Capital flows, credit cycles and macroprudential policy[1]

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In the wake of the Global Financial Crisis (GFC), a considerable number of countries have adopted major changes in their policy frameworks geared towards enhancing financial stability. It is now conventional wisdom that part of the surge in capital flows into emerging market economies (EMEs) was in part a side effect from unconventional policies such as quantitative easing and negative interest rates, which generated a huge amount of global liquidity, as well as low interest rates in advanced economies. These inflows, mostly in the form of portfolio inflows, have in turn led to risks associated with a massive domestic credit expansion in EMEs. These phenomena have raised concerns over potential external imbalances, as well as maturity and currency mismatches between assets and liabilities in the household and corporate sectors.

For EMEs, the major policy challenge has become how to look for the ways of decreasing the sensitivity of credit and the exchange rates to capital inflows. Given the existing global economic and financial environment, using conventional monetary policies would be associated with increased risks to financial stability, since these policies could amplify credit and exchange rate swings. In particular, raising domestic interest rates in emerging markets – aimed at slowing down domestic credit growth – could in fact lead to high capital inflows, which in turn would fuel rapid credit growth. Furthermore, high interest rates would also lead to a smaller monetary policy space needed for stabilising inflation and output. In other words, the reliance on conventional monetary policy actions in such an environment may also sharpen the trade-off between the price and financial stability.

Given these challenges, the policy framework in Turkey in the post-GFC period has mainly entailed redefining the policy objectives, devising new policy tools, and introducing new mechanisms for coordinating the policy actions across different institutions responsible for different aspects of financial stability. On the monetary policy front, the financial stability objective has been incorporated into the monetary policy framework as a secondary objective, while keeping price stability as the primary objective. This approach has also entailed enriching the policy toolkit to alleviate the trade-offs arising from having high interest rates for price stability reasons in an environment of massive and volatile capital flows. On the macroprudential policy front, the toolkit has been composed of various traditional policies, such as the use

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of loan to value ratios, risk weights on different components on credit implemented by Banking Regulation and Supervision Agency (BRSA); as well as the interest rate corridors to discourage the inflow of short-term capital and to decrease the sensitivity of the domestic credit cycle to the global liquidity cycle.

The set of policies taken for maintaining the financial stability also led to the Central Bank of the Republic of Turkey (CBRT)'s new monetary policy framework, which was adopted at the end of 2010. With this change in the policy framework, the CBRT continued to focus primarily on price stability, while incorporating financial stability as a side objective. The latter entailed decreasing the sensitivity of both the economic activity in the financial and non-financial sectors to global capital flows and risk perceptions, and reducing the risks due to maturity and currency mismatches. With the multiple policy objectives, the policy toolkit has also been revised accordingly. While the key policy tool in the setup with only price stability objective was the policy rate, the new setup has utilised a much broader set of tools such as the interest rate corridor, the liquidity policy, the policy rate and finally the reserve requirement ratio (RRR), differentiated both across maturity and the currency denomination of liabilities.

In theory, such policies work both on the upside and downside of the capital flow cycle, ie the policies can reduce systemic risk and can also mitigate the effects of a credit crunch as a result of a reversal of capital flows. To date, there has been no causal evidence on the impact of such policies on the joint response of credit supply, credit demand and investment. To put it differently, we do not know whether macroprudential policies are successful in curbing credit growth and at the same time in diminishing risk taking by firms and banks without hampering investment and growth. In fact, the empirical evidence that is based on country-level aggregate data from emerging markets show inconclusive results in terms of the effects of macroprudential policies on credit supply, output and investment (see Forbes (2014) and Forbes and Klein (2013)).

There are several identification challenges in this literature. First and foremost, any macroprudential policy that aims at curbing domestic credit growth, which is linked to foreign capital inflows, will be correlated with capital inflows since the policy is taken in response to these flows. Second, when a country imposes capital controls or macroprudential policies to curb the domestic credit growth, it also imposes other macroprudential measures. Therefore, it is hard to tease out the effect of one policy from another, and especially at the annual frequency, which is the focus of many cross-country empirical studies. Third, both capital flows and macroprudential policy (or policies) are correlated with macroeconomic and microeconomic fundamentals. Therefore, even if one finds a negative effect of a capital control policy or a loan-to-value ratio cap policy on capital flows and domestic credit growth, this does not imply causality given omitted country fundamentals, firm and bank characteristics and trends. Fourth, theoretical models point to rich micro-level heterogeneity arising from pecuniary or aggregate demand externalities. In particular, these models highlight how certain agents' risk-taking behavior will have aggregate effects (eg see Farhi and Werning (2014) and Korinek (2015)). In fact, such models' predicted design for the optimal macroprudential policy rests on this heterogeneous risk-taking. Aggregate data do not have the rich firm-, bank- and loan-level heterogeneity needed to test for heterogeneous impacts of policy. And last but not least, given country heterogeneity, one policy may work differently in different countries, and hence trying to infer the causal impact of policy from the diverse experiences of many EMEs might bias the results to finding nothing. As a result, it has thus far proved elusive to tease

out the direction of causality, and hence gauge the effectiveness of macroprudential policies on credit growth and real growth during capital inflow and outflow episodes for EMEs.

