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Article

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INTRODUCTION

In the 2007-08 global financial crisis, it became evident that unsustainable imbalances had evolved during the previous, seemingly stable period of output and inflation. These imbalances consisted of excessively leveraged financial institutions, high household indebtedness and maturity mismatches in the banking system. The ensuing recession after the crisis also demonstrated the significant negative impact that such financial instabilities can have on the economy (Blanchard, Dell'Ariccia and Mauro 2014). Freixas, Laeven and Peydró (2015) consider the recent financial crisis as a systemic risk event that has been building up endogenously over time. In their view, key features of systemic risk are its endogenous build-up in the financial system, its threat to the financial system as a whole and its potentially large negative effects on the real economy. Key indicators of such a build-up of systemic risk include asset price bubbles, excessive risk-taking or credit booms. In fact, the recent empirical literature has identified credit growth and asset price booms as the most robust predictors of financial crises (Akinci and Olmstead-Rumsey 2015).[2]

While the financial crisis has shown the strong interactions between financial market developments and the real economy, academics and policymakers have started to recognise shortcomings in the regulatory approach prior to the crisis (Claessens 2014). According to Freixas, Laeven and Peydró (2015), the banking system took an excessively high level of risk, which the existing regulation in place was unable to properly take account of. The regulatory approach prior to the crisis was largely microprudential-oriented, i.e. related to risks on an individual institutions level.[3] Microprudential regulation takes financial institutions in isolation to ensure that each of them is individually solvent. The standard microprudential regulatory approach is based on a moral hazard argument. For example, the expectation of a government bailout ex post incentivises creditors to engage in riskier activities ex ante (De Nicolò, Favara and Ratnovski 2012). However, even if moral hazard is dealt with at the individual level and individual institutions are sufficiently solvent, this does not mean that the financial system as a whole is stable. The reason for this is the interconnectedness of banks and other financial institutions through contagion, pecuniary externalities via asset price fluctuations or strategic interactions that can lead to correlated risk exposure. This interconnectedness is the reason why it does not suffice to view the financial system as an aggregate of individual financial intermediaries that have to be regulated. A microprudential approach alone is not able to sufficiently take account of the financial system as a whole and to cope with the build–up of systemic risk (Freixas, Laeven and Peydró 2015, Claessens 2014, Blanchard, Dell'Ariccia and Mauro 2014, De Nicolò, Favara and Ratnovski 2012). This is why macroprudential policies have become more prevalent again. However, the fundamental rationale for the usage of macroprudential policies does not lie in the build-up of systemic risk per se, but the market failures and different externalities that constitute systemic risk in the first place (Claessens 2014).

The following section gives an overview of the different types of externalities that justify macroprudential policies. We subsequently describe a macroprudential policy index constructed by Cerutti, Claessens and Laeven (2015) and use this index to examine the usage of macroprudential policy measures among developed and emerging economies. This is followed by a short overview of selected papers on the effectiveness of macroprudential policies. The last section outlines possible directions for future research on that topic.

THE FUNDAMENTAL RATIONALE FOR MACROPRUDENTIAL POLICIES – THE EXTERNALITY VIEW

Based on a broad body of academic literature, De Nicolò, Favara and Ratnovski (2012) identify the following three types of externalities: firstly, *strategic complementarities* can arise due to the strategic interaction of banks, agents and other financial institutions. They often happen during the expansionary phase of a financial cycle. Strategic complementarities describe a situation where decisions of different agents mutually reinforce each other because the payoff for a certain strategy increases with the number of agents pursuing the same strategy. A number of sources for such strategic complementarities have been identified in the literature such as increased competition between banks in boom times, the incentive structure of bank managers or the anticipation of a government bailout in the case of a financial downturn. Due to such complementarities, financial institutions are likely to have correlated credit and liquidity risk exposure. Banks become exposed to similar risks and the quality of their portfolios depreciates during the boom, which can lead to vulnerabilities for the financial system.

