Macroprudential regulation: history, theory and policy

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1. Introduction

The great depression of 1929 led to the emergence of macroeconomics as a separate branch of economics, to better understand how the whole economy functions. This time, in the wake of the global financial crisis (GFC) of 2008-9 the macroprudential regulation approach to financial regulation, in a similar fashion, has emerged – or, more accurately perhaps, re-emerged – as a new discipline, aiming at mitigating the risk of the financial system as a whole (or "systemic risk"). In its Washington "Declaration of the summit on financial markets and the world economy" on 15 November 2008, the G20 initiated overhauling "reforms that [have] strengthened financial markets and regulatory regimes so as to avoid future crises" and underscored the importance of macroprudential policies in this regard.

Macroprudential policy has thus become an overarching public policy in achieving financial stability across the world. This new perspective has generated profound changes and impacts on our understanding of how the whole economy functions when the effects of financial policies and actions are taken into account, the role of monetary policy in the presence of macroprudential policies and the institutional framework for an optimal policy coordination and cooperation between monetary, fiscal and prudential policies. The macroprudential perspective revolutionised the establishment of the Financial Stability Board (FSB) and the reorientation of the existing IOs to extend their surveillance functions to include global and national financial stability, and the construction of aggregated financial stability indicators on systemic risk, stress-testing and etc. The latter resembles the formation of aggregated indicators such as GDP, unemployment rates, national income and price indices, some of which regarded as the great inventions of the twentieth century.

Since the inception of the GFC, there have been a lot of new works that improve our understanding macroprudential regulation with respect to indicators of systemic risk including the time dimension of risk and the cross-sectional dimension of risk, institutional underpinnings and international policy coordination, the effectiveness of macroprudential policy tools. Numerous reports, policy papers, discussion papers and academic papers on macroprudential regulation have been produced and their findings and conclusions have been discussed in many conferences and meetings across the world. However, macroprudential regulation is still very much work in progress. With this in mind, on 26-27 October 2015 the Central Bank of the Republic of Turkey (CBRT) together with the International Monetary Fund (IMF) and the Bank for International Settlements (BIS) organised a joint conference with the title of "Macroprudential Policy: Effectiveness and Implementation Challenges." As the title

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suggests participants from different parts of the world and with different institutional affiliations including academia, central banks and international organisations discussed the factors affecting the implementation of macroprudential policies across both advanced economies (AEs) and emerging market economies (EMEs). The factors covered in the conference included macroprudential policy's interaction with monetary and fiscal policies, its links with microprudential regulation, external shocks such capital flows, spillover effects of macroprudential policy tools and institutional frameworks. Sessions on "country experiences with macroprudential policies" in turn provided the practical solutions adopted by both AEs and EMEs in designing and implementing effective macroprudential policies in the presence of these factors and other factors.

This short paper provides an introduction to the historical and theoretical aspects of macroprudential regulation in order to shed insight on effective macroprudentional policies. The section on macroprudential policies attempts to use this insight in the discussion of the state of play in macroprudential policy tools.

2. The history of macroprudential regulation

Although the term 'macroprudential' dates from the 1970s, and the global adoption of the macroprudential policies is more recent, the underlying approach has a long history. It began decades ago in the advanced economies and later in the emerging market economics faced with excessive capital inflows. The United States was probably the first country that implemented macroprudential policies to control credit growth in aggregate or in a major economic sector such as housing.[2] This history is of interest, especially given the neglect by major central banks of the advanced economies in subsequent decades of credit aggregates.

The objectives of these early US macroprudential policies included not only achieving financial stability but also achieving smoother economic and financial cycles, price stability as well as specific industrial policies. Table 1 reports the policies implemented by the Federal Reserve and other agencies under the classification of tools that operate on the demand for credit, such as limits on loan-to-value ratios and loan maturities, and those that operate on the supply of credit, such as limits on deposit rates (and therefore the supply of funds to lend), limits on lending rates, restrictions on banks portfolios, reserve requirements, capital requirements, and supervisory pressure. Among these measures the reserve requirement policy is worth noting as it is used to control not only general credit growth through required reserves on liabilities but also selective credit through changing the credit portfolio allocation of the banking sector at the expense of consumer credit with asset based required reserves. In addition, they are even extended to money markets funds.

Over almost a century until the 1990s, the United States utilised the measures reported in Table 1 to ease as well as tighten credit conditions over numerous episodes. The US experience suggests that tightening policies were effective to a great extent contrary to largely ineffective easing macroprudential policy measures. However, the effectiveness of macroprudential policy in general has over time greatly

[2] The US history of macroprudential policies is largely based on the work of Elliott, Feldberg and Andreas Lehnert (2013).

diminished in line with the fundamentally changed US financial system with results of credit activity tending to shift to unregulated lenders, the administration of controls demanding a substantial bureaucracy, rule-making authority and enforcement mechanisms, and distortions in resource allocation and inefficiencies. Their efficiency too wilted as the costs have become quite sizable to the extent that they were implemented over a long period of time.

