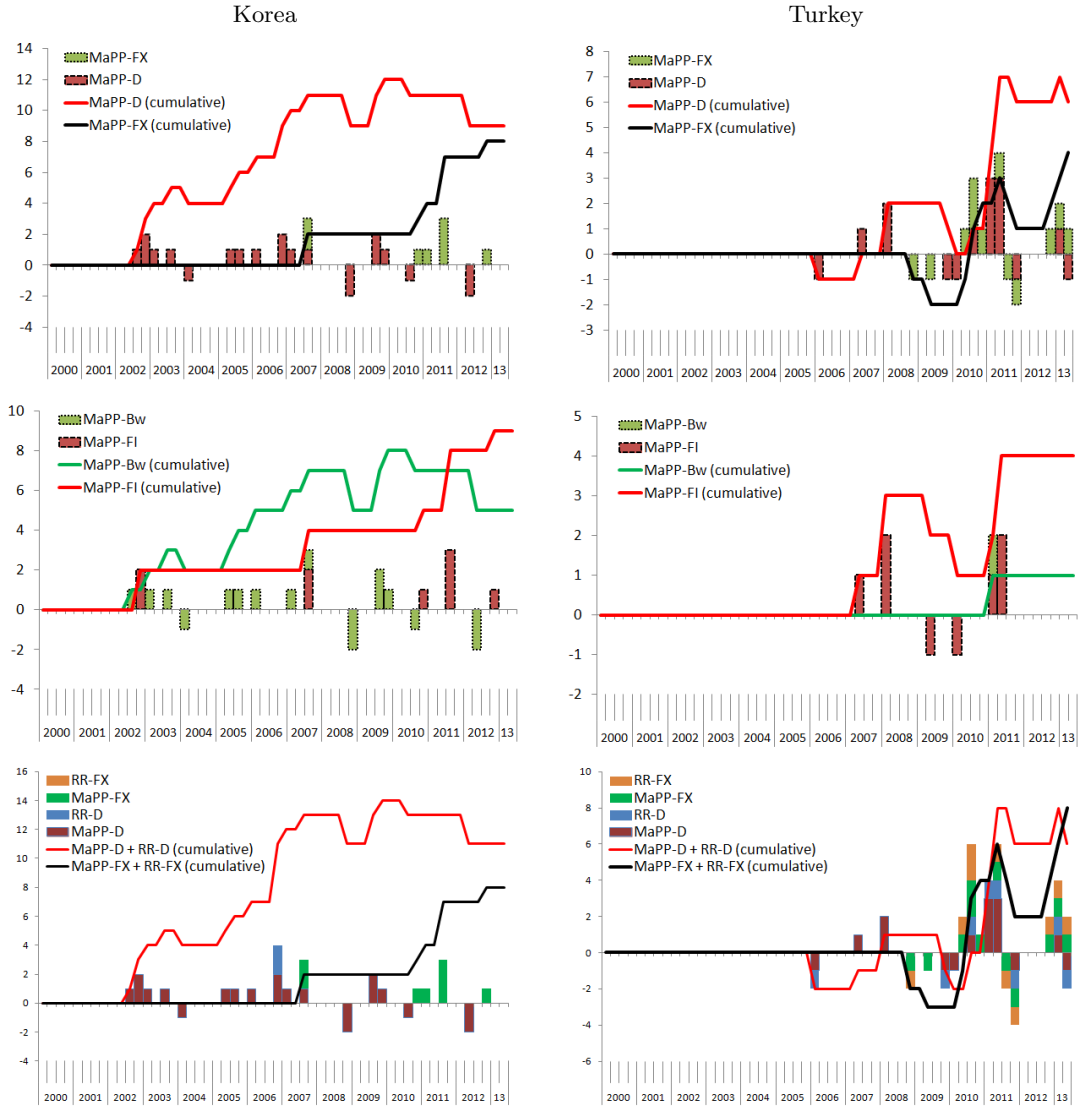
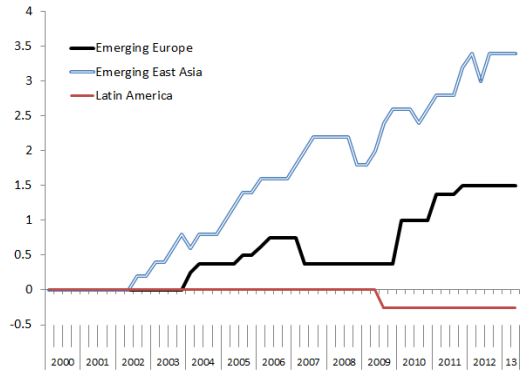
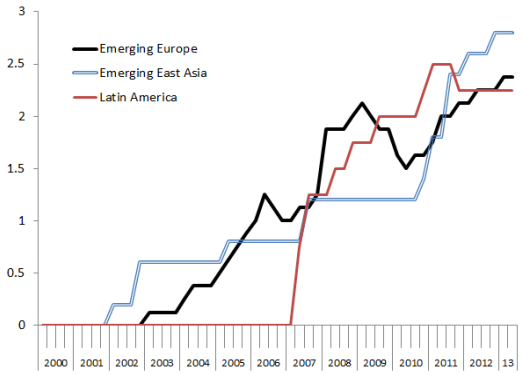


FIGURE 6: MACROPRUDENTIAL POLICY STANCE FOR EMERGING MARKET ECONOMIES (EMERGING EUROPE, EMERGING EAST ASIA, AND LATIN AMERICA)

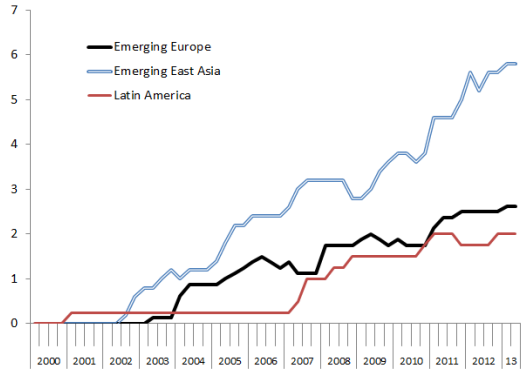
Borrower-based measures (**MaPP-Bw**)



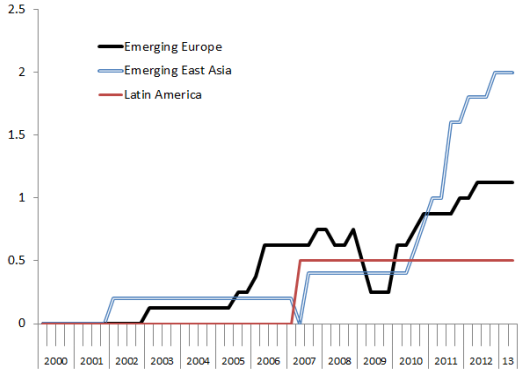
Fin. Inst-based measures (**MaPP-FI**)



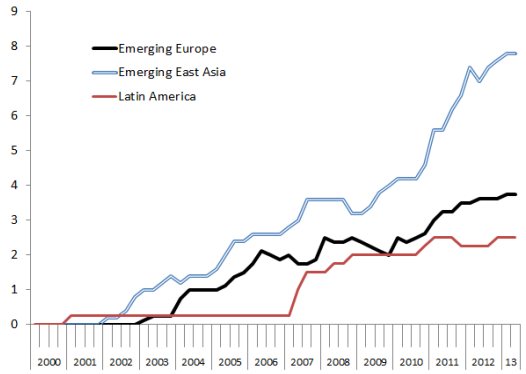
Domestic measures (**MaPP-D**)



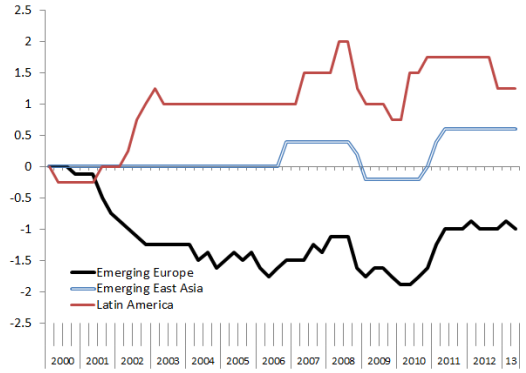
FX-related measures (**MaPP-FX**)



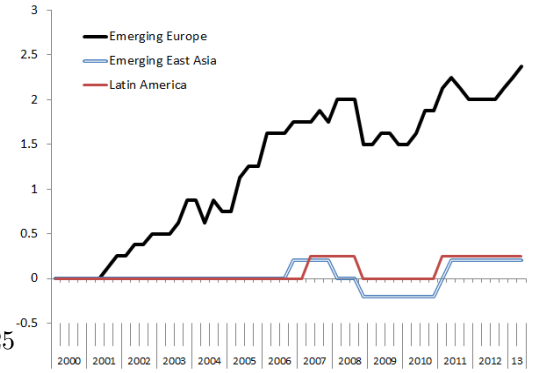
Overall Macroprudential Stance (**MPI**)



Domestic Currency Reserve Requirements (**RR-D**)



Foreign Currency Reserve Requirements (**RR-FX**)



Notes. Cumulative tightenings net of easings per region (divided by the number of countries in each region). Emerging Europe includes Bulgaria, Croatia, Czech Republic, Hungary, Poland, Romania, Russia, and Turkey (8 countries), Emerging East Asia includes Indonesia, Korea, Malaysia, Philippines, and Thailand (5 countries), and Latin America includes Brazil, Chile, Colombia, and Mexico (4 countries).

Table 2: Credit Boom Episodes

COUNTRIES	CREDIT BOOM EPISODES	Average $\Delta^4\left(\frac{Credit}{GDP}\right)$	Average $\left(\frac{Credit}{GDP}\right)^{gap}$	% of times in a Credit Boom
Brazil	2004q4 2006q2 2006q3 2006q4 2007q1 2008q4 2009q1 2009q2 2009q3 2010q4			
	2011q1 2011q4 2012q1 2012q2 2012q3 2012q4	42.615	12.847	0.296
Bulgaria	2002q4 2003q2 2003q3 2003q4 2004q1 2004q2 2004q3 2004q4 2005q1 2005q2			
	2005q3 2005q4 2007q2 2007q3 2007q4 2008q1 2008q3 2008q4 2009q1 2009q2 2009q3 2012q2 2012q3	35.737	4.413	0.426
Chile	2001q3 2005q1 2008q3 2008q4 2009q1 2009q2 2011q4 2012q2	37.463	16.894	0.148
Colombia	2006q3 2006q4 2008q4 2009q1 2009q2 2010q4 2011q1 2011q2 2011q3	32.688	6.351	0.167
Croatia	2005q4 2006q1 2006q2 2008q4 2009q1 2009q2 2009q3 2010q4 2011q1 2012q2 2012q3	30.808	6.910	0.204
Czech Republic	2005q4 2006q1 2006q2 2008q4 2009q1 2009q2 2009q3 2012q2 2012q3	45.843	12.006	0.167
Hungary	2003q4 2004q1 2004q2 2005q3 2005q4 2006q1 2006q2 2006q3 2008q4 2009q1			
	2009q2 2009q3 2010q4 2012q2	40.158	7.109	0.259
Indonesia	2003q2 2004q2 2004q3 2004q4 2005q1 2005q3 2008q4 2009q1 2011q1 2012q2 2012q3 2012q4	27.576	3.565	0.222
Korea	2008q2 2008q3 2008q4 2009q1 2009q2	44.345	61.268	0.093
Malaysia	2008q4 2009q1 2009q2 2009q3 2011q4 2012q1 2012q2 2012q3	26.564	24.742	0.148
Mexico	2008q4 2009q1 2009q2 2009q3 2011q4 2012q2	33.089	1.715	0.111
Philippines	2008q4 2009q1 2009q2 2009q3 2011q4 2012q1	25.838	7.289	0.111
Poland	2005q4 2006q1 2006q2 2008q4 2009q1 2009q2 2009q3 2011q1 2012q2	63.509	6.401	0.167
Romania	2003q4 2004q1 2004q2 2005q4 2006q1 2006q2 2006q3 2007q4 2008q1 2008q2			
	2008q3 2008q4 2009q1 2009q2 2009q3 2012q2 2012q3	41.581	4.660	0.315
Russia	2001q4 2002q1 2002q2 2007q2 2007q3 2008q4 2009q1 2009q2 2009q3 2012q2 2012q3	45.500	8.036	0.204
South Africa	2004q4 2005q2 2005q3 2005q4 2006q1 2008q4 2009q1 2011q4 2012q1 2012q2 2012q3	30.699	1.334	0.204
Thailand	2008q4 2009q1 2009q2 2011q4 2012q1 2012q2 2012q3	25.712	21.891	0.130
Turkey	2004q3 2004q4 2005q1 2005q4 2006q1 2006q2 2006q3 2006q4 2008q3 2008q4			
	2009q1 2009q2 2009q3 2010q4 2011q1 2011q2 2011q3 2011q4 2012q1 2012q2	40.507	5.432	0.370
AVERAGES		37.235	11.826	0.208

Notes. Credit boom is as defined in Dell'Ariccia *et al.*(2012), in particular, if either of the following two conditions is satisfied: (i) the credit-to-GDP gap is greater than 1.5 times its country-specific standard deviation and the annual growth rate of credit-to-GDP ratio exceeds 10 percent; or (ii) the annual growth rate of credit-to-GDP ratio exceeds 20 percent.

Table 3: Cross-Correlation between the Target Credit Variables

VARIABLES	Credit-to-GDP $\text{gap}_{i,t}$	Credit-to-GDP $\text{gap}_{i,t\|\lambda=1600}$	$\Delta\left(\frac{\text{Credit}}{\text{GDP}}\right)_{i,t}$	Credit $\text{Boom}_{i,t}$
Credit-to-GDP $\text{gap}_{i,t}$	1			
Credit-to-GDP $\text{gap}_{i,t\|\lambda=1600}$	0.925***	1		
$\Delta\left(\frac{\text{Credit}}{\text{GDP}}\right)_{i,t}$	0.454***	0.572***	1	
Credit $\text{Boom}_{i,t}$	0.468***	0.449***	0.241***	1

Notes: Contemporaneous cross-correlations are reported. *** denotes significance level at .01 percent.

Table 4: Estimating a Simple Monetary Policy Rule for Emerging Market Economies

VARIABLES	(1)	(2)
Mon. Policy Rate_{t-1}	0.602***	0.602***
	(0.025)	(0.025)
Inflation	0.463***	0.462***
	(0.042)	(0.042)
	[1.163]	[1.161]
Δ Real GDP	0.079*	0.090**
	(0.041)	(0.044)
	[0.198]	[0.226]
Δ^4 RER		0.010
		(0.014)
		[0.025]
Observations	954	954
R-squared	0.680	0.680
# of countries	18	18

Notes. Fixed effects panel regression. Independent variables are lagged by one quarter. Robust standard errors are in parantheses. ***, **, and * denote significance levels at 1%, 5%, and 10%, respectively. The terms in square brackets are the long-run reaction coefficients (i.e. the respective coefficient estimate divided by (1- "policy persistence").