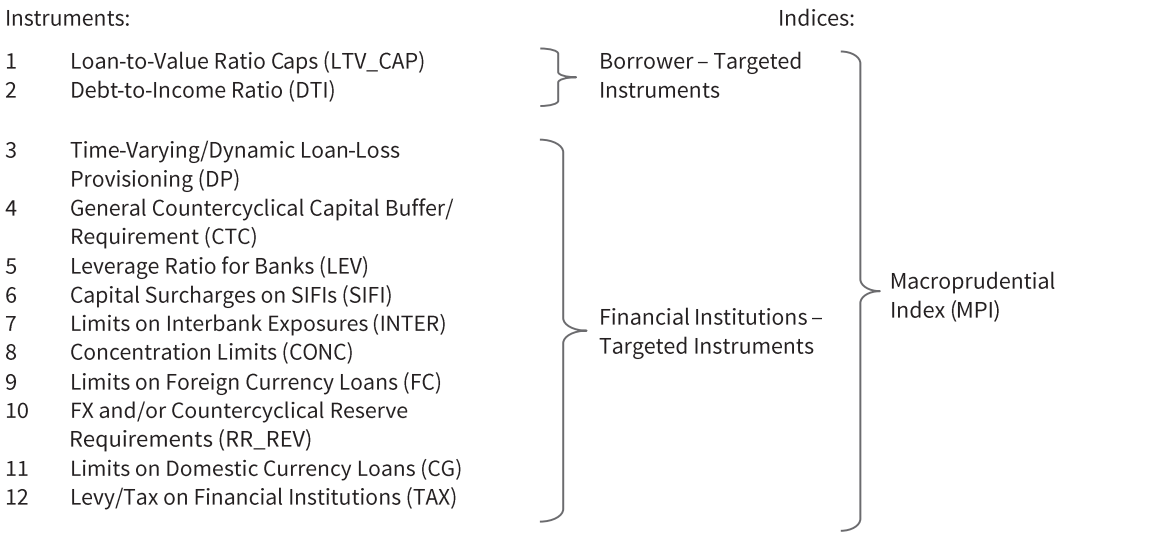
Secondly, *fire sales* and *credit crunches* typically occur in the downturn of a financial cycle. Fire sales describe a situation in which an investor is forced to sell an asset when buyers are also concerned. If the number of buyers is limited, the asset may be sold at a price below its fundamental value, creating a loss for the investor. In addition, the decline in that asset price can also lower the prices of similar assets. This incurs fur-

[1] ifo Institute (both).

[2] See also Schularick and Taylor (2012), Gourinchas and Obstfeld (2012), Mendoza and Terrones (2012) and Dell'Arricia et al. (2012).

[3] The microprudential approach is partial equilibrium in nature (Blanchard, Dell'Ariccia and Mauro 2014).

Box 1
Dataset on Macroprudential Policies



Source: Cerutti, Claessens and Laeven (2015), authors' compilation.

ther losses for other financial institutions. Hence, fire sales amplify already existing financial distress in the system through a pecuniary externality. When fire sales lead to declining asset prices, this may also reduce the collateral value of borrowers' assets. This, in return, can reduce their access to external finance, which may eventually result in a credit crunch with further negative effects on the real economy.

Thirdly, *externalities related through interconnectedness* can occur in the following way: the distress or failure of one bank can affect other financial institutions due to bilateral balance sheets and other exposures, movements in asset prices (as explained above) and aggregate feedback effects from the real economy. Systemically important financial institutions (SIFIs) are particularly affected by interconnectedness externalities since they are often too complex, operate internationally and have high interbank market linkages, which makes them "too big to fail". This also creates a perverse incentive for banks to become systemically important in the first place (Claessens 2014).

The fact that these market failures can bring about systemic risk in the financial system with significant consequences for the economy has illustrated the importance of better understanding the usage and effectiveness of different macroprudential policies. For this reason, we present the dataset by Cerutti, Claessens and Laeven (2015), who have constructed overall indicators for macroprudential policies. Their dataset is also very granular because it provides information on the usage of different, very specific macroprudential instruments. In the next section, we present this dataset and its construction.

DESCRIPTION OF DATASET ON MACROPRUDENTIAL POLICIES

Cerutti, Claessens and Laeven (2015) document the use of different types of macroprudential policies for 119 countries from 2000 until 2013. This dataset is constructed on the basis of the Global Macroprudential Policy Instruments (GMPI) survey conducted by the IMF's Monetary and Capital Department during 2013–2014. The department recorded responses directly from country authorities, and cross-checked them with other sources to ensure a high quality. Cerutti, Claessens and Laeven (2015) make use of 12 macroprudential instruments that are displayed in Box 1. They code each instrument as a binary measure on an annual basis with 1 indicating that the measure is implemented. The degree of the intensity of a respective measure is not captured, but only the information on whether the measure is in place or not. The authors build three indices on the use of macroprudential policies. These are the comprehensive Macroprudential Index, an index on Borrower-Targeted Instruments and another wider index on Financial Institutions-Targeted Instruments. Box 1 also illustrates how the indices are made up. The index on Borrower–Targeted Instruments is created as the sum of Loan-to-Value Ratio Caps and Debt-to-Income Ratio (1–2). The index on Financial Institution–Targeted Instruments is created as the sum of macroprudential instruments 3–12.[4] Cerutti, Claessens and Laeven (2015) also calculate an overall Macroprudential Index (MPI) as the sum of all 12 instruments.