The history of cyclical macroprudential policy in the United States: tools to control credit growth

Table 1

Tools affecting demand for credit	Tools affecting supply of credit
Loan-to-value ratios	Lending rate ceilings
Margin requirements	Interest rate ceilings
Loan maturities	Reserve requirements
Tax policy and incentives	Capital requirements
	Portfolio restrictions
	Supervisory pressure

Note: This Table is taken from Elliott, Feldberg, and Andreas Lehnert (2013).

Country experiences with macroprudential policy are not limited to the United States.[3] Large numbers of European economies in post-World War II era also resorted to macroprudential policy measures as they were mostly in economic boom regimes and interest rate policies were constrained by capital inflows and fiscal policy pressures associated with higher public debt levels. EMEs too had a great deal of macroprudential policy experiences in the wake of their financial crises in the 1990s. Most EMEs implemented numerous macroprudential policy measures to mitigate the systemic risks caused by the excessive capital inflows to their countries in the 2000s. The macroprudential policies implemented in Europe fall into three main categories: credit control instruments, liquidity and reserve requirements, and recommendations to the banking sector. Discretionary as well as broad-based rediscount ceilings and constraints on credit expansion were used not only to prevent financial bubbles but also to fine tune economies in stabilising inflationary pressures. The direct limits on credit expansion was the most contentious policy across Europe. The policy lasted from the 1950s towards end of the 1970s. The only country never to make use of it was the Federal Republic of Germany. Regulating the liquidity ratios of banks were designed to channel resources towards specific sectors of the economy and encourage the issuance of medium and long term loans. In the 1960s European countries increasingly moved to reserve requirements at the back of the successful case of the Bundesbank in the 1950s. European central banks also made recommendations such as liquidity and solvency ratios to banks by exploiting their supervisory and lender of the last resort roles. In some cases such as France and Italy there were specifically established institutions in the form of national credit councils to make the recommendations.

[3] Brunnermeier and Schnabel (2015) provides a detailed historical perspectives on the policies, including macroprudential measures, implemented by central banks across the world while Monnet (2014) and Kelber, Monnet, et al (2014) focus specially on the European experience with macroprudential policies.

Germany followed a different path and implemented capital flow management (CFM) measures including capital controls as well as macroprudential policies such as credit controls to limit the credit extension of German banks. This policy mix was Germany's response to large speculative capital inflows during the 1960s and early 1970s with an aim to preserve the foreign exchange value of the mark. The CFM toolkit includes several measures including a non-interest-bearing reserve requirement ratio of 100% on foreign currency denominated deposits and constraining the issuances of DM obligations in external bond and international money markets by domestic residents as well as by foreigners in German capital markets. In addition, there were strict regulations on bond issuances with a complete prohibition of floating rate, zero-coupon and FX-linked bond issuances. In this respect, to avoid leakages in the system even interest rate swaps were prohibited.[4]

In response to their respective financial crises in the 1980s and the 1990s, EMEs constructed numerous macroprudential policy and CFM measures as they faced excessive capital inflows during the great moderation era.[5] During both episodes, many EMEs experienced capital flows fuelled by rapid credit growth and sizeable real effective exchange rate misalignments. And their problems were exacerbated by strong domestic demand for credit. Several EMEs are currently in a comparable situation to that of Germany in the 1960s and early 1970s, in particular in terms of the state of development of their financial markets.

The origin of the term macroprudential can be traced back to unpublished documents prepared in the late 1970s by the BIS and the Bank of England. During this period, the term generally denoted a systemic orientation of regulation and supervision linked to the macroeconomy. Public references to macroprudential policy surfaced only in the 1980s. In 1986 the BIS discussed it as a policy aimed at supporting the safety and soundness of the financial system as a whole, as well as payments mechanism. In the early 2000s, following the widespread use of macroprudential policies in the EM world and growing concerns about financial stability in AEs the notion of a macroprudential approach to regulation and supervision received new impetus in BIS meetings and speeches (Clement 2010). The use of the term macroprudential has become much more common in the wake of the GFC and the establishment of effective macroprudential policy framework has become one of the prime objectives of the G20, EU, IMF and other structures.[6]

[4] German monetary history in the second half of the Twentieth Century provides an excellent case on the appropriate policies to capital flow shocks. See the works of Hetzel (2002a, 2002b) as well as Neumann (1986) for a comprehensive account of German monetary policy and its interactions with macroprudential regulation.