Table 5: Descriptive Statistics

VARIABLES	mean	median	sd	p25	p75	N
Dependent Variables						
`Credit-to-GDP gap`	0.00	-1.09	10.39	-4.89	3.36	858
`Credit-to-GDP gap`$_{\|\lambda=1600}$	0.00	-0.66	8.62	-3.55	2.17	858
$\Delta\left(\frac{Credit}{GDP}\right)$	0.40	0.34	6.29	-1.36	2.07	842
`Credit Boom`	0.26	0.00	0.44	0.00	1.00	788
Control Variables						
Monetary Policy Stance	-0.00	-0.08	4.50	-0.76	0.61	954
Δ Real GDP	3.92	4.37	3.69	2.46	5.96	970
Δ^4 RER	-2.54	-3.14	11.23	-9.94	3.84	972
Δ Portfolio Flows/GDP	-0.07	-0.08	2.17	-1.05	0.79	969
Other Variables						
Δ Mon. Policy Rate	-0.24	-0.01	5.20	-0.52	0.26	971
Δ M2-to-GDP	0.01	-0.00	0.17	-0.08	0.08	939
Credit-to-GDP ratio	0.53	0.39	0.40	0.25	0.68	858
$\Delta^4\left(\frac{Credit}{GDP}\right)$	7.84	5.82	24.08	-6.28	19.67	788
Δ Portfolio Flows/GDP(1)	-0.01	-0.00	1.31	-0.48	0.48	607
Δ Portfolio Flows/GDP(2)	-0.01	0.06	1.51	-0.67	0.67	607
Δ Portfolio Flows/GDP(3)	-0.01	0.03	1.12	-0.45	0.45	904

Definitions: Credit-to-GDP gap is defined as the deviation of credit-to-GDP ratio from its long-run trend using recursive Hodrick-Prescott (HP) filter with $\lambda = 400000$. Credit-to-GDP gap$_{|\lambda=1600}$ is the deviation of credit-to-GDP ratio from its trend, where the trend is estimated using recursive HP filter with $\lambda = 1600$. $\Delta\left(\frac{Credit}{GDP}\right)$ is the one-quarter change in the credit-to-GDP ratio. Credit boom is as defined in Dell'Ariccia *et al.* (2012). Credit-to-GDP is the ratio of aggregate private sector credit to nominal GDP, where nominal GDP is annualized. Monetary policy stance is the estimated residual from a fixed-effects panel regression of short-term policy rate on lagged policy rate, inflation and real GDP growth. RER denotes the real exchange rate, and a decrease in the RER implies appreciation of the currency in real terms. Portfolio Flows, the benchmark capital flows variable, is the cross-border loans and deposits of BIS-reporting banks to bank and non-bank sectors in individual countries (BIS Table 7A), and is divided by nominal GDP. Mon. Policy Rate is the short-term money market rate. $\Delta^4\left(\frac{Credit}{GDP}\right)$ is the annual growth rate of credit-to-GDP ratio. Alternative definitions for portfolio flows are (1) gross portfolio inflows (total portfolio investment liabilities), (2) net portfolio inflows (portfolio investment liabilities net of assets) (available after 2005Q1), and (3) net portfolio debt inflows, obtained from IMF Balance of Payments Statistics. Other variables are obtained from IMF International Financial Statistics.

Table 6: Descriptive Statistics - Macroprudential Policy Actions

VARIABLES	mean	median	sd	min	max	N
MaPP-Bw	0.66	0.00	1.56	-1.00	8.00	972
MaPP-FI	0.95	0.00	1.70	-3.00	9.00	972
MaPP-D	1.39	0.00	2.28	-3.00	10.00	972
MaPP-FX	0.39	0.00	1.18	-3.00	8.00	972
MPI	1.77	0.00	2.93	-3.00	16.00	972
RR-D	-0.26	0.00	1.98	-7.00	5.00	972
RR-FX	0.58	0.00	1.89	-3.00	9.00	972
Δ MaPP-Bw	0.03	0.00	0.29	-3.00	4.00	972
Δ MaPP-FI	0.04	0.00	0.30	-1.00	3.00	972
Δ MaPP-D	0.06	0.00	0.37	-3.00	2.00	972
Δ MaPP-FX	0.02	0.00	0.24	-2.00	3.00	972
Δ MPI	0.08	0.00	0.47	-3.00	5.00	972
Δ RR-D	0.00	0.00	0.36	-2.00	3.00	972
Δ RR-FX	0.02	0.00	0.29	-2.00	2.00	972

Table 7: Effectiveness of Macroprudential Policy Tools

(Benchmark Target Credit Variable: Credit-to-GDP gap)

VARIABLES	Borrower-Based		Fin.Inst-Based		Domestic MaPP		MaPP with CFM focus		Overall Index	
	MaPP-Bw		**MaPP-FI**		**MaPP-D**		**MaPP-FX**		**MPI**	
	Whole Period									
Credit-to-GDP gap$_{t-1}$	0.928***	0.971***	0.881***	0.951***	0.922***	0.960***	0.843***	0.918***	0.872***	0.907***
	(0.035)	(0.054)	(0.023)	(0.044)	(0.029)	(0.023)	(0.029)	(0.051)	(0.029)	(0.036)
Δ Macro. Prud.	**-3.581*** **	**-4.137** **	-3.134	-0.944	**-2.576*** **	**-2.750** **	**-2.973*** **	**-3.158** **	**-2.402*** **	**-2.093*** **
	(0.780)	(1.890)	(1.965)	(2.351)	(0.751)	(1.350)	(1.056)	(1.289)	(0.316)	(0.673)
Monetary Policy Stance	0.162	0.617	0.052	0.290	0.106*	0.143	0.040	0.012	-0.089	-0.119
	(0.309)	(0.485)	(0.038)	(0.492)	(0.056)	(0.437)	(0.053)	(0.471)	(0.327)	(0.384)
Δ Real GDP	0.676***	0.557***	0.725***	0.598***	0.712***	0.513***	0.743***	0.628***	0.763***	0.580***
	(0.087)	(0.093)	(0.114)	(0.074)	(0.110)	(0.091)	(0.106)	(0.110)	(0.091)	(0.092)
Δ^4 RER	-0.239***	-0.225***	-0.181***	-0.204***	-0.229***	-0.203***	-0.164***	-0.185***	-0.189***	-0.169***
	(0.030)	(0.036)	(0.019)	(0.036)	(0.025)	(0.024)	(0.022)	(0.036)	(0.023)	(0.023)
Δ Portfolio Flows/GDP	0.512***	0.722***	0.716***	0.703***	0.545***	0.669***	0.734***	0.781***	0.662***	0.708***
	(0.120)	(0.061)	(0.049)	(0.100)	(0.096)	(0.074)	(0.067)	(0.056)	(0.091)	(0.092)
Δ Portfolio Flows/GDP		1.020		-0.798		-0.150		-0.259		-0.216
* Δ Macro. Prud.		(1.472)		(0.580)		(0.243)		(2.460)		(0.990)
Observations	822	822	822	822	822	822	822	822	822	822
# of countries	18	18	18	18	18	18	18	18	18	18
AR(2)-p	0.21	0.22	0.22	0.17	0.17	0.17	0.30	0.32	0.20	0.22
	Recent Period									
Credit-to-GDP gap$_{t-1}$	0.951***	0.980***	0.913***	0.939***	0.943***	0.976***	0.924***	0.958***	0.930***	0.954***
	(0.022)	(0.046)	(0.026)	(0.048)	(0.034)	(0.075)	(0.029)	(0.064)	(0.017)	(0.062)
Δ Macro. Prud.	**-6.323*** **	**-7.150*** **	**-5.290** *	0.110	**-5.022*** **	**-4.410*** **	**-2.166*** **	**-2.622*** **	**-3.835*** **	**-3.076*** **
	(0.781)	(1.366)	(2.716)	(3.051)	(1.203)	(1.004)	(0.353)	(0.901)	(0.427)	(0.814)
Monetary Policy Stance	-0.467***	-0.553	-0.742***	-1.199***	-0.666***	-0.906	-0.735***	-0.762	-0.691***	-1.001
	(0.121)	(0.421)	(0.149)	(0.390)	(0.164)	(0.830)	(0.158)	(0.532)	(0.144)	(0.691)
Δ Real GDP	0.682***	0.447***	0.661***	0.540***	0.748***	0.538***	0.874***	0.606***	0.729***	0.478***
	(0.075)	(0.057)	(0.109)	(0.078)	(0.142)	(0.074)	(0.038)	(0.083)	(0.084)	(0.068)
Δ^4 RER	-0.258***	-0.278***	-0.211***	-0.216***	-0.245***	-0.243***	-0.227***	-0.234***	-0.246***	-0.237***
	(0.029)	(0.048)	(0.033)	(0.034)	(0.028)	(0.064)	(0.035)	(0.062)	(0.024)	(0.056)
Δ Portfolio Flows/GDP	0.923***	0.954***	0.990***	0.977***	0.975***	0.878***	0.992***	0.992***	0.983***	0.955***
	(0.073)	(0.063)	(0.067)	(0.083)	(0.070)	(0.079)	(0.051)	(0.091)	(0.048)	(0.072)
Δ Portfolio Flows/GDP		-1.229		**-1.816***		-1.085		-0.151		-0.802
* Δ Macro. Prud.		(1.157)		(0.992)		(1.121)		(0.254)		(0.666)
Observations	393	393	393	393	393	393	393	393	393	393
# of countries	18	18	18	18	18	18	18	18	18	18
AR(2)-p	0.27	0.23	0.23	0.24	0.21	0.16	0.29	0.30	0.24	0.25

Notes: For variable definitions, see Table 5. Robust standard errors are in parantheses. ***, **, and * denote significance levels at 1%, 5%, and 10%, respectively.

Table 8: Effectiveness of Macroprudential Policy Tools

(Summary of Results)

VARIABLES	Credit-to-GDP gap	Credit-to-GDP gap$_{\|\lambda=1600}$	$\Delta\left(\frac{Credit}{GDP}\right)$	Credit Boom
	Can a macroprudential policy action help contain credit cycles?			
Δ MaPP-Bw	**-4.137****	**-3.443*****	**-3.75*****	0.147
	(1.89)	(0.991)	(0.837)	(0.549)
Δ MaPP-FI	-0.944	-1.72	**-2.785***	-0.106
	(2.351)	(2.728)	(1.627)	(0.192)
Δ MaPP-D	**-2.75****	-0.824	**-3.608*****	0.121
	(1.35)	(1.298)	(1.251)	(0.217)
Δ MaPP-FX	**-3.158****	-0.647	-0.759	-0.181
	(1.289)	(1.306)	(2.651)	(0.339)
Δ MPI	**-2.093*****	-1.281	**-2.867*****	-0.019
	(0.673)	(0.899)	(1.014)	(0.199)
	Can a macroprudential policy action help contain the impact of portfolio inflows on credit cycles?			
Δ MaPP-Bw	1.02	0.441	0.044	-0.037
* Δ Portfolio Flows/GDP	(1.472)	(0.705)	(0.3)	(0.111)
	[40.336%]	[20.603%]	[2.415%]	[-55.342%]
Δ MaPP-FI	-0.798	-0.471	-1.027	**-0.018***
* Δ Portfolio Flows/GDP	(0.58)	(0.479)	(0.749)	(0.009)
	[-34.24%]	[-21.397%]	[-63.027%]	[-30.485%]
Δ MaPP-D	-0.15	-0.298	0.027	-0.038
* Δ Portfolio Flows/GDP	(0.243)	(0.247)	(0.307)	(0.028)
	[-8.356%]	[-20.467%]	[1.888%]	[-75.494%]
Δ MaPP-FX	-0.259	-0.143	-0.205	-0.036
* Δ Portfolio Flows/GDP	(2.46)	(0.666)	(1.683)	(0.027)
	[-7.991%]	[-5.635%]	[-9.646%]	[-38.321%]
Δ MPI	-0.216	-0.01	-0.025	**-0.027***
* Δ Portfolio Flows/GDP	(0.99)	(0.309)	(0.121)	(0.015)
	[-14.186%]	[-0.745%]	[-2.384%]	[-61.331%]
	Recent Period			
	Can a macroprudential policy action help contain credit cycles?			
Δ MaPP-Bw	**-7.15*****	**-5.438*****	**-5.029*****	0.152
	(1.366)	(0.743)	(1.141)	(0.241)
Δ MaPP-FI	0.11	-1.395	**-4.027****	-0.345
	(3.051)	(2.517)	(2.184)	(0.496)
Δ MaPP-D	**-4.41*****	**-3.823*****	**-4.465*****	0.157
	(1.004)	(0.976)	(1.062)	(0.189)
Δ MaPP-FX	**-2.622*****	**-2.434****	-1.897	-0.616
	(0.901)	(0.966)	(1.263)	(0.488)
Δ MPI	**-3.076*****	**-3.209*****	**-2.952*****	-0.008
	(0.814)	(0.624)	(0.467)	(0.374)
	Can a macroprudential policy action help contain the impact of portfolio inflows on credit cycles?			
Δ MaPP-Bw	-1.229	**-2.296*****	**-2.834*****	**-0.101*****
* Δ Portfolio Flows/GDP	(1.157)	(0.525)	(0.535)	(0.024)
	[-36.781%]	[-78.168%]	[-100.196%]	[-95.05%]
Δ MaPP-FI	**-1.816***	-0.778	**-1.134***	-0.005
* Δ Portfolio Flows/GDP	(0.992)	(0.589)	(0.663)	(0.08)
	[-56.004%]	[-26.987%]	[-38.055%]	[-8.121%]
Δ MaPP-D	-1.085	**-0.947***	-0.972	**-0.119*****
* Δ Portfolio Flows/GDP	(1.121)	(0.573)	(0.521)	(0.034)
	[-45.988%]	[-43.697%]	[-47.131%]	[-179.413%]
Δ MaPP-FX	-0.151	-0.089	0.153	**-0.101*****
* Δ Portfolio Flows/GDP	(0.254)	(0.222)	(0.459)	(0.032)
	[-3.666%]	[-2.455%]	[4.172%]	[-79.273%]
Δ MPI	-0.802	**-0.825***	**-0.838*****	**-0.082*****
* Δ Portfolio Flows/GDP	(0.666)	(0.447)	(0.302)	(0.031)
	[-39.075%]	[-47.487%]	[-47.728%]	[-139.502%]

Notes. Robust standard errors are in parentheses. ***, **, and * denote significance levels at 1%, 5%, and 10%, respectively. The terms in squared brackets are the percentage reduction in the sensitivity of target credit variable in response to a one-standard deviation change in **Δ MaPP-Bw**, **Δ MaPP-FI**, **Δ MaPP-D**, **Δ MaPP-FX**, or **Δ MPI**.