THE USAGE OF MACROPRUDENTIAL POLICIES

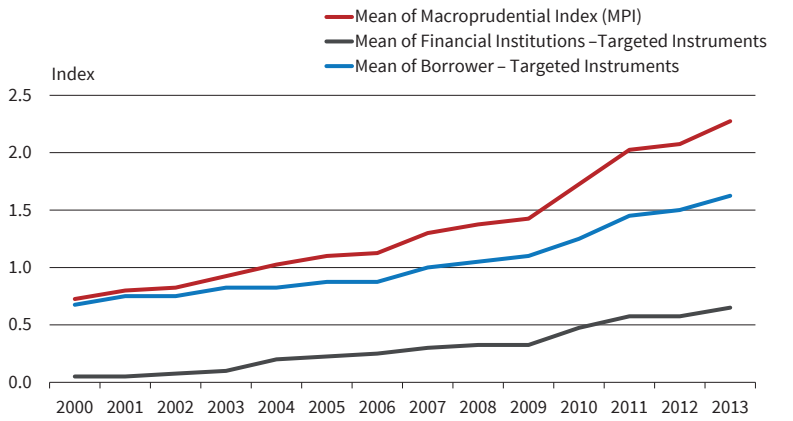
In this section, we analyse the usage of macroprudential policy measures in those countries that are included in the DICE Database.[5] In 2013, the countries applied 2.275 instruments on average. The mean of Borrower – Targeted Instruments was much higher (1.625) than the mean of Financial Institutions – Targeted Instruments

[4] The distinction between Borrower- and Financial Institutions-Targeted Instruments is similarly applied in studies such as Bank of England (2011) or Schoenmaker and Wierts (2011).

[5] These 40 countries are the EU countries except for Denmark, Greece and Luxembourg for which the index is not available; Macedonia, Norway, Switzerland and Turkey, as well as Australia, Brazil, Canada, China, India, Japan, Korea, Mexico, New Zealand, the Russian Federation and the United States.

Figure 1

Mean of macroprudential policy indices, 2000–2013



Source: Authors' calculations based on Cerutti, Claessens and Laeven (2015). © ifo Institute

(0.65). This is remarkable since the Borrower – Targeted Index is the sum of only two instruments compared to ten. All three indices depict a positive trend, indicating that the usage of macroprudential policies has increased over the last decade on average. After the financial crisis 2007-08, the plotted lines become steeper. This is in line with politicians starting to share a greater recognition for the relevance of macroprudential policies. Loan–to–Value Ratio Caps and Debt–to–Income Ratios that target borrowers have been more common before the financial crisis and adopted already for quite some time. The increase in Borrower-Targeted Instruments was more pronounced than that of Financial Institutions-Targeted Instruments.

Table 1 shows the development of the usage of each individual instrument among the 40 countries considered during the time period from 2000 to 2013. The percentages indicate the shares of countries having a certain instrument in place in a given year. In 2000, only two instruments – Limits on Interbank Exposures (INTER) and Concentration Limits (CONC) – were implemented in more than two countries. The latter was in place in over one third of the 40 countries. Spain and Canada were the only countries that had established three macroprudential policy instruments in 2000. In the following years, the percentage of countries using a specific instrument either remained constant or increased. None of the countries considered ever abolished any instruments with the exception of Bulgaria (FX and/or Countercyclical Reserve Requirements (RR_REV) in 2008).

The increase in the share of countries using a specific instrument was particularly pronounced after the financial crisis: in both 2007 and 2008, five instruments were used in more countries than in the respective previous year; in 2010, it were even seven instruments. Six instruments were more widely used in 2011 and 2013 respectively. The largest increase in the usage of one instrument (+12.5 percentage points) occurred in 2011 when Levy/Tax on Financial Institutions (TAX) was used by more EU-countries. In 2013, half of the 40 countries had Concentration Limits (CONC) in place, 37.5 percent Loan-to-Value Ratio Caps (LTV_CAP), 32.5 percent Limits on Interbank Exposures (INTER) and 30.0 percent Levy/Tax on Financial Institutions (TAX). In 2013, the overall Macroprudential Index was highest in China with a value of eight, followed by Canada, Switzerland and Turkey with a value of five respectively. The MPI was also comparatively high in several Eastern European countries (values of four or five) as well as in Korea and Norway (value of four respectively). With a value of zero, it was lowest in Estonia, Slovenia, Malta, Ireland and the United Kingdom.