[5] Of course, EMEs again lately experienced excessive capital inflows during the Fed's quantitative easing episode of 2010-2013 and still suffer from the volatile impacts of the unconventional monetary policies in AEs and the ongoing quantitative easing by the ECB and Bank of Japan.

[6] See the FSB, IMF and BIS prepared 2011 Macroprudential Policy Tools and Frameworks Progress Report to G20 for an early but a comprehensive assessment of the state of play in macroprudential regulation.

3. The theoretical foundations of macroprudential regulation

The rationale for macroprudential regulation stems from the negative externalities from limited liability, limited enforcement and asymmetric information. Agents endowed with limited liability, limited enforcement and asymmetric information find it in their private interest to propagate risks through increasing leverage, expanding balance sheets and relying on short-term liquidity. Operating in an interconnected system the financial system further propagates the systemic risk. Because of strategic complementarities – where an action chosen by an agent strengthens the incentives of other agents act in the same way – financial intermediaries also choose to correlate their risk. Furthermore, fire-sales by some financial firms spillover, and adversely affect the balance sheet of others. These externalities are respectively called interconnectedness externalities, strategic complementarities and pecuniary externalities.[7] Agents do not internalise these externalities on other agents and the economy as a whole. Macroprudential regulation is then justified to the extent that the social, and overall, costs of market failures (such as a financial crisis) due to these externalities exceed both the private costs of failure and the extra costs of regulation.[8]

A pecuniary externality is related to fire sales which typically arise in down-turns. They occur when the sale of an asset by a troubled financial institution reduces the price of similar assets because of the also troubled nature of potential buyers in times of heightened financial volatility. The sale price of this asset falls below its fundamental value, causing losses to the seller. Similarly, fire sales also may depress the prices of similar assets held by other agents. In a frictionless world, such losses affect the distribution of wealth among agents, but entail no welfare losses. However, when markets are incomplete, pecuniary externalities can have real welfare effects. The existence of the fundamental market inefficiencies such as limited liability, asymmetric information and limited enforcement is the source of endogenous risk. In this case, asymmetric information or limited enforcement induces lenders to demand collateral from borrowers, which limits the amount of debt to the value of their collateral. A shock that causes agents to sell assets can lead to a deterioration of collateral values. As a consequence, borrowers become more credit constrained and some profitable investments will not be carried out; the real economy suffers a loss.

Fire sales related externality can be quite acute for banks because of their business model of liquidity, maturity and credit transformation. In downturn, given their mostly liquid liabilities as opposed to illiquid assets banks are exposed to the risk of having to liquidate assets prematurely in case of a sudden withdrawal of deposits or whole sale funding. Excessive reliance on short-term and mostly noncore

[7] In addition, recent papers on macroprudential regulation also identify another source of externality which does not rely on the existence of incomplete market: aggregate demand externalities [Farhi and Werning (2013) and Korinek and Simsek (2014)]. Relying on the situations with nominal price and wage rigidities and macroeconomic stabilisation constraints in the form of a zero lower bound for monetary policy they justify financial market interventions to correct aggregate demand externality due to household deleveraging.

[8] This section is largely depends on the excellent work by De Nicoló, Favara, and Ratnovski (2012). I have also utilised Borchgrevink, Ellingsrud and Hansen (2014) and (Brunnermeier, Crockett, Goodhart, Persaud, and Shin 2009) to a great extent in writing this section.

(wholesale) debt often exacerbates this fire sale problem. The heart of the matter is that banks fail to internalise the fire sale related general equilibrium effects of their liquid and short-term funding while they enjoy the benefits from cheap debt financing. On the other hand, this ex-post fire sale problem that the financial sector in particular and the economy in general face in downturns is mostly the result of over-borrowing taking place in booms which is again related to the fact that agents do not internalise the adverse general equilibrium effects of their borrowings. As a result, the economy faces too much debt compared to the social optimum.

The second type of externality is interconnectedness externalities which stem from the interconnected nature of the financial sector business, especially the banking sector. The banking business, for example, makes banks portfolios correlated and balance sheets interlinked. Even an idiosyncratic shock hitting just a single bank is then likely to hit the whole banking sector. In particular, interbank exposures of banks aggravate this interconnectedness externality. Of course, shocks hitting to systemically important financial institutions (SIFIs) will likely to generate much larger externalities, since they are complex, operate internationally, and play a role as backbones of the financial infrastructure. Again, to the extent that financial intermediaries do not take into account the effects of their actions on the risk in other institutions and the financial system as a whole, interconnectedness externalities can lead to financial instabilities by excessively exposing the financial system to shocks and contagion.