Table 9: Effectiveness of Reserve Requirement Policies (Dependent Variable: Credit/GDP gap)

VARIABLES	Domestic R.R. ***RR-D***		Foreign R.R ***RR-FX***	
	Whole Period	*Recent Period*	*Whole Period*	*Recent Period*
Credit-to-GDP gap$_{t-1}$	0.933***	0.948***	0.953***	0.977***
	(0.034)	(0.022)	(0.048)	(0.025)
Δ Reserve Req.	-0.052	-2.018	-0.550	-3.186
	(1.428)	(1.819)	(4.794)	(2.855)
Monetary Policy Stance	0.011	-0.498*	-0.385	-0.622*
	(0.509)	(0.263)	(0.413)	(0.385)
Δ Real GDP	0.647***	0.449***	0.716***	0.629***
	(0.097)	(0.113)	(0.081)	(0.042)
Δ^4 RER	-0.179***	-0.221***	-0.203***	-0.253***
	(0.029)	(0.023)	(0.041)	(0.034)
Δ Portfolio Flows/GDP	0.693***	0.870***	0.614***	0.912***
	(0.083)	(0.093)	(0.102)	(0.050)
Δ Portfolio Flows/GDP	**-0.245****	**-0.204****	-0.346	0.716
* Δ Reserve Req.	(0.109)	(0.100)	(0.795)	(0.897)
Observations	822	393	822	393
# of countries	18	18	18	18
AR(2)-p	0.26	0.25	0.23	0.20

Notes: Robust standard errors are in parentheses. ***, **, and * denote significance levels at 1%, 5%, and 10%, respectively.

Table 10: Effectiveness of Reserve Requirement Policies
(Summary of Results)

VARIABLES	Credit-to-GDP gap	Credit-to-GDP gap$_{\|\lambda=1600}$	$\Delta\left(\frac{Credit}{GDP}\right)$	Credit Boom
	Can a reserve requirement policy action help contain credit cycles?			
Δ RR-D	-0.052	0.755	-1.665	0.089
	(1.428)	(0.959)	(1.432)	(0.229)
Δ RR-FX	-0.55	-2.768	-2.31	-0.044
	(4.794)	(2.669)	(1.623)	(0.093)
	Can a reserve requirement policy action help contain the impact of portfolio inflows on credit cycles?			
Δ RR-D	**-0.245****	**-0.216****	-0.108	**-0.02****
* Δ Portfolio Flows/GDP	(0.109)	(0.09)	(0.109)	(0.01)
	[-10.429%]	[-10.697%]	[-6.039%]	[-56.146%]
Δ RR-FX	-0.346	-0.168	-0.018	**-0.022*****
* Δ Portfolio Flows/GDP	(0.795)	(0.145)	(0.32)	(0.004)
	[-15.043%]	[-7.441%]	[-0.825%]	[-36.49%]
	Recent Period			
	Can a reserve requirement policy action help contain credit cycles?			
Δ RR-D	-2.018	0.469	**-2.633*****	0.001
	(1.819)	(1.183)	(0.869)	(0.113)
Δ RR-FX	-3.186	-3.253	-2.562	-0.095
	(2.855)	(2.183)	(1.710)	(0.060)
	Can a reserve requirement policy action help contain the impact of portfolio inflows on credit cycles?			
Δ RR-D	**-0.204****	-0.106	-0.03	**-0.024*****
* Δ Portfolio Flows/GDP	(0.100)	(0.13)	(0.126)	(0.009)
	[-7.757%]	[-4.015%]	[-1.234%]	[-34.106%]
Δ RR-FX	0.716	-0.163	0.193	**-0.04*****
* Δ Portfolio Flows/GDP	(0.897)	(0.107)	(0.377)	(0.009)
	[20.515%]	[-5.266%]	[6.409%]	[-67.219%]

Notes: Robust standard errors are in parentheses. ***, **, and * denote significance levels at 1%, 5%, and 10%, respectively. The terms in squared brackets are the percentage reduction in the sensitivity of target credit variable in response to a one-standard deviation change in **Δ RR-D** or **Δ RR-FX**.

Table 11: Effectiveness of Macroprudential Policy Tools (Regional Differences)
(Dependent Variable: Credit-to-GDP gap, Benchmark Specification, Within Estimates)

VARIABLES	Emerging Europe	Emerging Asia	Latin America	Emerging Europe	Emerging Asia	Latin America
	Can a macroprudential policy action help contain credit cycles?					
	Whole Period			Recent Period		
Δ MaPP-Bw	-1.013	**-6.011*** **	6.209	-1.604	**-9.044*** **	4.263
	(0.809)	(1.190)	(4.056)	(1.214)	(1.852)	(5.477)
Δ MaPP-FI	0.167	-0.703	-0.328	-0.218	-2.693	0.897
	(0.631)	(1.642)	(1.032)	(1.018)	(2.967)	(2.157)
Δ MaPP-D	-0.052	**-4.219*** **	-0.042	-0.807	**-7.232*** **	0.243
	(0.545)	(1.006)	(1.117)	(0.938)	(1.623)	(1.913)
Δ MaPP-FX	-1.012	-0.283	-2.861	-0.867	-1.834	-
	(0.720)	(1.846)	(2.949)	(1.176)	(2.934)	-
Δ MPI	-0.378	**-3.159*** **	-0.399	-0.769	**-5.502*** **	0.243
	(0.410)	(0.863)	(0.980)	(0.663)	(1.366)	(1.913)
Δ RR-D	**-0.860***	**-3.591***	1.088	-1.408	**-7.030***	**2.046***
	(0.503)	(2.202)	(0.716)	(0.917)	(4.175)	(1.194)
Δ RR-FX	-0.578	-2.165	**-4.335***	-0.558	-1.926	-5.432
	(0.509)	(3.762)	(2.569)	(0.907)	(5.265)	(4.971)
	Can a macroprudential policy action help contain the impact of portfolio inflows on credit cycles?					
	Whole Period			Recent Period		
Δ MaPP-Bw	0.287	-0.269	–	-0.368	-2.945	–
* Δ Portfolio Flows/GDP	(0.615)	(0.935)	–	(1.575)	(2.049)	–
Δ MaPP-FI	**-0.459***	-0.753	-2.934	**-0.916** **	-1.414	-4.320
* Δ Portfolio Flows/GDP	(0.235)	(0.908)	(3.025)	(0.439)	(1.922)	(4.738)
Δ MaPP-D	**-0.386***	-0.536	**-2.487***	**-1.155** **	-1.250	-1.855
* Δ Portfolio Flows/GDP	(0.230)	(0.736)	(1.407)	(0.457)	(1.529)	(1.946)
Δ MaPP-FX	0.047	-0.156	0.729	0.057	-0.129	-
* Δ Portfolio Flows/GDP	(0.319)	(1.072)	(8.552)	(0.528)	(1.978)	-
Δ MPI	-0.214	-0.607	**-2.530***	**-0.592***	-1.058	-1.855
* Δ Portfolio Flows/GDP	(0.187)	(0.578)	(1.372)	(0.347)	(1.204)	(1.946)
Δ RR-D	**-0.288***	-0.346	**-1.737*** **	-0.354	1.098	**-3.066*** **
* Δ Portfolio Flows/GDP	(0.171)	(0.718)	(0.507)	(0.277)	(1.236)	(0.898)
Δ RR-FX	**-0.252** **	-0.237	**-4.413*** **	-0.059	1.189	-3.385
* Δ Portfolio Flows/GDP	(0.126)	(2.381)	(1.475)	(0.243)	(3.479)	(2.373)

Notes: Robust standard errors are in parentheses. ***, **, and * denote significance levels at 1%, 5%, and 10%, respectively.

Table 12: Mean Reversion Rates for Different Definitions of Target Credit Variables

	Credit-to-GDP gap	Credit-to-GDP gap$_{\lvert\lambda=1600}$	$\Delta\left(\frac{\text{Credit}}{\text{GDP}}\right)$	Credit Boom
$\widehat{\kappa}$	-0.185***	-0.257***	-0.662***	-0.466***
	(0.009)	(0.021)	(0.027)	(0.027)
R^2	0.093	0.131	0.332	0.233
N	840	840	824	770

Notes: Robust standard errors are in parentheses. ***, **, and * denote significance levels at 1%, 5%, and 10%, respectively.

Table 13: Estimated Equation: $\Delta MPI_{i,t} = \sum_{s=0}^{3} \alpha_{1,s} Y_{i,t+s} + \eta_i + e_{i,t}$

	(1)	(2)	(3)	(4)
	Credit-to-GDP gap	Credit-to-GDP gap$_{\lvert\lambda=1600}$	$\Delta\left(\frac{\text{Credit}}{\text{GDP}}\right)$	Credit Boom
Y_t	-0.005	-0.007	-0.010**	0.055
	(0.005)	(0.005)	(0.004)	(0.046)
Y_{t+1}	0.001	0.002	0.006	0.033
	(0.008)	(0.009)	(0.004)	(0.069)
Y_{t+2}	-0.004	-0.004	0.001	-0.104
	(0.004)	(0.005)	(0.004)	(0.082)
Y_{t+3}	0.007*	0.007	0.006*	0.072
	(0.004)	(0.005)	(0.003)	(0.063)
$\sum_{s=0}^{3} \widehat{\alpha_{1,s}}$	-0.001	-0.003	0.004	0.056
p-value	0.628	0.423	0.447	0.427
$(H_0 : \sum_{s=0}^{3} \alpha_{1,s} = 0)$				
Observations	804	804	788	734
R-squared	0.019	0.021	0.028	0.006
# of countries	18	18	18	18

Notes: Robust standard errors are in parentheses. ***, **, and * denote significance levels at 1%, 5%, and 10%, respectively.

Table A. Macroprudential Policy Actions in Selected Set of Countries

Quarter	LTV	DTI	Countercylical Capital Requirements (CCR)	Provisioning	Restr. on FX Lending	Limits on Net Open Position (NOP)	Tax	Other	Reserve Requirements
2000 Q1									Brazil(-1), Russia(+1, +1*)
2000 Q2									Brazil(-1)
2000 Q3				Spain(+1)					
2000 Q4									Bulgaria(-1)
2001 Q1								Mexico(+1)	
2001 Q2									
2001 Q3									Brazil(+1), Croatia(-1, +1*), Hungary(-1), Romania(-1)
2001 Q4									Croatia(-1, +1*), Romania(-1)
2002 Q1						Thailand(+1*)			Hungary(-1)
2002 Q2									Brazil(+1), Romania(-1, +1*)
2002 Q3	Korea(+1)								Brazil(-2), Hungary(-1)
2002 Q4			Korea(+1)	Korea(+1)					Brazil(+1), Romania(-1, +1*)
2003 Q1	Korea(+1)					Croatia(+1*)			Brazil(+1)
2003 Q2								Croatia(+1)	Brazil(-1)
2003 Q3	Korea(+1)								Croatia(+1*)
2003 Q4	Thailand(+1)				Austria(+1*)				Croatia(+2*)
2004 Q1	Canada(+1), Korea(-1), Romania(+1)	Romania(+1)		Croatia(+1)				Hungary(+1)	
2004 Q2		Thailand(+1)	Bulgaria(+1)						Russia(-2, -2*)
2004 Q3									Bulgaria(+1), Croatia(+1*), Romania(+1*)
2004 Q4									Bulgaria(+1), Croatia(-1), Russia(-2, -1*)
2005 Q1		Thailand(+1)			Romania(+1*)			Croatia(-1*)	Croatia(+1)
2005 Q2	Korea(+1)		Bulgaria(+1), Malaysia(+1)						Bulgaria(+1, +1*), Croatia(+2*)
2005 Q3		Korea(+1), Romania(+1)		Romania(+1*)				Indonesia(+1)	Romania(-1, -1*)
2005 Q4				Bulgaria(+1)					Bulgaria(+1)

Table A (continued)

Quarter	LTV	DTI	Countercylical Capital Requirements (CCR)	Provisioning	Restr. on FX Lending	Limits on Net Open Position (NOP)	Tax	Other	Reserve Requirements
2006 Q1	Canada(-1), Croatia(+1)	Croatia(+1), Korea(+1)			Poland(+1*)				Croatia(-1, +1*), Romania(+2*), Turkey(-1)
2006 Q2			Croatia(+2*), Ireland(+1)						Bulgaria(-1)
2006 Q3				Croatia(-1)					Romania(+1)
2006 Q4	Korea(-1)	Korea(+1)		Bulgaria(-1)					Korea(+2), Russia(+1, +1*), Thailand(+1*)
2007 Q1	Netherlands(+1)	Korea(+1), Netherlands(+1)					Netherlands(-1)	Croatia(+1)	
2007 Q2	Canada(-1), Romania(-1)	Romania(-2), Thailand(+1)	Thailand(+1), Turkey(+1)	Colombia(+1)		Malaysia(-1*), Brazil(+1*), Colombia(+1*)			Colombia(+2, +1*)
2007 Q3		Korea(+1)	Brazil(+2)		Korea(+2*)	Brazil(+1*)			Bulgaria(+1), Russia(+1, +1*)
2007 Q4			Poland(+1*)						Russia(-1, -1*)
2008 Q1			Croatia(+2), Romania(+1), Turkey(+1)						Russia(+2, +2*), Thailand(-1*)
2008 Q2			Spain(+1)	Colombia(+1)				Croatia(-1*)	Colombia(+2)
2008 Q3									
2008 Q4	Canada(+1), Korea(-1)	Canada(+1), Korea(-1)	Colombia(+1), Turkey(+1)		Austria(+1*)	Russia(+1*)		Canada(+1)	Brazil(-2), Bulgaria(-1), Chile(-1*), Colombia(-1), Croatia(-2*), Hungary(-1), Indonesia(-1*), Malaysia(-1), Romania(-1), Russia(-1, -1*), Turkey(-1*)
2009 Q1			Russia(-1), Poland(+1)	Croatia(+1)				Croatia(-2*)	Brazil(-1), Bulgaria(-1, -1*), Croatia(+1*), Malaysia(-2)
2009 Q2	Thailand(+1)		Romania(+1)		Turkey(-1*)				Poland(-1), Romania(-1*), Russia(+2, +2*)
2009 Q3	Chile(-1),Korea(+1)	Korea(+1)		Mexico(+1), Russia(-1)		Russia(-1*)			Romania(-2, -2*), Russia(+2, +2*)
2009 Q4	Korea(+1)						Brazil(+2**)	Croatia(-1)	Brazil(-1), Romania(-1*), Turkey(-1)
2010 Q1	Hungary(+1,+1*)	Hungary(+1,+1*), Poland(+1)	Bulgaria(-1)	Turkey(-1)	Austria(+1*), Poland(+1*)	Croatia(-1*)		Hungary(+1*)	Croatia(-1)
2010 Q2	Canada(+2)			Russia(-1)	Austria(+1*)			Canada(+1)	Brazil(+3), Turkey(+1*)
2010 Q3		Korea(-1)			Hungary(+1*)		Thailand(+1*)		Turkey(+1,+2*)
2010 Q4	Malaysia(+1), Sweden(+1)		Brazil(+1)			Korea(+1*)	Brazil(+3**), Turkey(+1*)		Brazil(+1), Indonesia(+1), Poland(+1)