In our work, we overcome these identification challenges by using a unique administrative data set from a typical emerging market, Turkey, combined with a unique policy experiment. Turkey received capital flows on a consistent basis since 2003, with a current account deficit to GDP ratio of 8 percent on average. There have also been several macroprudential policies implemented since 2009 onward to curb domestic credit growth. We focus on certain policies that took place after June 2009. Our dataset covers the period 2003−13, and is at the loan-firm-bank-quarter level. We match loan-level data from a credit registry to firm and bank balance sheets collected by the CBRT. We work with quarterly frequencies to understand the effect of capital flows and macroprudential policy on financial outcomes such as loan growth, and then turn to the annual frequency to tease out the effects of flows and policy on firm-level investment.

Our identification strategy is composed of several building blocks. We want to identify the causal effect of capital inflows on domestic credit expansion, and then test for the effect of macroprudential policy in mitigating the risks of such an expansion. Given our loan-bank-firm-quarter level data set, we examine how global financial conditions and macroprudential policy impact credit conditions in Turkey by regressing loans and interest rates on these variables using the credit registry data. We are able to saturate all our regressions with firm-quarter fixed effects, which fully control for the direct effects of unobserved time-varying firm fundamentals (including the firm demand for credit), and also with bank-quarter fixed effects to control for the direct effects of all bank-specific factors that vary over time and affect banks' credit supply. We next run a difference-in-difference analysis before and after the macroprudential policy episode, which started in the third quarter of 2009, to see the difference in loan provision in terms of domestic currency and foreign currency loans for risky and non-risky borrowers.

Our results are as follows. First, we establish the link from global liquidity and capital flows to an increase in domestic credit provision in Turkey. Although there are several existing papers that establish this link using macro data, we are not aware of any work that links variables such as VIX and emerging market capital flows to loan growth directly using detailed micro data. Second, we show that during periods of such capital flow surges, loans in foreign currency also expand together with loans in domestic currency as part of the credit boom. Finally, we investigate the effects of the macroprudential policies on loan provision in terms of the differences between foreign and domestic currency loans before and after the policies take place in a difference-in-difference setting. We show that foreign currency borrowing declines after the policies, but not if there is a capital flow surge taking place across EMEs.

Our paper is related to several strands of the literature. Ours relates to papers that show a link between global conditions and emerging market capital flows such Forbes and Warnock (2012), Rey (2013), Bruno and Shin (2013a, 2013b, 2015), Miranda-Agrippino and Rey (2014) and McCauley et al (2015). This literature focuses on the global financial conditions that are significantly influenced by the stance of US monetary policy. Both credit booms and busts in EMEs can be driven by global capital flows which, in turn, are affected by global liquidity and US interest rates. In the light of a possible monetary policy normalisation in advanced countries, a possible tightening in the financial conditions in the international markets can create

spillover effects, according to this literature, where capital leaves the EMEs and/or cost of borrowing increases substantially for these economies (eg, see Fratzscher et al (2013), Chen et al (2015) and Sobrun and Turner (2015)). At the same time, a dollar appreciation will increase the value of dollar debt and the real burden of dollar-denominated debt will increase in EMEs in such a case (See Shin (2013) and BIS (2015)).

Finally, our paper contributes to the literature on the real effects of the credit supply and demand shocks by investigating the firms' investment outcomes. There are only very few papers that analyse the real effects of credit supply and/or credit demand shocks by matching credit register data with precise firm-level information. For example, in a very recent paper using Italian credit registry data, Cingano, Manaresi and Sette (2013) exploit the dramatic liquidity drought in the interbank markets following the 2007 financial crisis and find important effects of credit shocks to banks on firm investments through the bank lending channel. Paravisini, Rappoport, Schnabl and Wolfenzon (2014) use Peruvian credit register data to show how the banking crisis negatively affects trade via a credit supply reduction, while Chodorow-Reich (2014) exploits US syndicated loan-level data to show that the financial crisis negatively affected employment of firms via a reduction of credit availability through their banks – he finds large effects. However, for Spain, Jimenez, Mian, Peydro and Saurina (2015) and Jimenez, Ongena, Peydro and Saurina (2015) use Spanish credit registry data and find insignificant real effects of credit supply booms in terms of employment.

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