Externalities related to strategic complementarities, that arise from the strategic interactions of banks and other financial institutions and agents, cause the build-up of vulnerabilities during the boom phase of a financial cycle and the magnification of vulnerabilities in downturns. Strategic complementarities are present when the agents mutually reinforce one another. There are several sources of strategic complementarities. The classic one is bank runs of the Diamond-Dybvig banking model. Depositors withdraw cash from their bank accounts in expectation of deposit withdrawals by other depositors. In the presence of interconnected externalities even a bank run on one troubled bank have the potential to lead to a complete shut-down of the financial system because of similar runs on other banks if depositors expect the other banks to be in similar difficulties. There are various sources of complementarities such as increased competition in boom times among banks, implicit government guaranties provided to banks and etc. They can generate excessive risk taking through asset communality. Having exposed to the same type of risk and the same quality of portfolios financial intermediaries also find these vulnerabilities deepened and leading to the downside of a financial cycle.

4. Macroprudential policies

In the lights of the recent developments, financial stability has become one of the key policy objectives and its policy instrument is macroprudential policy along with microprudential regulation. However, developing macroprudential policies is a work in progress since there are number of issues related to the use of macroprudential

policies.[9] It starts with developing metrics for financial stability or systemic risk. Such metrics should incorporate: (i) the growth in total credit and macroeconomic drivers of imbalances; (ii) financial between each sector and the rest of the world; and (iii) the structure of the financial system and linkages within and across key classes of intermediaries and market infrastructures. The scope of systemic risk necessitates several measures as opposed to a single metric[10] and requires the use of market intelligence and soft supervisory information on trends and market developments as well as supervisory and statistical data. In this regard, it is worth noting that this underscores the significance of the G20 Data Gaps initiative with a set of 20 recommendations on the enhancement of economics and financial statistics in closing data and information gaps.

Once metrics of systemic risk have been established, there are other points need to be taken account in order to identify effective macroprudential policy measures to mitigate systemic risk and financial vulnerabilities. They include the goals and scope of macroprudential policy, the existence of a strong supervisory and enforcement system, the support of appropriate monetary, fiscal and other financial sector policies, a well-constructed macroprudential toolkit and the strong institutional and governance frameworks.[11] This process of identifying measures and constructing a policy and institutional framework for a successful implementation of macroprudential policy is also a difficult task to accomplish as macroprudential policies interact strongly with other economic policies including macroeconomic policies and CFM measures. In this process, policy makers also have to pay attention to the spillover effects of macroprudential policies in foreign jurisdictions on their domestic economies. The recent research finds that the level of financial market development is a key determinant for an effective macroprudential policy framework. Indeed, the successful implementation of macroprudential policies for the world as a whole needs to take into account cross-border implications of macroprudential policies as well. This calls for international coordination.

To introduce economic rationale into the discussion of macroprudential policy and to assess the effectiveness of macroprudential policies, one can view macroprudential policy as a tool to correct externalities that create systemic risk or financial instability. Specifically, this approach maps externalities related to strategic complementarities, fire sales and interconnectedness with the following macroprudential policy proposals: capital instruments, liquidity instruments and credit instruments, taxation and resolution procedures. Capital-related instruments

[9] On the one hand, academic papers are making progresses in their analysis of macroprudential regulation issues. On the other hand, international organisations, namely the IMF, BIS, FSB, WB and OECD have produced several official and staff written papers on the topic. For example, as part of its surveillance function the IMF has produced policy papers on macroprudential regulation: see (IMF 2013).

[10] The Macroeconomic Imbalance Procedure of the European Union is an exemplary mechanism with a scoreboard of indicators to identify potential risks early on. See "European Parliament, 2011a. Regulation (EU) no 1174/2011 of the European Parliament and of the Council of 16 November 2011" and "European Parliament. 2011b. Regulations (EU) no 1173-1177/2011 and Council Directive 2011/85/EU."

[11] For a book level discussion of these topics see Freixas, Laeven, and Peydro (2015). For an article level but still comprehensive treatment of macroprudential policy tools see (Claessens 2014).

include countercyclical capital requirements including dynamic provisioning, leverage ratios, and restrictions on profit distribution.[12]

Liquidity instruments include limits on maturity mismatch and reserve requirements. Credit instruments include restrictions on bank activities, assets and liabilities such as caps on loan-to-value (LTV) ratios, caps on debt-to-income (DTI) ratios, and ceilings on credit or credit growth.

Externalities and macroprudential policies Table 2

Externalities due to	*Can be addressed by*				
	Capital instruments	Liquidity instruments	Capital instruments	Liquidity instruments	Resolution mechanism
Strategic complementarities	X		X		
Fire sales	X	X		X	
Interconnectedness	X		X	X	X

Note: This Table is a slightly modified version of Table 1 in De Nicolo´, Favara, and Ratnovski (2012).