Table A (continued)

Quarter	LTV	DTI	Countercylical Capital Requirements (CCR)	Provisioning	Restr. on FX Lending	Limits on Net Open Position (NOP)	Tax	Other	Reserve Requirements
2011 Q1	Canada(+2), Finland(+1), Romania(+1, +1*), Thailand(+1), Turkey(+1)		Malaysia(+1), Thailand(+1)	Mexico(+1), Romania(+1), Turkey(+1)			Brazil(+2**), Korea(+1*), Malaysia(+1)	Canada(+1),Croatia(-1*), Indonesia(+1), Netherlands(+1)	Brazil(+1*), Indonesia(+1, +1*), Malaysia(+1), Russia(+2, +2*), Turkey(+1)
2011 Q2			Turkey(+1)	Turkey(+1)			Brazil(+1**)		Indonesia(+1*), Malaysia(+1), Romania(-1*), Russia(+1, +1*), Turkey(+1,+1*)
2011 Q3	Netherlands(+1)				Korea(+1*)	Korea(+2*)			Turkey(-1*)
2011 Q4	Malaysia(+1)	Malaysia(+1), Poland(+1*)	Brazil(-1), Russia(+1)				Brazil(-1**)		Croatia(+1), Turkey(-1,-1*)
2012 Q1	Thailand(+1)		Russia(-1), Thailand(+1)				Brazil(+1**), Malaysia(+1)	Austria(+1), Malaysia(+1*)	Austria(-1), Croatia(+1), Finland(-1), Ireland(-1), Netherlands(-1), Spain(-1)
2012 Q2	Korea(-1)	Korea(-1)	Poland(+1*)				Brazil(-1**)		Croatia(-1)
2012 Q3	Canada(+2), Indonesia(+2)	Canada(+1)						Canada(+1)	
2012 Q4	Canada(+1)					Korea(+1*)	Brazil(-1**)	Mexico(+1)	Brazil(-2), Turkey(+1*)
2013 Q1	Netherlands(-1)			Russia(+1)	Austria(+1*)		Malaysia(+1), Netherlands(+1)		Turkey(+1,+1*)
2013 Q2									Turkey(+1*)

Notes:

*: included in MaPP-FX index

**: Brazil's IOF tax (not included in the estimation)

Other for Croatia is Limits on Maturity Mismatch and Credit Growth Limit, Other for Indonesia is Credit Growth Limit, Other category in all countries.

The table provides macroprudential policy actions for a wider set of countries than the one used in the paper. The paper focuses on emerging market economies.

Appendix (for online publication)

Figure A1: Credit-to-GDP gap (Recursive versus two-sided HP filtering)

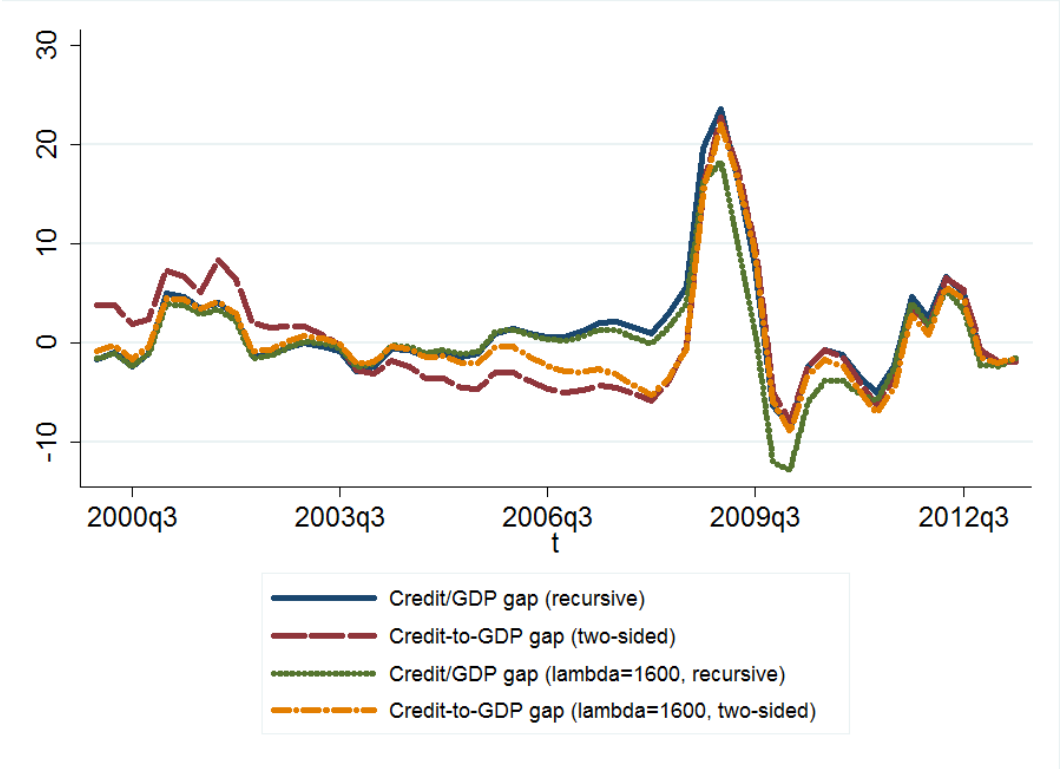


Table A1: Effectiveness of Macroprudential Policy Tools

(Within Estimates)

VARIABLES	Borrower-Based		Fin.Inst-Based		Domestic MaPP		MaPP with CFM focus		Overall Index	
	MaPP-Bw		**MaPP-FI**		**MaPP-D**		**MaPP-FX**		**MPI**	
	Whole Period									
Credit-to-GDP gap$_{t-1}$	0.880***	0.880***	0.881***	0.881***	0.885***	0.884***	0.879***	0.879***	0.881***	0.880***
	(0.022)	(0.022)	(0.023)	(0.023)	(0.023)	(0.023)	(0.023)	(0.023)	(0.022)	(0.022)
Δ Macro. Prud.	**-3.147*** **	**-3.205*** **	-0.423	-0.334	**-1.882*** **	**-1.763*** **	-1.011	-1.016	**-1.482*** **	**-1.426*** **
	(0.594)	(0.618)	(0.580)	(0.580)	(0.463)	(0.469)	(0.725)	(0.727)	(0.372)	(0.374)
Monetary Policy Stance	0.030	0.031	0.034	0.010	0.048	0.033	0.023	0.023	0.031	0.016
	(0.130)	(0.130)	(0.132)	(0.132)	(0.130)	(0.131)	(0.132)	(0.132)	(0.130)	(0.131)
Δ Real GDP	0.214***	0.215***	0.237***	0.230***	0.240***	0.233***	0.236***	0.236***	0.244***	0.238***
	(0.061)	(0.061)	(0.062)	(0.062)	(0.061)	(0.061)	(0.062)	(0.062)	(0.061)	(0.061)
Δ^4 RER	-0.081***	-0.081***	-0.079***	-0.078***	-0.082***	-0.082***	-0.078***	-0.078***	-0.080***	-0.081***
	(0.020)	(0.020)	(0.021)	(0.021)	(0.020)	(0.020)	(0.021)	(0.021)	(0.020)	(0.020)
Δ Portfolio Flows/GDP	0.634***	0.633***	0.635***	0.653***	0.634***	0.638***	0.637***	0.638***	0.638***	0.644***
	(0.084)	(0.084)	(0.085)	(0.086)	(0.084)	(0.084)	(0.085)	(0.085)	(0.084)	(0.084)
Δ Portfolio Flows/GDP		0.160		**-0.527** **		-0.371		-0.036		-0.267
* Δ Macro. Prud.		(0.470)		(0.264)		(0.248)		(0.356)		(0.201)
Observations	840	840	840	840	840	840	840	840	840	840
R-squared	0.709	0.709	0.700	0.701	0.705	0.706	0.700	0.700	0.705	0.706
# of countries	18	18	18	18	18	18	18	18	18	18
	Recent Period									
Credit-to-GDP gap$_{t-1}$	0.900***	0.900***	0.901***	0.900***	0.908***	0.907***	0.895***	0.896***	0.896***	0.895***
	(0.035)	(0.035)	(0.036)	(0.036)	(0.035)	(0.035)	(0.036)	(0.036)	(0.035)	(0.035)
Δ Macro. Prud.	**-5.493*** **	**-5.518*** **	-1.250	-0.931	**-3.952*** **	**-3.756*** **	-1.590	-1.565	**-2.845*** **	**-2.782*** **
	(0.999)	(0.997)	(1.027)	(1.037)	(0.809)	(0.809)	(1.226)	(1.242)	(0.633)	(0.633)
Monetary Policy Stance	-0.335	-0.333	-0.283	-0.370	-0.243	-0.299	-0.344	-0.341	-0.337	-0.378
	(0.317)	(0.316)	(0.329)	(0.331)	(0.320)	(0.319)	(0.330)	(0.331)	(0.321)	(0.321)
Δ Real GDP	0.292***	0.271**	0.360***	0.333***	0.361***	0.334***	0.341***	0.342***	0.352***	0.329***
	(0.109)	(0.109)	(0.113)	(0.114)	(0.109)	(0.109)	(0.112)	(0.113)	(0.110)	(0.110)
Δ^4 RER	-0.126***	-0.132***	-0.118***	-0.121***	-0.123***	-0.133***	-0.118***	-0.118***	-0.123***	-0.129***
	(0.040)	(0.040)	(0.041)	(0.041)	(0.040)	(0.040)	(0.041)	(0.041)	(0.040)	(0.040)
Δ Portfolio Flows/GDP	0.927***	0.933***	0.920***	0.944***	0.939***	0.921***	0.926***	0.925***	0.949***	0.947***
	(0.146)	(0.146)	(0.152)	(0.152)	(0.148)	(0.147)	(0.152)	(0.153)	(0.148)	(0.148)
Δ Portfolio Flows/GDP		-1.693		**-1.000***		**-1.148** **		0.087		-0.621
* Δ Macro. Prud.		(1.098)		(0.526)		(0.510)		(0.616)		(0.390)
Observations	393	393	393	393	393	393	393	393	393	393
R-squared	0.719	0.721	0.698	0.701	0.715	0.719	0.698	0.698	0.712	0.714
# of countries	18	18	18	18	18	18	18	18	18	18

Notes: Robust standard errors are in parentheses. ***, **, and * denote significance levels at 1%, 5%, and 10%, respectively.

Table A2: Effectiveness of Macroprudential Policy Tools

(4-quarter cumulative change in the macroprudential policy stance)

VARIABLES	Borrower-Based		Fin.Inst-Based		Domestic MaPP		MaPP with CFM focus		Overall Index	
	MaPP-Bw		**MaPP-FI**		**MaPP-D**		**MaPP-FX**		**MPI**	
	Whole Period									
Credit-to-GDP gap$_{t-1}$	0.871***	0.996***	0.860***	0.939***	0.837***	0.910***	0.862***	0.981***	0.845***	0.939***
	(0.043)	(0.058)	(0.022)	(0.067)	(0.027)	(0.038)	(0.029)	(0.051)	(0.021)	(0.061)
Δ^4 Macro. Prud.	-1.219	-0.077	0.298	-1.922	**-2.489*** **	-0.371	1.903	0.227	**-1.631** **	0.370
	(1.143)	(0.581)	(1.062)	(2.335)	(0.955)	(0.573)	(2.956)	(1.733)	(0.756)	(0.966)
Monetary Policy Stance	-0.083	0.336	-0.081	0.168	0.084*	-0.222	0.090	0.077	0.033	-0.167
	(0.224)	(0.411)	(0.244)	(0.458)	(0.051)	(0.282)	(0.079)	(0.391)	(0.062)	(0.275)
Δ Real GDP	0.671***	0.490***	0.587***	0.424***	0.684***	0.480***	0.795***	0.522***	0.716***	0.472***
	(0.106)	(0.108)	(0.100)	(0.065)	(0.112)	(0.086)	(0.090)	(0.113)	(0.102)	(0.095)
Δ^4 RER	-0.192***	-0.216***	-0.167***	-0.179***	-0.166***	-0.150***	-0.179***	-0.212***	-0.169***	-0.157***
	(0.024)	(0.033)	(0.016)	(0.049)	(0.019)	(0.024)	(0.020)	(0.037)	(0.016)	(0.026)
Δ Portfolio Flows/GDP	0.645***	0.705***	0.679***	0.725***	0.682***	0.728***	0.620***	0.679***	0.711***	0.709***
	(0.048)	(0.047)	(0.046)	(0.077)	(0.054)	(0.074)	(0.079)	(0.108)	(0.052)	(0.052)
Δ Portfolio Flows/GDP		-0.028		-0.148		**-0.119** **		**-0.070***		**-0.067*** **
* Δ Macro. Prud.		(0.090)		(0.117)		(0.050)		(0.042)		(0.017)
Observations	822	822	822	822	822	822	822	822	822	822
# Of countries	18	18	18	18	18	18	18	18	18	18
AR(2)-p	0.30	0.26	0.25	0.18	0.16	0.25	0.26	0.20	0.23	0.25
	Recent Period									
Credit-to-GDP gap$_{t-1}$	0.863***	1.016***	0.940***	0.978***	0.834***	0.898***	0.933***	0.957***	0.856***	0.889***
	(0.057)	(0.043)	(0.052)	(0.063)	(0.042)	(0.041)	(0.030)	(0.032)	(0.027)	(0.039)
Δ^4 Macro. Prud.	**-2.881*** **	**-0.950*** **	0.028	-2.300	**-3.731*** **	**-1.516** **	-0.830	-0.490	**-1.416*** **	**-0.917** *
	(0.714)	(0.368)	(1.247)	(1.980)	(0.886)	(0.642)	(1.573)	(1.125)	(0.341)	(0.561)
Monetary Policy Stance	-0.855**	-0.062	-0.350	-0.823**	-0.534***	-1.001***	-0.863***	-0.718***	-0.875***	-1.233***
	(0.392)	(0.505)	(0.591)	(0.389)	(0.200)	(0.326)	(0.134)	(0.175)	(0.163)	(0.318)
Δ Real GDP	0.774***	0.467***	0.627***	0.374***	0.676***	0.398***	0.735***	0.369***	0.740***	0.345***
	(0.070)	(0.101)	(0.089)	(0.082)	(0.112)	(0.079)	(0.104)	(0.083)	(0.113)	(0.108)
Δ^4 RER	-0.222***	-0.271***	-0.239***	-0.234***	-0.176***	-0.161***	-0.237***	-0.228***	-0.185***	-0.161***
	(0.046)	(0.037)	(0.046)	(0.051)	(0.038)	(0.033)	(0.033)	(0.035)	(0.029)	(0.033)
Δ Portfolio Flows/GDP	0.950***	0.945***	0.991***	0.965***	1.041***	1.023***	1.029***	1.069***	1.075***	1.062***
	(0.084)	(0.070)	(0.050)	(0.073)	(0.072)	(0.061)	(0.063)	(0.077)	(0.054)	(0.068)
Δ Portfolio Flows/GDP		-0.085		-0.029		-0.040		**-0.160*** **		**-0.079*** **
* Δ Macro. Prud.		(0.062)		(0.068)		(0.067)		(0.027)		(0.016)
Observations	393	393	393	393	393	393	393	393	393	393
# of countries	18	18	18	18	18	18	18	18	18	18
AR(2)-p	0.33	0.28	0.31	0.32	0.29	0.29	0.36	0.28	0.36	0.25

Notes: Robust standard errors are in parentheses. ***, **, and * denote significance levels at 1%, 5%, and 10%, respectively.