THE EFFECTIVENESS OF MACROPRUDENTIAL POLICIES

Cerutti, Claessens and Laeven (2015) examine whether the usage of macroprudential policies measured by their indices has an effect on credit and house price growth based on a sample of 119 countries from 2000 until 2013. In their findings, macroprudential policies are associated with lower growth rates in credit, but the effect is weaker in more developed and financially open economies. Macroprudential policies also have some negative impact on house prices. Developing their own indices of macroprudential policies from the first quarter 2000 until the fourth quarter 2014 for a sample of 57 advanced and emerging economies, Akinci and Olmstead – Rumsey (2015) find that developed and emerging economies use macroprudential polices more actively after the financial crisis. In their results, macroprudential policy variables also have a statistically significant negative effect on bank credit growth and house price inflation.

Dell'Ariccia et al. (2012) focus specifically on credit booms as episodes of rapid credit growth. Credit booms can create distinctive financial stability risks and can be a feature of a build-up in systemic risk. However, not all credit booms end up badly. In their sample, about a third of credit booms end up in a full-blown financial crisis. Their results show that macroprudential policies reduce the likelihood of a credit boom, as well as decrease the probability that a boom ends in a financial crisis.

Zhang and Zoli (2014) focus on the use of macroprudential policies in 13 Asian economies and 33 economies in other regions. According to them, Asian economies have used macroprudential measures more extensively compared to countries in other regions. In their findings, macroprudential policies have also reduced credit growth in Asia, although only housing-related measures were significant.

Table 1

Usage of instruments, 2000–2013, in percent

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Loan-to-Value Ratio Caps (LTV_CAP)	5.0	5.0	7.5	10.0	15.0	15.0	15.0	17.5	17.5	17.5	25.0	32.5	32.5	37.5
Debt-to-Income Ratio (DTI)	0.0	0.0	0.0	0.0	5.0	7.5	10.0	12.5	15.0	15.0	22.5	25.0	25.0	27.5
Time-Varying/ Dynamic Loan-Loss Provisioning (DP)	2.5	2.5	2.5	5.0	5.0	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
General Countercyclical Capital Buffer/Requirement (CTC)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.0
Leverage Ratio (LEV)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	7.5	7.5	7.5	10.0	10.0	10.0
Capital Surcharges on SIFIs (SIFI)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.5	2.5	5.0
Limits on Interbank Exposures (INTER)	15.0	17.5	17.5	20.0	20.0	20.0	20.0	27.5	27.5	30.0	32.5	32.5	32.5	32.5
Concentration Limits (CONC)	37.5	42.5	42.5	45.0	45.0	45.0	45.0	47.5	47.5	47.5	50.0	50.0	50.0	50.0
Limits on Foreign Currency Loans (FC)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.5	5.0	7.5	10.0	12.5	12.5	15.0
FX and/or Countercyclical Reserve Requirements (RR_REV)	5.0	5.0	5.0	5.0	5.0	7.5	7.5	7.5	5.0	5.0	7.5	7.5	7.5	7.5
Limits on Domestic Currency Loans (CG)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Levy/Tax on Financial Institutions (TAX)	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	5.0	5.0	10.0	22.5	27.5	30.0

Source: Authors' calculations based on Cerutti, Claessens and Laeven (2015).

In short, there appears to be some tentative overall evidence in the recent academic literature that macroprudential policies can reduce credit growth.

CONCLUSION

In our article, we outline the motivation for the usage of macroprudential policies, which lies in externalities that create systemic risk. Some studies already suggest that macroprudential policies can be effective in curbing credit growth, and thereby in reducing the build–up of systemic risk. Research could be deepened in the following areas. One can further examine the extent to which macroprudential policies interact with other microprudential or macroeconomic policies, such as monetary policy (see, for example, Dell'Arricia et. al 2012, Bruno, Shim and Shin 2015). Apart from that, using macroprudential policies will probably come at a cost and may have unintended distortive effects on financial markets. Arregui et al. (2013), for example, develop an analytical framework that enables to weigh up the costs against the benefits of macroprudential policies.

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