As depicted in Table 2 there are two types of policies used to correct externalities related to strategic complementarities: countercyclical capital requirements (surcharges) and restrictions on bank asset allocation. The Basel III accords capital surcharges on excessive aggregate loan growth are introduced to mitigate excessive risk-taking during credit expansions, inducing banks to internalise more of the cost of engaging in risky lending. Basel III also introduced sector specific capital requirements in order to control exposures to specific assets, such as real estate loans. On top of capital requirement tools which target supply of credit several countries have also introduced tools targeting demand for credit. They include caps to loan-to-value (LTV) and debt-to-income (DTI) ratios and are meant to address undesirable procyclicality in lending standards: lax during boom times and tight during downturns. These quantity restrictions together with sector specific capital requirements are aimed at preventing banks from taking large risk exposures. To the extent that these tools limit asset growth in the upturn of the credit cycle the cost associated with adjustments in downturns will be lower than otherwise.

Countercyclical capital buffers of Basel III are also corrective measures for pecuniary externalities, ie externalities related to fire sales as they aim at inducing banks to internalise the ex-post general equilibrium effects of their excessive and/or risky lending in normal times. Setting higher time-varying capital requirements in upturns lessens these externalities, by reducing the incentives for risk-taking in booms. In addition, having higher levels of capital serves as a buffer to offset losses and hence reduces the risk of selling assets at fire sale prices in downturns. Likewise, Basel III uses liquidity requirements (such as the liquidity coverage ratio and the net stable funding ratio) to ensure banks have adequate liquidity buffers when bank funding markets are disrupted. A related way to limit the use of noncore funding is to rely on taxes (a levy) calibrated to the cost difference between core and non-core funding as well as long- and short-term funding.

[12] Broader interpretations of macroprudential policy measures also consider the traditional flat capital requirement as policy instruments. The claim is that higher flat capital requirements weaken the problems caused by limited liability, thus decreasing the likelihood of fire sales, credit crunches, flights to quality, and asset commonalities [Basso and Costain (2016)].

As for corrective measures for interconnectedness externalities, there are four regulatory tools reported in Table 2. Resolution procedures for global systemically important banks (GSIBs) are a more obvious and specific measure. For example, the G20 instigated total loss-absorbing capacity (TLAC) standard is designed so that failing GSIBs will have sufficient loss-absorbing and recapitalisation capacity available in resolution for authorities to implement an orderly resolution that minimises impacts on financial stability, maintains the continuity of critical functions, and avoids exposing public funds to loss. With this better and faster resolution of banking crises the ultimate aim is to mitigate potential spillovers through the banking network. In this regard, capital surcharges linked to a measure of systemic importance introduced in 2011 by the BIS aim to require the firms themselves to bear the costs that their failure would impose on others. Interconnectedness is intrinsic to payments and securities systems and therefore a framework to oversee these markets systems is needed to decrease systemic risk.

In addition, there are also restrictions on the asset composition of GSIBs imposed in some countries. These restrictions are intended to reduce GSIBs' risky activities by limiting their proprietary trading activities. As for taxes, Pigouvian taxes, based on a measure of systemic risk externalities, can be also used to reduce systemic risk by forcing GSIBs to internalise the systemic risk they create.

5. The "Macroprudential policy: effectiveness and implementation challenges" conference

The first session of the conference was on "Macroprudential Policy and its Interactions with Other Policies" and all the three papers presented in this session appear in the conference volume. Luc Laeven's presentation on "Policies for Macrofinancial Stability: How to Deal with Credit Booms?" empirically examines the triggers of credit booms and importantly explores the types of credit booms ending up busts. In particular, the paper considers the role of monetary, macroprudential, and other policies in curbing credit growth and mitigating associated risks, including the fallout on the real economy from credit busts. The paper concludes that credit booms are associated with financial liberalization, buoyant economic growth, fixed exchange rate regimes, weak banking supervision and loose macroeconomic policies. His findings also establish that not all credit booms are bad, with only one-in-three booms ending up in crises, and that it is difficult to identify bad booms as they emerge. Unlike monetary and fiscal policies, he argues, macroprudential policies can be effective in containing booms and in limiting the consequences of busts. But circumvention of these macroprudential policies can undermine their effectiveness. In addition, monetary policy should act first and foremost when credit booms coincide with periods of a general overheating in the economy,

In a similar vein, the paper on "Credit cycles and capital flows: effectiveness of macroprudential policy framework in emerging countries" by Ahmet Faruk Aysan, Salih Fendoğlu, Mustafa Kılınç and Sümeyye Yıldız construct macroprudential policy index for a variety of macroprudential tools in order to evaluate the effectiveness of macroprudential tools from the perspective of emerging countries. Their identify empirically effective macroprudential policies that help cushion the economy from volatile capital flows. They also consider interactions among the tools and their unintended consequences. Overall, the findings of the paper support the use of

macroprudential policy measures in supporting macrofinancial stability in emerging countries: macroprudential tools targeting demand for credit (borrower-based measures) and domestic measures are successful in containing real credit growth where tools affecting supply of credit (financial-institutions-based measures) are effective in reducing sensitivity of credit growth to cross-border capital flows.