Table A3: Effectiveness of Macroprudential Policy Tools

(Using change in the monetary policy rate)

VARIABLES	Borrower-Based		Fin.Inst-Based		Domestic MaPP		MaPP with CFM focus		Overall Index	
	MaPP-Bw		**MaPP-FI**		**MaPP-D**		**MaPP-FX**		**MPI**	
	Whole Period									
Credit-to-GDP gap$_{t-1}$	0.928***	0.948***	0.874***	0.933***	0.903***	0.958***	0.839***	0.923***	0.865***	0.905***
	(0.038)	(0.052)	(0.014)	(0.040)	(0.045)	(0.022)	(0.031)	(0.054)	(0.029)	(0.036)
Δ Macro. Prud.	**-3.514*** **	**-4.464** **	-2.405	-0.006	**-1.982***	**-2.555** **	**-3.518*** **	**-3.175*** **	**-2.529*** **	**-2.190*** **
	(0.896)	(1.913)	(2.646)	(2.050)	(1.129)	(1.179)	(1.037)	(1.207)	(0.369)	(0.579)
Δ Monetary Policy Rate	0.147	0.264	-0.075	0.013	0.241	0.004	0.129	-0.106	-0.115	-0.264
	(0.276)	(0.467)	(0.315)	(0.465)	(0.600)	(0.397)	(0.290)	(0.463)	(0.240)	(0.303)
Δ Real GDP	0.664***	0.567***	0.731***	0.609***	0.643***	0.520***	0.734***	0.644***	0.746***	0.589***
	(0.083)	(0.106)	(0.117)	(0.089)	(0.136)	(0.107)	(0.107)	(0.128)	(0.089)	(0.092)
Δ^4 RER	-0.238***	-0.205***	-0.181***	-0.191***	-0.215***	-0.201***	-0.162***	-0.189***	-0.187***	-0.170***
	(0.030)	(0.032)	(0.014)	(0.031)	(0.029)	(0.025)	(0.021)	(0.042)	(0.022)	(0.022)
Δ Portfolio Flows/GDP	0.513***	0.738***	0.691***	0.691***	0.622***	0.664***	0.784***	0.778***	0.653***	0.669***
	(0.119)	(0.071)	(0.083)	(0.109)	(0.079)	(0.091)	(0.056)	(0.062)	(0.091)	(0.097)
Δ Portfolio Flows/GDP		1.127		-0.701		-0.187		-0.754		-0.385
* Δ Macro. Prud.		(1.451)		(0.641)		(0.217)		(2.932)		(0.904)
Observations	822	822	822	822	822	822	822	822	822	822
# of countries	18	18	18	18	18	18	18	18	18	18
AR(2)-p	0.21	0.23	0.24	0.20	0.20	0.19	0.32	0.35	0.20	0.22
	Recent Period									
Credit-to-GDP gap$_{t-1}$	0.964***	0.984***	0.948***	0.944***	0.957***	0.997***	0.938***	0.987***	0.982***	0.979***
	(0.020)	(0.037)	(0.037)	(0.037)	(0.031)	(0.051)	(0.024)	(0.029)	(0.027)	(0.040)
Δ Macro. Prud.	**-6.295*** **	**-7.297*** **	**-1.332** **	0.643	**-5.032*** **	**-4.487*** **	**-2.267*** **	**-3.163*** **	**-3.372*** **	**-3.181*** **
	(0.823)	(1.408)	(0.617)	(1.817)	(1.225)	(1.259)	(0.362)	(1.028)	(0.443)	(0.564)
Δ Monetary Policy Rate	-0.262***	-0.406	-0.478***	-1.127***	-0.472***	-0.668*	-0.447***	-0.458**	-0.333***	-0.671**
	(0.069)	(0.296)	(0.114)	(0.314)	(0.117)	(0.387)	(0.083)	(0.194)	(0.109)	(0.309)
Δ Real GDP	0.720***	0.505***	0.919***	0.641***	0.804***	0.621***	0.887***	0.665***	0.773***	0.571***
	(0.073)	(0.065)	(0.049)	(0.052)	(0.138)	(0.087)	(0.059)	(0.077)	(0.079)	(0.079)
Δ^4 RER	-0.268***	-0.284***	-0.243***	-0.237***	-0.260***	-0.266***	-0.239***	-0.266***	-0.291***	-0.264***
	(0.026)	(0.041)	(0.036)	(0.032)	(0.025)	(0.043)	(0.031)	(0.035)	(0.029)	(0.039)
Δ Portfolio Flows/GDP	0.914***	0.927***	0.975***	0.882***	0.976***	0.871***	0.985***	0.963***	0.830***	0.942***
	(0.065)	(0.069)	(0.077)	(0.106)	(0.063)	(0.076)	(0.049)	(0.113)	(0.101)	(0.074)
Δ Portfolio Flows/GDP		-1.206		-1.042		-1.133		-0.253		-0.507
* Δ Macro. Prud.		(1.166)		(1.079)		(1.248)		(0.271)		(0.986)
Observations	393	393	393	393	393	393	393	393	393	393
# of countries	18	18	18	18	18	18	18	18	18	18
AR(2)-p	0.28	0.24	0.29	0.29	0.23	0.20	0.30	0.30	0.13	0.27

Notes: Robust standard errors are in parentheses. ***, **, and * denote significance levels at 1%, 5%, and 10%, respectively.

Table A4: Effectiveness of Macroprudential Policy Tools

(Using change in the M2-to-GDP ratio)

VARIABLES	Borrower-Based		Fin.Inst-Based		Domestic MaPP		MaPP with CFM focus		Overall Index	
	MaPP-Bw		**MaPP-FI**		**MaPP-D**		**MaPP-FX**		**MPI**	
	Whole Period									
Credit-to-GDP gap$_{t-1}$	0.912***	0.923***	0.878***	0.950***	0.882***	0.932***	0.838***	0.916***	0.868***	0.887***
	(0.046)	(0.044)	(0.017)	(0.034)	(0.033)	(0.029)	(0.026)	(0.047)	(0.031)	(0.038)
Δ Macro. Prud.	**-4.001*** **	**-6.593** **	-3.625	**-4.488***	**-3.264*** **	**-3.056*** **	**-3.398** **	**-3.279***	**-2.735*** **	**-3.715*** **
	(1.501)	(2.625)	(2.328)	(2.656)	(0.803)	(0.742)	(1.349)	(1.780)	(0.632)	(1.257)
Δ M2-to-GDP	2.508**	3.693**	2.018***	1.113	2.506***	2.053**	2.316***	2.623***	2.988***	3.538***
	(1.148)	(1.444)	(0.612)	(0.987)	(0.670)	(0.904)	(0.551)	(0.634)	(0.687)	(0.880)
Δ Real GDP	0.656***	0.561***	0.766***	0.560***	0.752***	0.588***	0.766***	0.632***	0.726***	0.514***
	(0.127)	(0.103)	(0.107)	(0.100)	(0.128)	(0.068)	(0.119)	(0.073)	(0.128)	(0.106)
Δ^4 RER	-0.228***	-0.188***	-0.181***	-0.192***	-0.195***	-0.172***	-0.164***	-0.182***	-0.189***	-0.153***
	(0.036)	(0.031)	(0.018)	(0.029)	(0.029)	(0.028)	(0.017)	(0.038)	(0.026)	(0.027)
Δ Portfolio Flows/GDP	0.493***	0.663***	0.670***	0.739***	0.654***	0.716***	0.756***	0.726***	0.640***	0.659***
	(0.121)	(0.074)	(0.105)	(0.060)	(0.096)	(0.106)	(0.051)	(0.076)	(0.096)	(0.066)
Δ Portfolio Flows/GDP		1.569		-0.802		**-0.292***		0.313		-0.003
* Δ Macro. Prud.		(1.056)		(1.037)		(0.171)		(2.384)		(0.640)
Observations	801	801	801	801	801	801	801	801	801	801
# of countries	18	18	18	18	18	18	18	18	18	18
AR(2)-p	0.17	0.17	0.17	0.16	0.15	0.19	0.30	0.27	0.15	0.17
	Recent Period									
Credit-to-GDP gap$_{t-1}$	0.979***	0.999***	0.937***	0.962***	0.970***	0.993***	0.928***	0.982***	0.925***	0.959***
	(0.055)	(0.028)	(0.023)	(0.032)	(0.039)	(0.029)	(0.021)	(0.032)	(0.049)	(0.035)
Δ Macro. Prud.	**-6.114*** **	**-7.657*** **	-1.126	**-1.745***	**-4.784*** **	**-5.458** **	**-3.500*** **	**-3.864** **	**-4.272*** **	**-3.390*** **
	(1.621)	(1.018)	(1.056)	(1.072)	(0.976)	(2.354)	(0.888)	(1.934)	(1.157)	(0.492)
Δ M2-to-GDP	3.546**	4.194***	3.190***	1.474	3.194***	3.167***	4.029***	3.424***	4.223***	2.793***
	(1.551)	(0.617)	(0.818)	(1.793)	(1.053)	(0.883)	(0.621)	(0.628)	(1.236)	(0.502)
Δ Real GDP	0.622***	0.468***	0.876***	0.462***	0.784***	0.503***	0.741***	0.574***	0.676***	0.526***
	(0.083)	(0.053)	(0.094)	(0.139)	(0.102)	(0.076)	(0.111)	(0.088)	(0.150)	(0.072)
Δ^4 RER	-0.288***	-0.304***	-0.235***	-0.241***	-0.269***	-0.258***	-0.252***	-0.264***	-0.247***	-0.288***
	(0.043)	(0.034)	(0.028)	(0.037)	(0.031)	(0.042)	(0.026)	(0.035)	(0.035)	(0.033)
Δ Portfolio Flows/GDP	0.680***	0.775***	0.895***	1.012***	0.864***	0.839***	0.812***	0.916***	0.849***	0.856***
	(0.154)	(0.123)	(0.104)	(0.153)	(0.048)	(0.129)	(0.077)	(0.110)	(0.045)	(0.112)
Δ Portfolio Flows/GDP		-0.851		-1.601		-0.649		-0.179		0.304
* Δ Macro. Prud.		(0.924)		(2.087)		(1.334)		(0.199)		(0.842)
Observations	393	393	393	393	393	393	393	393	393	393
# of countries	18	18	18	18	18	18	18	18	18	18
AR(2)-p	0.23	0.18	0.29	0.26	0.21	0.19	0.32	0.32	0.24	0.17

Notes: Robust standard errors are in parentheses. ***, **, and * denote significance levels at 1%, 5%, and 10%, respectively.

Table A5: Effectiveness of Macroprudential Policy Tools
(Summary of Results – Gross Portfolio Flows (IMF-BOPS)–)

VARIABLES	Credit-to-GDP gap	Credit-to-GDP gap$_{\|\lambda=1600}$	$\Delta\left(\frac{Credit}{GDP}\right)$	Credit Boom
	Can a macroprudential policy action help contain credit cycles?			
Δ MaPP-Bw	**-5.236*** **	**-4.339*** **	**-5.165*** **	-0.332
	(0.276)	(1.13)	(0.791)	(0.355)
Δ MaPP-FI	-2.273	-0.947	**-3.416** **	0.129
	(2.285)	(0.671)	(1.544)	(0.249)
Δ MaPP-D	**-4.438*** **	-1.119	-3.342***	-0.013
	(1.516)	(1.026)	(0.616)	(0.163)
Δ MaPP-FX	-5.739	**-6.23** **	-3.55	-0.118
	(3.799)	(2.531)	(3.061)	(0.641)
Δ MPI	**-2.621*** **	**-2.982*** **	**-2.603*** **	-0.049
	(0.751)	(1.15)	(0.735)	(0.088)
	Can a macroprudential policy action help contain the impact of portfolio inflows on credit cycles?			
Δ MaPP-Bw	**-0.123***	**-0.11** **	**-0.342*** **	-0.004
* Δ Portfolio Flows/GDP	(0.071)	(0.054)	(0.047)	(0.007)
	[-20.395%]	[-21.438%]	[-66.748%]	[-12.593%]
Δ MaPP-FI	**0.118*** **	**0.142*** **	**0.071** **	-0.001
* Δ Portfolio Flows/GDP	(0.046)	(0.037)	(0.03)	(0.003)
	[19.958%]	[27.941%]	[16.951%]	[-2.815%]
Δ MaPP-D	**-0.224*** **	-0.037	**-0.267*** **	0
* Δ Portfolio Flows/GDP	(0.068)	(0.038)	(0.038)	(0.002)
	[-36.966%]	[-11.994%]	[-65.968%]	[-0.041%]
Δ MaPP-FX	-0.115	**-0.147***	**-0.142***	-0.005
* Δ Portfolio Flows/GDP	(0.111)	(0.083)	(0.084)	(0.025)
	[-16.552%]	[-29.271%]	[-32.595%]	[-14.122%]
Δ MPI	**-0.129*** **	**-0.097***	**-0.162*** **	-0.002
* Δ Portfolio Flows/GDP	(0.037)	(0.05)	(0.044)	(0.003)
	[-30.565%]	[-27.109%]	[-59.603%]	[-10.331%]
	Recent Period			
	Can a macroprudential policy action help contain credit cycles?			
Δ MaPP-Bw	**-7.842*** **	**-5.546*** **	**-7.386*** **	-0.111
	(0.507)	(0.973)	(0.836)	(0.297)
Δ MaPP-FI	-1.441	-0.262	**-4.235*** **	0.065
	(3.693)	(4.763)	(1.574)	(0.232)
Δ MaPP-D	**-5.845*** **	**-3.469** **	**-4.843*** **	0.005
	(1.899)	(1.384)	(0.589)	(0.163)
Δ MaPP-FX	-2.113	-3.978	-2.034	-0.439
	(4.053)	(2.809)	(2.916)	(0.334)
Δ MPI	-3.257	**-3.18*** **	**-4.543*** **	0.088
	(2.404)	(1.211)	(0.639)	(0.078)
	Can a macroprudential policy action help contain the impact of portfolio inflows on credit cycles?			
Δ MaPP-Bw	**-0.256*** **	**-0.154*** **	**-0.463*** **	-0.001
* Δ Portfolio Flows/GDP	(0.058)	(0.051)	(0.059)	(0.007)
	[-36.827%]	[-24.621%]	[-68.881%]	[-2.462%]
Δ MaPP-FI	**0.146*** **	**0.121***	**0.164** **	-0.003
* Δ Portfolio Flows/GDP	(0.051)	(0.072)	(0.071)	(0.007)
	[19.216%]	[21.113%]	[31.798%]	[-7.717%]
Δ MaPP-D	**-0.308*** **	**-0.213** **	**-0.404*** **	-0.002
* Δ Portfolio Flows/GDP	(0.101)	(0.097)	(0.092)	(0.001)
	[-40.241%]	[-39.172%]	[-63.729%]	[-4.638%]
Δ MaPP-FX	-0.061	-0.116	-0.136	-0.022
* Δ Portfolio Flows/GDP	(0.146)	(0.096)	(0.103)	(0.016)
	[-6.532%]	[-16.429%]	[-21.749%]	[-55.99%]
Δ MPI	-0.175	**-0.148*** **	**-0.284*** **	0.002
* Δ Portfolio Flows/GDP	(0.115)	(0.055)	(0.038)	(0.004)
	[-40.028%]	[-36.747%]	[-72.709%]	[8.143%]

Notes. Robust standard errors are in parentheses. ***, **, and * denote significance levels at 1%, 5%, and 10%, respectively. The terms in squared brackets are the percentage reduction in the sensitivity of target credit variable in response to a one-standard deviation change in **Δ MaPP-Bw**, **Δ MaPP-FI**, **Δ MaPP-D**, **Δ MaPP-FX**, or **Δ MPI**.