The recent experience with macroprudential policy measures across the world has coincided with the implementation of unconventional monetary policies in advanced economies and unorthodox policies in emerging economies. Exploring interactions between monetary policy and macroprudential regulation is therefore important. Erlend Nier's paper on "Monetary and macroprudential policies: exploring interactions" provides a concise analytical discussion and empirical examination of this issue. The Nier work identifies three areas in which monetary and macroprudential policies interact: (i) the impact of a range of "side effects" of monetary policy on financial stability; (ii) dampening "side effects" of macroprudential policy on output; and (iii) macroprudential policy can build buffers that can be relaxed in periods of financial stress. He then, based on his empirical analysis, correspondingly provides factors and conditions on: (i) how macroprudential policy contain monetary side effects effectively; (ii) how strong the side effects of macroprudential policy on output are; and (iii) how effective can be a relaxation of buffers in periods of stress. His final interest is to offer implications for the institutional set-up.

Spillover effects of macroprudential policy tools were covered in Session 2 and there were three presentations which will all appear in the conference volume. The paper by Bálint Horváth and Wolf Wagner on "Macroprudential policies and the Lucas Critique" reminds us that there may be unintended consequences of the implementation of new policies such as the recent macroprudential regulation. Their result is rooted in the Lucas Critique and accordingly highlights the importance of financial intermediaries' reactions to this new modified financial architecture. The paper discusses several areas in which such adjustment behaviour is likely and derive suggestions for how macroprudential policies can be improved to limit such problems. They recommend that regulators should pay more attention to the dynamic implications of new macroprudential instruments.

The second paper of this session was "Cross-border spillovers from macroprudential policy in the euro area" by Luca Nocciola and Dawid Zóchowski. Their study aims at uncovering and measuring cross-border effects of macroprudential regulation in the euro area using a large global banking data set on cross-border banking flows. Their results underscore the importance of cross-border spillovers on loan growth but also highlight that the sign and the magnitude of the spillovers depend on the ownership structure of the bank; the type of instrument; how the policy stance is measured; the timing of implementation; and the bank balance sheet and country characteristics. They conclude that their findings speak for stronger reciprocity arrangements in order to mitigate leakages.

The work of Kristin Forbes, Dennis Reinhardt and Tomasz Wieladek on "The spillovers, interactions, and (un)intended consequences of monetary and regulatory policies" takes an advanced, financial centre economy (the United Kingdom) perspective on regulation in the presence of unconventional monetary policy and tries to answer whether their possible interactions have been a factor behind the recent "deglobalisation" in cross-border bank lending or not. Their result suggest that the use of microprudential capital requirements tend to reduce international bank lending. Also, the Funding for Lending Scheme to revive domestic credit growth

significantly amplified the effects of increased capital requirements on external lending. This paper highlights the unintended consequences of domestic policies as it finds that unconventional monetary policy designed to support domestic lending can have an adverse impact on the foreign lending of banks in the United Kingdom.

In the third session, presenters discussed the impact of external shocks on macroprudential policies. Philip Turner chaired the session and afterwards extended his introductory remarks to a short paper under the title "External shocks, the exchange rate and macroprudential policy" for the conference volume. The paper discusses the exchange rate and the interest rate on local currency bonds and stresses that they are key endogenous variables in the transmission of external shocks (financial and real) to small open economies. He concludes that analyses of macroprudential policy choices need to have a convincing "story" for both variables.

The paper "Capital flows, credit cycle and investment: the role of macroprudential policy" by Yusuf Soner Başkaya, Julian di Giovanni, Sebne Kalemli-Özcan, José-Luis Peydró and Mehmet Fatih Ulu analyse the impact of external factors such as capital flows and changes in global risk premia on loan growth in Turkey by taking into account all firm-time and bank-time factors. The paper considers loans in different currencies and borrowers as exporters versus non-exporters. In this large framework, the main question is the effectiveness of macroprudential policies on loan growth in different currencies and the impact of capital flows on firm-level real outcomes such as investment. The richness of the paper allows a better analysis of the transmission channels of capital flows and policies. Their main finding is that macroprudential policies decrease the sensitivity of domestic loan growth to capital flow cycle, both total loans and FX loans.