Table A6: Effectiveness of Reserve Requirement Policies
(Summary of Results – Gross Portfolio Flows (IMF-BOPS)–)

VARIABLES	Credit-to-GDP gap	Credit-to-GDP gap$_{\|\lambda=1600}$	$\Delta\left(\frac{Credit}{GDP}\right)$	Credit Boom
	Can a reserve requirement policy action help contain credit cycles?			
Δ RR-D	-1.233	-0.28	-2.169	0.126
	(1.463)	(0.873)	(1.188)	(0.252)
Δ RR-FX	2.623	2.52	-1.544	-0.023
	(4.703)	(3.846)	(1.493)	(0.197)
	Can a reserve requirement policy action help contain the impact of portfolio inflows on credit cycles?			
Δ RR-D	**-0.321*** **	**-0.29*** **	**-0.241*** **	**-0.019*** **
* Δ Portfolio Flows/GDP	(0.065)	(0.037)	(0.045)	(0.007)
	[-48.956%]	[-50.196%]	[-48.143%]	[-53.86%]
Δ RR-FX	0.159	0.099	0.108	**0.015***
* Δ Portfolio Flows/GDP	(0.209)	(0.112)	(0.18)	(0.008)
	[24.359%]	[17.226%]	[23.351%]	[44.696%]
	Recent Period			
	Can a reserve requirement policy action help contain credit cycles?			
Δ RR-D	-1.59	-0.844	-2.749	0.001
	1.454	0.984	1.287	0.132
Δ RR-FX	0.973	-1.614	-1.594	-0.162
	4.351	3.281	2.344	0.181
	Can a reserve requirement policy action help contain the impact of portfolio inflows on credit cycles?			
Δ RR-D	**-0.422*** **	**-0.418*** **	**-0.36*** **	**-0.02*** **
* Δ Portfolio Flows/GDP	(0.093)	(0.05)	(0.06)	(0.003)
	[-46.817%]	[-48.166%]	[-51.229%]	[-37.74%]
Δ RR-FX	0.068	-0.146	-0.098	**0.019*** **
* Δ Portfolio Flows/GDP	(0.234)	(0.156)	(0.22)	(0.006)
	[7.851%]	[-18.443%]	[-18.59%]	[41.322%]

Notes. Robust standard errors are in parentheses. ***, **, and * denote significance levels at 1%, 5%, and 10%, respectively. The terms in squared brackets are the percentage reduction in the sensitivity of target credit variable in response to a one-standard deviation change in **Δ RR-D** or **Δ RR-FX**.

Table A7: Effectiveness of Macroprudential Policy Tools
(Summary of Results – Net Portfolio Flows (IMF-BOPS)–)

VARIABLES	Credit-to-GDP gap	Credit-to-GDP gap$_{\|\lambda=1600}$	$\Delta\left(\frac{Credit}{GDP}\right)$	Credit Boom
	Can a macroprudential policy action help contain credit cycles?			
Δ MaPP-Bw	**-5.314*** **	**-3.426*** **	**-4.737*** **	-0.193
	(0.304)	(0.961)	(0.726)	(0.339)
Δ MaPP-FI	**-2.695** **	**-6.486** **	-3.698	0.076
	(1.058)	(3.124)	(4.036)	(0.16)
Δ MaPP-D	-1.605	-1.688	**-3.53*** **	0.001
	(1.179)	(1.112)	(0.895)	(0.133)
Δ MaPP-FX	**-2.075** **	-1.858	-3.388	-0.03
	(0.838)	(2.181)	(3.151)	(0.502)
Δ MPI	**-3.331*** **	**-2.766*** **	**-2.265*** **	-0.015
	(0.745)	(0.59)	(0.627)	(0.144)
	Can a macroprudential policy action help contain the impact of portfolio inflows on credit cycles?			
Δ MaPP-Bw	**-0.204*** **	**-0.134*** **	**-0.374*** **	0.001
* Δ Portfolio Flows/GDP	(0.038)	(0.036)	(0.04)	(0.003)
	[-30.025%]	[-25.615%]	[-71.494%]	[2.803%]
Δ MaPP-FI	**0.13*** **	**0.118*** **	**0.122*** **	-0.003
* Δ Portfolio Flows/GDP	(0.04)	(0.031)	(0.028)	(0.004)
	[21.442%]	[22.926%]	[26.369%]	[-11.018%]
Δ MaPP-D	**-0.229*** **	**-0.128*** **	**-0.297*** **	-0.001
* Δ Portfolio Flows/GDP	(0.047)	(0.028)	(0.037)	(0.002)
	[-46.312%]	[-31.705%]	[-71.932%]	[-6.804%]
Δ MaPP-FX	-0.006	-0.051	-0.122	-0.003
* Δ Portfolio Flows/GDP	(0.031)	(0.054)	(0.076)	(0.016)
	[-0.832%]	[-7.563%]	[-24.876%]	[-7.901%]
Δ MPI	**-0.151*** **	**-0.111*** **	**-0.174*** **	-0.002
* Δ Portfolio Flows/GDP	(0.03)	(0.025)	(0.04)	(0.003)
	[-39.978%]	[-33.793%]	[-60.03%]	[-11.623%]
	Recent Period			
	Can a macroprudential policy action help contain credit cycles?			
Δ MaPP-Bw	**-7.651*** **	**-7.188*** **	**-6.991*** **	-0.186
	(0.553)	(1.424)	(0.617)	(0.286)
Δ MaPP-FI	-0.285	**-1.532** **	-5.608	0.05
	(1.43)	(0.679)	(4.974)	(0.232)
Δ MaPP-D	**-4.745*** **	**-4.709*** **	**-5.25*** **	0.015
	(0.295)	(0.561)	(0.807)	(0.121)
Δ MaPP-FX	-3.072	-4.064	-1.238	-0.114
	(4.432)	(2.708)	(3.236)	(0.138)
Δ MPI	-2.131	-1.509	**-3.927*** **	0.028
	(1.694)	(1.152)	(0.837)	(0.064)
	Can a macroprudential policy action help contain the impact of portfolio inflows on credit cycles?			
Δ MaPP-Bw	**-0.245*** **	**-0.279*** **	**-0.465*** **	0.001
* Δ Portfolio Flows/GDP	(0.063)	(0.038)	(0.037)	(0.002)
	[-27.301%]	[-37.708%]	[-62.205%]	[3.169%]
Δ MaPP-FI	0.102	**0.139**	**0.299** **	-0.007
* Δ Portfolio Flows/GDP	(0.082)	(0.073)	(0.119)	(0.01)
	[13.11%]	[18.954%]	[56.364%]	[-16.37%]
Δ MaPP-D	**-0.291*** **	**-0.143** **	**-0.348*** **	-0.002
* Δ Portfolio Flows/GDP	(0.04)	(0.064)	(0.05)	(0.002)
	[-36.832%]	[-27.82%]	[-55.197%]	[-6.637%]
Δ MaPP-FX	-0.101	-0.115	-0.078	-0.008
* Δ Portfolio Flows/GDP	(0.133)	(0.083)	(0.115)	(0.006)
	[-9.474%]	[-13.599%]	[-10.199%]	[-15.598%]
Δ MPI	**-0.158** **	**-0.138*** **	**-0.302*** **	-0.001
* Δ Portfolio Flows/GDP	(0.073)	(0.033)	(0.063)	(0.002)
	[-32.895%]	[-29.295%]	[-63.943%]	[-3.893%]

Notes. Robust standard errors are in parentheses. ***, **, and * denote significance levels at 1%, 5%, and 10%, respectively. The terms in squared brackets are the percentage reduction in the sensitivity of target credit variable in response to a one-standard deviation change in **Δ MaPP-Bw**, **Δ MaPP-FI**, **Δ MaPP-D**, **Δ MaPP-FX**, or **Δ MPI**.

Table A8: Effectiveness of Reserve Requirement Policies
(Summary of Results – Net Portfolio Flows (IMF-BOPS)–)

VARIABLES	Credit-to-GDP gap	Credit-to-GDP gap$_{\|\lambda=1600}$	$\Delta\left(\frac{Credit}{GDP}\right)$	Credit Boom
	Can a reserve requirement policy action help contain credit cycles?			
Δ RR-D	-1.095	-0.448	-2.507	0.046
	(1.472)	(0.893)	(1.41)	(0.221)
Δ RR-FX	-1.474	1.073	-2.985	-0.104
	(2.879)	(3.456)	(1.999)	(0.096)
	Can a reserve requirement policy action help contain the impact of portfolio inflows on credit cycles?			
Δ RR-D	**-0.259*** **	**-0.313*** **	**-0.244*** **	**-0.017** **
* Δ Portfolio Flows/GDP	(0.073)	(0.03)	(0.052)	(0.008)
	[-41.639%]	[-49.837%]	[-50.127%]	[-54.059%]
Δ RR-FX	**0.155***	**0.156** **	0.067	**0.021*** **
* Δ Portfolio Flows/GDP	(0.081)	(0.073)	(0.117)	(0.005)
	[21.605%]	[27.037%]	[12.839%]	[58.082%]
	Recent Period			
	Can a reserve requirement policy action help contain credit cycles?			
Δ RR-D	-1.684	0.139	-2.988	0.081
	(1.383)	(1.201)	(1.323)	(0.108)
Δ RR-FX	-0.67	2.828	-1.9	**-0.087***
	(4.759)	(4.295)	(2.432)	(0.051)
	Can a reserve requirement policy action help contain the impact of portfolio inflows on credit cycles?			
Δ RR-D	**-0.426*** **	**-0.439*** **	**-0.364*** **	**-0.022*** **
* Δ Portfolio Flows/GDP	(0.076)	(0.045)	(0.056)	(0.003)
	[-46.838%]	[-51.217%]	[-49.89%]	[-45.382%]
Δ RR-FX	0.296	**0.35***	0.102	**0.026*** **
* Δ Portfolio Flows/GDP	(0.346)	(0.204)	(0.199)	(0.004)
	[29.51%]	[43.078%]	[15.784%]	[49.476%]

Notes. Robust standard errors are in parentheses. ***, **, and * denote significance levels at 1%, 5%, and 10%, respectively. The terms in squared brackets are the percentage reduction in the sensitivity of target credit variable in response to a one-standard deviation change in **Δ RR-D** or **Δ RR-FX**.

Table A9: Effectiveness of Macroprudential Policy Tools
(Summary of Results – Net Portfolio Debt Flows (IMF-BOPS)–)

VARIABLES	Credit-to-GDP gap	Credit-to-GDP gap$_{\|\lambda=1600}$	$\Delta\left(\frac{Credit}{GDP}\right)$	Credit Boom
	Can a macroprudential policy action help contain credit cycles?			
Δ MaPP-Bw	**-5.295*** **	**-4.655*** **	**-5.795*** **	0.048
	(0.458)	(1.619)	(0.882)	(0.607)
Δ MaPP-FI	-1.653	-1.072	-2.707	0.018
	(1.012)	(2.288)	(1.808)	(0.071)
Δ MaPP-D	**-2.831*** **	-1.774	**-4.092*** **	-0.082
	(1.062)	(1.394)	(0.71)	(0.241)
Δ MaPP-FX	0.465	-1.157	1.905	**-0.873***
	(4.69)	(3.692)	(3.495)	(0.487)
Δ MPI	**-1.981** **	**-5.105** **	**-3.602*** **	-0.034
	(0.965)	(2.23)	(1.093)	(0.107)
	Can a macroprudential policy action help contain the impact of portfolio inflows on credit cycles?			
Δ MaPP-Bw	**-0.145***	-0.142	**-0.392*** **	0.005
* Δ Portfolio Flows/GDP	(0.076)	(0.106)	(0.065)	(0.037)
	[-52.9%]	[-61.697%]	[-183.619%]	[29.312%]
Δ MaPP-FI	0.036	0.071	-0.053	0.004
* Δ Portfolio Flows/GDP	(0.094)	(0.192)	(0.129)	(0.004)
	[16.218%]	[42.646%]	[-36.2%]	[18.316%]
Δ MaPP-D	-0.116	0.01	**-0.311*** **	-0.005
* Δ Portfolio Flows/GDP	(0.082)	(0.102)	(0.048)	(0.015)
	[-60.901%]	[8.257%]	[-239.054%]	[-28.701%]
Δ MaPP-FX	0.069	-0.022	0.003	**-0.046***
* Δ Portfolio Flows/GDP	(0.22)	(0.17)	(0.176)	(0.025)
	[21.659%]	[-10.618%]	[1.067%]	[-374.917%]
Δ MPI	-0.076	**-0.261***	**-0.265*** **	-0.003
* Δ Portfolio Flows/GDP	(0.061)	(0.136)	(0.068)	(0.008)
	[-68.47%]	[-245.006%]	[-527.459%]	[-19.74%]
	Recent Period			
	Can a macroprudential policy action help contain credit cycles?			
Δ MaPP-Bw	**-9.406*** **	**-9.03*** **	**-9.95*** **	0.092
	(0.624)	(0.359)	(1.696)	(0.249)
Δ MaPP-FI	-0.703	-0.823	**-4.309** **	-1.213
	(1.413)	(1.208)	(1.938)	(0.757)
Δ MaPP-D	**-4.579*** **	**-4.228*** **	**-6.761*** **	0.034
	(1.382)	(1.378)	(0.787)	(0.129)
Δ MaPP-FX	1.465	**-1.98** **	-1.376	-0.398
	(3.13)	(0.86)	(1.887)	(0.395)
Δ MPI	**-4.507*** **	**-3.712*** **	**-5.238*** **	-0.066
	(0.573)	(0.59)	(1.24)	(0.327)
	Can a macroprudential policy action help contain the impact of portfolio inflows on credit cycles?			
Δ MaPP-Bw	**-0.438*** **	**-0.453*** **	**-0.73*** **	0.008
* Δ Portfolio Flows/GDP	(0.1)	(0.066)	(0.136)	(0.017)
	[-100.756%]	[-166.617%]	[-310.641%]	[24.365%]
Δ MaPP-FI	0.138	0.564	-0.041	-0.056
* Δ Portfolio Flows/GDP	(0.647)	(0.478)	(0.144)	(0.05)
	[35.418%]	[287.317%]	[-18.228%]	[-310.596%]
Δ MaPP-D	**-0.204***	**-0.214** **	**-0.72*** **	0.004
* Δ Portfolio Flows/GDP	(0.111)	(0.101)	(0.041)	(0.015)
	[-67.914%]	[-77.251%]	[-304.506%]	[16.956%]
Δ MaPP-FX	0.116	-0.051	-0.156	-0.017
* Δ Portfolio Flows/GDP	(0.139)	(0.045)	(0.096)	(0.018)
	[26.493%]	[-21.411%]	[-64.087%]	[-55.802%]
Δ MPI	**-0.196** **	-0.109	**-0.426*** **	-0.004
* Δ Portfolio Flows/GDP	(0.092)	(0.07)	(0.077)	(0.025)
	[-127.384%]	[-103.963%]	[-318.513%]	[-17.294%]

Notes. Robust standard errors are in parentheses. ***, **, and * denote significance levels at 1%, 5%, and 10%, respectively. The terms in squared brackets are the percentage reduction in the sensitivity of target credit variable in response to a one-standard deviation change in **Δ MaPP-Bw**, **Δ MaPP-FI**, **Δ MaPP-D**, **Δ MaPP-FX**, or **Δ MPI**.