The second presentation of the session by José-Luis Peydró focussed on a comprehensive analysis of macroprudential policies during credit and asset cycles by providing evidence from some countries. He explained the theory and practice of credit and asset cycles and corresponding macroprudential policies as covered in his co-authored book (Freixas, Laeven and Peydró, 2015). His joint work on Spanish dynamic provisioning experiments highlights the role countercyclical bank capital buffers on credit supply (Jiménez, Ongena, Peydró and Saurina Salas, 2012). He also examines macroprudential regulation by modelling credit supply by banks together with their securities trades (Abbassi, Iyer, Peydró and Tous 2016).

The session's last presentation was by Franz Hamann on "Monetary and macroprudential policies in an oil-exporting economy". Hamann discussed monetary and macroprudential policies in an oil-exporting economy like Columbia which is subject to large, sudden and persistent commodity price swings. Using a small open DSGE framework, it is argued that efficient credit allocation between tradable and nontradable sectors is disturbed by sectoral financial frictions. The paper points out an interesting result: general purpose macro- prudential policy, ie policies targeting aggregate credit, may amplify these inefficiencies.

On the first "country experiences" session, the Governor of the Central Bank Croatia, Boris Vujčić, provided an authoritative account of "managing systemic risk in the Croatian economy". Croatia experienced excessive capital inflows in the pre-GFC period which coincided with financial liberalisation and investors' exuberance. These developments fuelled strong credit growth in foreign currency as well as domestic currency and led to a rapid accumulation of external imbalances. The authorities in Croatia respond decisively and timely to this sharp deterioration in the two robust crisis predictors, namely domestic credit growth and real currency appreciation by

introducing the then very unconventional set of policies including macroprudential regulation and marginal reserve requirements with significant successes in moderating banks' credit growth and curbing banks' foreign indebtedness. Accumulated buffers during the pre-crisis period were also effectively used to support the Croatian Economy during the downturn after the GFC in a countercyclical fashion.

Santiago García-Verdú presented his joint paper titled "Macroprudential policy regulation: continuing challenges" with Manuel Ramos-Francia which analyses the externalities created by global asset management companies due to run-like dynamics in their investment decisions. It is potentially a systemic risk mainly affecting emerging market economies and as such a continuing macroprudential policy regulation challenge. They find evidence of the presence of run-like dynamics in bond flows to and from EMEs. They also find that changes in US monetary policy affect such dynamics, and that the strength of such effects could have increased since 2013.

Session five focused on the interaction between cyclical and prudential risks. The pressing matter with macroprudential regulation is to understand and improve the effectiveness of macroprudential policy tools. Empirical work on macroprudential policy is still at early stage and often relies on aggregate data to draw policy conclusions. In this regard, the paper by Eugenio Cerutti, Stijn Claessens and Luc Laeven attempts to provide new evidence on the use and effectiveness of macroprudential policies. They investigate the effects of macroprudential policies on procyclicality. In particular, their paper tries to answer the question 'how do macroprudential policies affect credit growth and house prices?' and identity effective instruments. Claessens claimed that microprudential rules (eg higher capital requirements) can create some procyclicality, and that macroprudential policies could correct these. He also highlighted the pattern observed in several country cases that quantitative macroprudential measures tend to become less effective as real incomes rise.

The work of Yusuf Soner Başkaya, Turalay Kenç, Ilhyock Shim and Philip Turner takes the effectiveness analysis to financial development and analyses the impact of different levels of financial development on the effectiveness of macroprudential policies more precisely in terms of quantity-based and price-based macroprudential policy measures. They show that the stage of financial development is a key determinant in the choice between quantity and price based macroprudential policy measures. Given the coimplementation of capital flow management measures and macroprudential policy measures (especially by emerging market economies) and the potential interactions between them, their work also examine their interactions and impacts on the effectiveness of price-based and quantity-based macroprudential measures.

The second "country experiences" session is chaired by Erlend Nier. In the paper titled "housing market dynamics and macroprudential policy tools: the UK's recent experience" David Aikman elaborates the design and implementation of sectoral macroprudential policy tools on the UK housing market in the presence of strong and rising house price inflation. Such case studies are important as real estate lending booms are typically followed by deeper recessions and slower recoveries. In the UK case, the authorities use the capital-based tools (affecting supply of credit) – countercyclical buffer and sectoral risk weights – and the product-based tools (affecting demand for credit) – LTV and DTI ratios to slow down house price inflation. The paper provides some early evidence on the effectiveness of this policy initiated in 2014 and finds that the share of lending with LTI > 4.5 was 1% point lower by

end-2014. The paper by Dong He, Erlend Nier, and Heedon Kang also looks into the effectiveness of macroprudential policy measures in addressing housing sector risks.