Table A10: Effectiveness of Reserve Requirement Policies
(Summary of Results – Net Portfolio Debt Flows (IMF-BOPS)–)

VARIABLES	Credit-to-GDP gap	Credit-to-GDP gap$_{\|\lambda=1600}$	$\Delta\left(\frac{Credit}{GDP}\right)$	Credit Boom
	Can a reserve requirement policy action help contain credit cycles?			
Δ RR-D	-0.566	-2.34	-1.396	0.257
	(1.845)	(1.634)	(1.444)	(0.252)
Δ RR-FX	-0.141	0.17	-2.835	-0.009
	(3.68)	(2.135)	(1.455)	(0.329)
	Can a reserve requirement policy action help contain the impact of portfolio inflows on credit cycles?			
Δ RR-D	**0.121*** **	0.389	**0.08***	-0.005
* Δ Portfolio Flows/GDP	(0.036)	(0.335)	(0.041)	(0.003)
	[58.227%]	[294.353%]	[47.506%]	[-23.832%]
Δ RR-FX	-0.021	-0.05	-0.075	0.004
* Δ Portfolio Flows/GDP	(0.141)	(0.096)	(0.129)	(0.003)
	[-8.72%]	[-22.826%]	[-61.852%]	[15.678%]
	Recent Period			
	Can a reserve requirement policy action help contain credit cycles?			
Δ RR-D	-2.809	1.561	**-3.299*** **	0.167
	(2.325)	(1.784)	(1.191)	(0.195)
Δ RR-FX	-0.533	-0.261	-0.98	-0.159
	(2.216)	(2.079)	(1.811)	(0.23)
	Can a reserve requirement policy action help contain the impact of portfolio inflows on credit cycles?			
Δ RR-D	0.298	-0.682	0.274	-0.012
* Δ Portfolio Flows/GDP	(0.841)	(0.623)	(0.673)	(0.023)
	[91.723%]	[-317.354%]	[115.746%]	[-49.323%]
Δ RR-FX	**-0.372** **	-0.176	**-0.442** **	0.007
* Δ Portfolio Flows/GDP	(0.154)	(0.204)	(0.177)	(0.014)
	[-103.079%]	[-70.943%]	[-280.149%]	[23.87%]

Notes. Robust standard errors are in parentheses. ***, **, and * denote significance levels at 1%, 5%, and 10%, respectively. The terms in squared brackets are the percentage reduction in the sensitivity of target credit variable in response to a one-standard deviation change in **Δ RR-D** or **Δ RR-FX**.

Table A11: Effectiveness of Macroprudential Policy Tools

(Two-sided HP filter)

VARIABLES	Borrower-Based		Fin.Inst-Based		Domestic MaPP		MaPP with CFM focus		Overall Index	
	MaPP-Bw		**MaPP-FI**		**MaPP-D**		**MaPP-FX**		**MPI**	
	Whole Period									
Credit-to-GDP gap$_{t-1}$	0.760***	0.873***	0.743***	0.828***	0.739***	0.893***	0.749***	0.806***	0.742***	0.863***
	(0.029)	(0.033)	(0.022)	(0.020)	(0.016)	(0.032)	(0.034)	(0.030)	(0.019)	(0.025)
Δ Macro. Prud.	**-4.963*** **	**-4.787*** **	0.652	1.213	**-3.326*** **	**-3.076*** **	-0.350	-2.294	**-3.929*** **	**-2.393*** **
	(0.508)	(1.614)	(2.208)	(3.775)	(0.977)	(0.959)	(3.523)	(1.945)	(0.665)	(0.725)
Monetary Policy Stance	0.023	-0.013	-0.077**	-0.141**	-0.008	-0.034	-0.049	-0.089	-0.053	-0.096
	(0.075)	(0.063)	(0.035)	(0.065)	(0.058)	(0.082)	(0.079)	(0.061)	(0.087)	(0.085)
Δ Real GDP	0.286***	0.301***	0.336***	0.234***	0.320***	0.268***	0.323***	0.261***	0.277***	0.265***
	(0.035)	(0.060)	(0.057)	(0.049)	(0.066)	(0.063)	(0.046)	(0.086)	(0.054)	(0.064)
Δ^4 RER	-0.104***	-0.112***	-0.087***	-0.092***	-0.074***	-0.120***	-0.096***	-0.081***	-0.079***	-0.104***
	(0.023)	(0.024)	(0.023)	(0.027)	(0.017)	(0.027)	(0.030)	(0.017)	(0.017)	(0.024)
Δ Portfolio Flows/GDP	0.716***	0.763***	0.767***	0.733***	0.747***	0.785***	0.704***	0.765***	0.861***	0.794***
	(0.065)	(0.097)	(0.060)	(0.106)	(0.083)	(0.082)	(0.138)	(0.120)	(0.081)	(0.089)
Δ Portfolio Flows/GDP		0.739		**-1.256***		-0.225		0.801		**-0.297*** **
* Δ Macro. Prud.		(1.611)		(0.740)		(0.282)		(1.417)		(0.077)
Observations	822	822	822	822	822	822	822	822	822	822
# of countries	18	18	18	18	18	18	18	18	18	18
AR(2)-p	0.19	0.21	0.23	0.13	0.13	0.15	0.25	0.21	0.19	0.17
	Recent Period									
Credit-to-GDP gap$_{t-1}$	0.801***	0.883***	0.767***	0.824***	0.790***	0.847***	0.710***	0.805***	0.750***	0.828***
	(0.034)	(0.032)	(0.049)	(0.024)	(0.029)	(0.043)	(0.012)	(0.029)	(0.019)	(0.058)
Δ Macro. Prud.	**-7.777*** **	**-6.420*** **	-1.370	-4.048	**-6.369*** **	**-5.079*** **	**-5.121*** **	**-3.454***	**-4.700*** **	**-3.838*** **
	(0.690)	(1.230)	(2.204)	(4.009)	(0.599)	(1.582)	(1.708)	(2.076)	(0.699)	(0.566)
Monetary Policy Stance	-0.639***	-1.357***	-0.998	-1.271***	-1.136***	-0.948*	-1.038***	-1.601***	-1.011***	-1.332
	(0.232)	(0.474)	(0.776)	(0.390)	(0.136)	(0.494)	(0.301)	(0.494)	(0.247)	(0.889)
Δ Real GDP	0.259***	0.263***	0.462***	0.327***	0.229***	0.314***	0.418***	0.292***	0.294***	0.270***
	(0.035)	(0.079)	(0.052)	(0.078)	(0.082)	(0.066)	(0.033)	(0.113)	(0.049)	(0.059)
Δ^4 RER	-0.133***	-0.132***	-0.067	-0.055*	-0.111***	-0.081*	-0.032	-0.075**	-0.083***	-0.090
	(0.035)	(0.026)	(0.047)	(0.029)	(0.036)	(0.046)	(0.022)	(0.038)	(0.025)	(0.061)
Δ Portfolio Flows/GDP	1.089***	1.109***	1.204***	1.268***	1.145***	1.022***	1.230***	1.194***	1.216***	1.119***
	(0.081)	(0.096)	(0.070)	(0.117)	(0.096)	(0.137)	(0.045)	(0.119)	(0.042)	(0.141)
Δ Portfolio Flows/GDP		**-2.796** **		-0.670		**-1.401** **		-0.181		-1.062
* Δ Macro. Prud.		(1.111)		(1.017)		(0.694)		(0.745)		(0.754)
Observations	393	393	393	393	393	393	393	393	393	393
# of countries	18	18	18	18	18	18	18	18	18	18
AR(2)-p	0.23	0.19	0.28	0.25	0.22	0.11	0.28	0.31	0.26	0.26

Notes: Robust standard errors are in parentheses. ***, **, and * denote significance levels at 1%, 5%, and 10%, respectively.

Further Analysis: Interaction among Macro-Financial Stability Frameworks: Macroprudential, Monetary and Reserve Requirement Tools. So far, the evidence suggest that macroprudential and reserve requirement policy tools appear effective in containing excessive credit cycles. A caveat is that a tighter macroprudential policy stance may coincide with tighter monetary or reserve requirement policies at a given point in time, making it harder to infer which macro-financial stability tool is driving the results.

Table A12 provides contemporaneous pairwise correlation between the policy spheres (the off-diagonal blocks). A monetary policy tightening (a positive value for monetary policy stance or a positive change in the monetary policy rate) is not contemporaneously correlated with a tightening in macroprudential or reserve requirement policies. Although a change in domestic required reserves seems positively and significantly correlated with financial-institutions-related and domestic measures, the correlation is weak (about 0.06). Moreover, a tighter **RR-FX** policy is generally accompanied by an accommodative monetary policy stance. Nonetheless, the contemporaneous correlation is low (0.15).

This result should not be readily interpreted broadly as a lack of coordination among the macro-financial policy spheres. For instance, a macroprudential or reserve requirement policy action might be accompanied by monetary policy in later periods. Along these lines, I also consider whether the monetary policy stance (or the change in the policy rate) is correlated with the change in macroprudential and reserve requirement policy stance over the last 4 quarters (i.e. current monetary policy stance against Δ^4**MPI** or Δ^4**RR-D**). While I observe less weak results in this case, e.g. **MaPP-FI**, **MaPP-FX**, and **MPI** are positively correlated with change in the policy rate for the recent period, the correlations are again moderate (around 0.15, see Table A13).

Finally, borrower-based macroprudential actions might be correlated with financial-institutions-based actions, and similarly, domestic measures might be correlated with FX-related measures. Tables A12 and Table A13 show that such categories of macroprudential policy actions are only weakly correlated (around .06 to .13).

Table A12: Interaction Among Monetary, Macroprudential and Reserve Requirement Policies (Contemporaneous Pair-wise Correlations)

VARIABLES	Mon.Pol.Stance	Δ Interest Rate	**ΔMaPP-Bw**	**ΔMaPP-FI**	**ΔMaPP-D**	**ΔMaPP-FX**	**ΔMPI**	**ΔRR-D**	**ΔRR-FX**
Mon.Pol.Stance	1.000								
Δ Interest Rate	0.884***	1.000							
	(0.000)								
ΔMaPP-Bw	-0.005	0.005	1.000						
	(0.869)	(0.873)							
ΔMaPP-FI	-0.002	0.007	0.093***	1.000					
	(0.944)	(0.830)	(0.004)						
ΔMaPP-D	0.000	0.009	0.701***	0.555***	1.000				
	(0.999)	(0.785)	(0.000)	(0.000)					
ΔMaPP-FX	-0.016	0.007	0.275***	0.469***	0.112***	1.000			
	(0.622)	(0.823)	(0.000)	(0.000)	(0.000)				
ΔMPI	-0.008	0.011	0.703***	0.687***	0.857***	0.608***	1.000		
	(0.799)	(0.738)	(0.000)	(0.000)	(0.000)	(0.000)			
ΔRR-D	0.023	0.014	-0.020	0.067**	0.054*	-0.024	0.031	1.000	
	(0.485)	(0.659)	(0.530)	(0.037)	(0.091)	(0.457)	(0.335)		
ΔRR-FX	-0.022	-0.015	0.017	0.001	0.036	-0.051	0.002	0.340***	1.000
	(0.496)	(0.643)	(0.586)	(0.973)	(0.262)	(0.111)	(0.944)	(0.000)	

Recent Period

VARIABLES	Mon.Pol.Stance	Δ Interest Rate	**ΔMaPP-Bw**	**ΔMaPP-FI**	**ΔMaPP-D**	**ΔMaPP-FX**	**ΔMPI**	**ΔRR-D**	**ΔRR-FX**
Mon.Pol.Stance	1.000								
Δ Interest Rate	0.501***	1.000							
	(0.000)								
ΔMaPP-Bw	-0.002	0.012	1.000						
	(0.964)	(0.818)							
ΔMaPP-FI	-0.003	0.045	0.064	1.000					
	(0.950)	(0.368)	(0.202)						
ΔMaPP-D	0.001	0.013	0.656***	0.586***	1.000				
	(0.989)	(0.800)	(0.000)	(0.000)					
ΔMaPP-FX	-0.073	0.066	0.357***	0.344***	0.112**	1.000			
	(0.146)	(0.193)	(0.000)	(0.000)	(0.026)				
ΔMPI	-0.039	0.046	0.705***	0.644***	0.840***	0.633***	1.000		
	(0.435)	(0.365)	(0.000)	(0.000)	(0.000)	(0.000)			
ΔRR-D	0.005	-0.027	0.015	0.030	0.076	-0.039	0.038	1.000	
	(0.917)	(0.590)	(0.768)	(0.553)	(0.130)	(0.437)	(0.451)		
ΔRR-FX	-0.149***	-0.138***	-0.004	-0.065	0.010	-0.118**	-0.056	0.468***	1.000
	(0.003)	(0.006)	(0.943)	(0.198)	(0.840)	(0.019)	(0.262)	(0.000)	

Notes: ***, **, and * denote significance levels at 1%, 5%, and 10%, respectively. p-values in parentheses.