With a similar purpose to the Başkaya, di Giovanni, Kalemli-Özcan, Peydró and Ulu paper discussed above (but using a different approach), Hara Kara also discusses the effectiveness of the macroprudential policies implemented in Turkey in the wake of GFC on curbing rapid loan growth in general and consumer loan growth in particular. Based on economic and financial developments he concludes that macroprudential policies in Turkey have brought about a soft landing and improved sustained growth prospects by lowering the sensitivity of economic activity to capital flow volatility considerably.

David Hargreaves provided an empirical analysis of the macroprudential policy experiment of New Zealand over the last five years. His reflections on the role of macroprudential policy based on New Zealand experience include: (i) that cyclical macroprudential policy is complicated, and is no substitute for striving for the appropriate permanent policy settings; (ii) that the potential relationship between monetary and macroprudential policy in recent years is complicated; and (iii) that very low interest rates in major advanced economies can be detrimental to financial stability in both advanced and emerging market economies.

In the penultimate session on "Microprudential and macroprudential links and policy frameworks", Jean-Pierre Landau provided an ex-policymaker's account of macroprudential policy effectiveness. His presentation raised several questions on this issue. Focusing on maturity transformation he highlighted areas where macroprudential policy measures may lead to ineffective outcomes. In her presentation on "key elements of an institutional framework for macroprudential policy", Inci Ötker-Robe underscores the risks of macroprudential policy inaction and too much action due to the lack of clear assignment of power mandate responsibilities. A strong and effective institutional framework is there- fore essential to reduce these two risks by clarifying the objectives and assigning the macroprudential policy mandate to ensure timely/forceful/appropriate policy action. In particular, it is essential is to guard against political/industry pressures to delay action, to provide legal foundation for using macroprudential policy and to help ensure macroprudential policy is not used beyond its call of duty. The existence of several different institutional frameworks indicates the case of no one-size-fits-all as they mostly reflect specific circumstances of the countries in terms of their history, legal environment, resources, size/complexity of financial systems. But there are some common desirable elements including a major role for the central bank and the importance of government participation.

The concluding session was a policy panel, chaired by Luiz Pereira da Silva, Deputy General Manager of the BIS. Otaviano Canuto said that the effectiveness of macroprudential policies depended on specific circumstances (Agénor and da Silva (2014)). He echoed the view expressed by some speakers that macroprudential policies tended to work better in booms, but in recessions monetary policy had to be used. For emerging markets, capital flows/commodity price swings played key roles. Because there is no one-size-fits-all, we are unlikely to develop a framework for macroprudential policy as standardised as that which had emerged for monetary policy.

Athanasios Orphanides worried about the uncertainty (which model? what transmission mechanism?) which bedevilled macroprudential policy. He did not agree that such uncertainty justified greater discretion in policy because the "temptation to

find the optimal decision at every single step" as economic conditions evolved ran the risk of dynamic inconsistency. As with monetary policy, he said, the need is for simple rules that can be explained to Ministers or the public. But most others did not believe simple standardisation would be either feasible or desirable. Uniform prudential standards set too high could lead to serious welfare losses – targeted policies are more efficient.

Turalay Kenç reminded everybody that what we now call macroprudential policies (eg reserve requirements) had been used also in the United States and other advanced economies before the 1980s. The subsequent neglect by advanced economy central banks of credit aggregates had been a mistake. One participant asked the panel whether central banks were not converging to a new world of very low interest rates if most of them chose to tighten macroprudential policy rather than monetary policy because of fear of exchange rate appreciation/volatility.

He Dong (IMF) said the IMF encouraged members to experiment with different macroprudential tools, and adapt policy pragmatically. He wondered whether there was a case for relaxing macroprudential policies in EMEs facing heavy capital outflows. The IMF would analyse the boundaries of such policies, notably considering how to apply them to asset management companies.

Luiz Pereira da Silva warned that macroprudential tools were not silver bullets that would solve complex financial stability issues – but had to be complemented by aggregate demand policies. Capital flows had an impact on the domestic cycle, influenced local financial conditions and created forex risks. He said that policy response to large and persistent movements in capital flows and exchange rates was high on the BIS agenda. Recent BIS research had identified a risk-taking channel of currency appreciation (Hofmann et al, 2016). With national boundaries no longer defining the decision-making unit or the currency area, the analytical frameworks underlying open economy macroeconomics need rethinking.

6. Conclusion

The GFC has led to the revival of macroprudential regulation and the birth of many new instruments. Experience with these measures is still at an early stage. The fine-tuning of existing macroprudential policy tools and its institutional framework continues. There are still a number of issues to be ironed out: effective macroprudential policy tools; rule-based versus discretionary policies, its interactions with other macroeconomic policies especially monetary policy, effective institutional frameworks, international policy coordination and so on.

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