Table A13: Interaction Among Monetary, Macroprudential and Reserve Requirement Policies (Contemporaneous Pair-wise Correlations, 4-quarter change in macroprudential and reserve requirement policies)

VARIABLES	Mon.Pol.Stance	Δ Interest Rate	Δ^4**MaPP-Bw**	Δ^4**MaPP-FI**	Δ^4**MaPP-D**	Δ^4**MaPP-FX**	Δ^4**MPI**	Δ^4**RR-D**	Δ^4**RR-FX**
Mon.Pol.Stance	1.000								
Δ Interest Rate	0.884***	1.000							
	(0.000)								
Δ^4**MaPP-Bw**	-0.010	0.011	1.000						
	(0.754)	(0.720)							
Δ^4**MaPP-FI**	-0.004	0.020	0.131	1.000					
	(0.909)	(0.536)	(0.000)						
Δ^4**MaPP-D**	-0.002	0.021	0.727***	0.573***	1.000				
	(0.939)	(0.516)	(0.000)	(0.000)					
Δ^4**MaPP-FX**	-0.022	0.015	0.284***	0.477***	0.128***	1.000			
	(0.493)	(0.634)	(0.000)	(0.000)	(0.000)				
Δ^4**MPI**	-0.014	0.024	0.721***	0.701***	0.854***	0.625***	1.000		
	(0.675)	(0.446)	(0.000)	(0.000)	(0.000)	(0.000)			
Δ^4**RR-D**	0.044	0.038	0.045	0.077**	0.116***	0.012	0.097***	1.000	
	(0.171)	(0.233)	(0.158)	(0.017)	(0.000)	(0.715)	(0.002)		
Δ^4**RR-FX**	-0.010	0.001	0.027	-0.037	-0.008	0.055*	0.022	0.371***	1.000
	(0.768)	(0.970)	(0.403)	(0.255)	(0.792)	(0.084)	(0.487)	(0.000)	

Recent Period

VARIABLES	Mon.Pol.Stance	Δ Interest Rate	Δ^4**MaPP-Bw**	Δ^4**MaPP-FI**	Δ^4**MaPP-D**	Δ^4**MaPP-FX**	Δ^4**MPI**	Δ^4**RR-D**	Δ^4**RR-FX**
Mon.Pol.Stance	1.000								
Δ Interest Rate	0.501***	1.000							
	(0.000)								
Δ^4**MaPP-Bw**	-0.036	0.041	1.000						
	(0.472)	(0.417)							
Δ^4**MaPP-FI**	0.055	0.152***	0.055	1.000					
	(0.279)	(0.002)	(0.272)						
Δ^4**MaPP-D**	0.020	0.113	0.667***	0.568***	1.000				
	(0.687)	(0.024)	(0.000)	(0.000)					
Δ^4**MaPP-FX**	-0.083	0.113**	0.327***	0.407***	0.107**	1.000			
	(0.101)	(0.025)	(0.000)	(0.000)	(0.034)				
Δ^4**MPI**	-0.032	0.150***	0.695***	0.666***	0.823***	0.653***	1.000		
	(0.529)	(0.003)	(0.000)	(0.000)	(0.000)	(0.000)			
Δ^4**RR-D**	0.055	0.139***	0.062	0.030	0.107***	0.022	0.094*	1.000	
	(0.275)	(0.006)	(0.219)	(0.554)	(0.033)	(0.669)	(0.062)		
Δ^4**RR-FX**	-0.084*	0.050	-0.013	-0.196***	-0.121**	0.028	-0.076	0.575***	1.000
	(0.096)	(0.317)	(0.794)	(0.000)	(0.016)	(0.584)	(0.130)	(0.000)	

Notes: ***, **, and * denote significance levels at 1%, 5%, and 10%, respectively. p-values in parentheses.

FIGURE A2: SUMMARY OF RESULTS: CAN MACROPRUDENTIAL POLICY ACTIONS HELP CONTAIN CREDIT CYCLES?

	Whole Period				*Recent Period*			
	Credit-to-GDP gap (long-run recursive trend)	**Credit-to-GDP gap (medium-run recursive trend)**	**Δ (Credit/GDP)**	**Credit Boom**	**Credit-to-GDP gap (long-run recursive trend)**	**Credit-to-GDP gap (medium-run recursive trend)**	**Δ (Credit/GDP)**	**Credit Boom**
Portfolio Banking Inflows	**MaPP-Bw****	**MaPP-Bw*****	**MaPP-Bw*****	MaPP-Bw	**MaPP-Bw*****	**MaPP-Bw*****	**MaPP-Bw*****	MaPP-Bw
	MaPP-FI	MaPP-FI	**MaPP-FI***	MaPP-FI	MaPP-FI	MaPP-FI	**MaPP-FI****	MaPP-FI
	MaPP-D**	MaPP-D	**MaPP-D*****	MaPP-D	**MaPP-D*****	**MaPP-D*****	**MaPP-D*****	MaPP-D
	MaPP-FX**	MaPP-FX	MaPP-FX	MaPP-FX	**MaPP-FX*****	**MaPP-FX****	MaPP-FX	MaPP-FX
	MPI***	MPI	**MPI*****	MPI	**MPI*****	**MPI*****	**MPI*****	MPI
	RR-D	RR-D	RR-D	RR-D	RR-D	RR-D	**RR-D*****	RR-D
	RR-FX	RR-FX	RR-FX	RR-FX	RR-FX	RR-FX	RR-FX	RR-FX
Gross Portfolio Inflows	**MaPP-Bw*****	**MaPP-Bw*****	**MaPP-Bw*****	MaPP-Bw	**MaPP-Bw*****	**MaPP-Bw*****	**MaPP-Bw*****	MaPP-Bw
	MaPP-FI	MaPP-FI	**MaPP-FI****	MaPP-FI	MaPP-FI	MaPP-FI	**MaPP-FI*****	MaPP-FI
	MaPP-D***	MaPP-D	**MaPP-D*****	MaPP-D	**MaPP-D*****	**MaPP-D****	**MaPP-D*****	MaPP-D
	MaPP-FX	**MaPP-FX****	MaPP-FX	MaPP-FX	MaPP-FX	MaPP-FX	MaPP-FX	MaPP-FX
	MPI***	**MPI*****	**MPI*****	MPI	MPI	**MPI*****	**MPI*****	MPI
	RR-D	RR-D	RR-D	RR-D	RR-D	RR-D	RR-D	RR-D
	RR-FX	RR-FX	RR-FX	RR-FX	RR-FX	RR-FX	RR-FX	RR-FX
Net Portfolio Inflows	**MaPP-Bw*****	**MaPP-Bw*****	**MaPP-Bw*****	MaPP-Bw	**MaPP-Bw*****	**MaPP-Bw*****	**MaPP-Bw*****	MaPP-Bw
	MaPP-FI**	**MaPP-FI****	MaPP-FI	MaPP-FI	MaPP-FI	**MaPP-FI****	MaPP-FI	MaPP-FI
	MaPP-D	MaPP-D	**MaPP-D*****	MaPP-D	**MaPP-D*****	**MaPP-D*****	**MaPP-D*****	MaPP-D
	MaPP-FX**	MaPP-FX	MaPP-FX	MaPP-FX	MaPP-FX	MaPP-FX	MaPP-FX	MaPP-FX
	MPI***	**MPI*****	**MPI*****	MPI	MPI	MPI	**MPI*****	MPI
	RR-D	RR-D	RR-D	RR-D	RR-D	RR-D	RR-D	RR-D
	RR-FX	RR-FX	RR-FX	RR-FX	RR-FX	RR-FX	RR-FX	**RR-FX***
Net Portfolio Debt Inflows	**MaPP-Bw*****	**MaPP-Bw*****	**MaPP-Bw*****	MaPP-Bw	**MaPP-Bw*****	**MaPP-Bw*****	**MaPP-Bw*****	MaPP-Bw
	MaPP-FI	MaPP-FI	MaPP-FI	MaPP-FI	MaPP-FI	MaPP-FI	**MaPP-FI****	MaPP-FI
	MaPP-D***	MaPP-D	**MaPP-D*****	MaPP-D	**MaPP-D*****	**MaPP-D*****	**MaPP-D*****	MaPP-D
	MaPP-FX	MaPP-FX	MaPP-FX	**MaPP-FX***	MaPP-FX	**MaPP-FX****	MaPP-FX	MaPP-FX
	MPI**	**MPI****	**MPI*****	MPI	**MPI*****	**MPI*****	**MPI*****	MPI
	RR-D	RR-D	RR-D	RR-D	RR-D	RR-D	**RR-D*****	RR-D
	RR-FX	RR-FX	RR-FX	RR-FX	RR-FX	RR-FX	RR-FX	RR-FX

Notes. This figure summarizes the results reported in Tables 7-10 and A5-A10. The category of tools are **MaPP-Bw** (borrower-based), **MaPP-FI** (financial-institutions-based), **MaPP-D** (domestic), **MaPP-FX** (FX-related), **MPI** (overall), **RR-D** (domestic-currency reserve requirement), and **RR-FX** (FX reserve requirement). ***, **, and * denote significance levels at 1%, 5%, and 10%, respectively, based on robust standard errors. A negative and statistically significant coefficient estimate (i.e. the tool that appears helpful in containing the target credit variable) is highlighted with a light green background. Not-highlighted cells correspond to insignificant coefficient estimates.

FIGURE A3: SUMMARY OF RESULTS: CAN MACROPRUDENTIAL POLICY ACTIONS HELP CONTAIN THE IMPACT OF PORTFOLIO FLOWS ON THE CREDIT CYCLES?

	Whole Period				*Recent Period*			
	Credit-to-GDP gap (long-run recursive trend)	**Credit-to-GDP gap (medium-run recursive trend)**	**Δ (Credit/GDP)**	**Credit Boom**	**Credit-to-GDP gap (long-run recursive trend)**	**Credit-to-GDP gap (medium-run recursive trend)**	**Δ (Credit/GDP)**	**Credit Boom**
Portfolio Banking Inflows	MaPP-Bw	MaPP-Bw	MaPP-Bw	MaPP-Bw	MaPP-Bw	**MaPP-Bw*** **	**MaPP-Bw*** **	**MaPP-Bw*** **
	MaPP-FI	MaPP-FI	MaPP-FI	**MaPP-FI***	**MaPP-FI***	MaPP-FI	**MaPP-FI***	MaPP-FI
	MaPP-D	MaPP-D	MaPP-D	MaPP-D	MaPP-D	**MaPP-D***	MaPP-D	**MaPP-D*** **
	MaPP-FX	MaPP-FX	MaPP-FX	MaPP-FX	MaPP-FX	MaPP-FX	MaPP-FX	**MaPP-FX*** **
	MPI	MPI	MPI	**MPI***	MPI	**MPI***	**MPI*** **	**MPI*** **
	RR-D**	**RR-D****	RR-D	**RR-D****	**RR-D****	RR-D	RR-D	**RR-D*** **
	RR-FX	RR-FX	RR-FX	**RR-FX*** **	RR-FX	RR-FX	RR-FX	**RR-FX*** **
Gross Portfolio Inflows	**MaPP-Bw***	**MaPP-Bw****	**MaPP-Bw*** **	MaPP-Bw	**MaPP-Bw*** **	**MaPP-Bw*** **	**MaPP-Bw*** **	MaPP-Bw
	MaPP-FI* **	**MaPP-FI*** **	**MaPP-FI****	MaPP-FI	**MaPP-FI*** **	**MaPP-FI***	**MaPP-FI****	MaPP-FI
	MaPP-D* **	MaPP-D	**MaPP-D*** **	MaPP-D	**MaPP-D*** **	**MaPP-D****	**MaPP-D*** **	MaPP-D
	MaPP-FX	**MaPP-FX***	**MaPP-FX***	MaPP-FX	MaPP-FX	MaPP-FX	MaPP-FX	MaPP-FX
	MPI* **	**MPI***	**MPI*** **	MPI	MPI	**MPI*** **	**MPI*** **	MPI
	RR-D* **	**RR-D*** **	**RR-D*** **	**RR-D*** **	**RR-D*** **	**RR-D*** **	**RR-D*** **	**RR-D*** **
	RR-FX	RR-FX	RR-FX	**RR-FX***	RR-FX	RR-FX	RR-FX	**RR-FX*** **
Net Portfolio Inflows	**MaPP-Bw*** **	**MaPP-Bw*** **	**MaPP-Bw*** **	MaPP-Bw	**MaPP-Bw*** **	**MaPP-Bw*** **	**MaPP-Bw*** **	MaPP-Bw
	MaPP-FI* **	**MaPP-FI*** **	**MaPP-FI*** **	MaPP-FI	MaPP-FI	**MaPP-FI***	**MaPP-FI****	MaPP-FI
	MaPP-D* **	**MaPP-D*** **	**MaPP-D*** **	MaPP-D	**MaPP-D*** **	**MaPP-D****	**MaPP-D*** **	MaPP-D
	MaPP-FX	MaPP-FX	MaPP-FX	MaPP-FX	MaPP-FX	MaPP-FX	MaPP-FX	MaPP-FX
	MPI* **	**MPI*** **	**MPI*** **	MPI	**MPI****	**MPI*** **	**MPI*** **	MPI
	RR-D* **	**RR-D*** **	**RR-D****	**RR-D*** **	**RR-D*** **	**RR-D*** **	**RR-D*** **	**RR-D*** **
	RR-FX*	**RR-FX****	RR-FX	**RR-FX*** **	RR-FX	**RR-FX***	RR-FX	**RR-FX*** **
Net Portfolio Debt Inflows	**MaPP-Bw***	MaPP-Bw	**MaPP-Bw*** **	MaPP-Bw	**MaPP-Bw*** **	**MaPP-Bw*** **	**MaPP-Bw*** **	MaPP-Bw
	MaPP-FI	MaPP-FI	MaPP-FI	MaPP-FI	MaPP-FI	MaPP-FI	MaPP-FI	MaPP-FI
	MaPP-D	MaPP-D	**MaPP-D*** **	MaPP-D	**MaPP-D***	**MaPP-D****	**MaPP-D*** **	MaPP-D
	MaPP-FX	MaPP-FX	MaPP-FX	**MaPP-FX***	MaPP-FX	MaPP-FX	MaPP-FX	MaPP-FX
	MPI	**MPI***	**MPI*** **	MPI	**MPI****	MPI	**MPI*** **	MPI
	RR-D* **	RR-D	**RR-D***	RR-D	RR-D	RR-D	RR-D	RR-D
	RR-FX	RR-FX	RR-FX	RR-FX	**RR-FX****	RR-FX	**RR-FX****	RR-FX

Notes. This figure summarizes the results reported in Tables 7-10 and Tables A5-A10. The category of tools are **MaPP-Bw** (borrower-based), **MaPP-FI** (financial-institutions-based), **MaPP-D** (domestic), **MaPP-FX** (FX-related), **MPI** (overall), **RR-D** (domestic-currency reserve requirement), and **RR-FX** (FX reserve requirement). ***, **, and * denote significance levels at 1%, 5%, and 10%, respectively, based on robust standard errors. A negative and statistically significant coefficient estimate (i.e. the tool that appears helpful in containing the sensitivity of target credit variable to portfolio flows) is highlighted with a light green background. A positive and statistically significant coefficient estimate is highlighted with a dark red background. Not-highlighted cells correspond to insignificant coefficient estimates.

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