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How effective are macroprudential policies? An empirical investigation[☆]

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ABSTRACT

In recent years, policymakers have generally relied on macroprudential policies to address financial stability concerns. However, our understanding of these policies and their efficacy is limited. In this paper, we construct a novel index of macroprudential policies in 57 advanced and emerging economies covering the period from 2000:Q1 to 2013:Q4, with tightenings and easings recorded separately. The effectiveness of these policies in curbing credit growth and house price appreciation is then assessed using a dynamic panel data model. The main findings of the paper are: (1) Macroprudential policies have been used far more actively after the global financial crisis in both advanced and emerging economies. (2) These policies have primarily targeted the housing sector, especially in the advanced economies. (3) Macroprudential policies are usually changed in tandem with bank reserve requirements, capital flow restrictions, and monetary policy. (4) Our analysis suggests that macroprudential tightening is associated with lower bank credit growth, housing credit growth, and house price appreciation. (5) Targeted policies – for example, those specifically intended to limit house price appreciation – seem to be more effective, especially in economies where bank finance is important.

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1. Introduction

In recent years, many countries have experienced boom-bust cycles in credit and asset prices, some of which resulted in severe financial crises. In response to these cycles, authorities in many countries have used macroprudential policies as a first line of defense against financial instability risks.¹ Examples of the

macroprudential tools employed are capital and provision requirements, credit growth limits in specific sectors, and time-varying loan-to-value (LTV) or debt-service-to-income ratio (DSTI) caps for mortgage loans.

Even though macroprudential policies have been used intensively in recent years, our understanding of these policies and their efficacy is limited. This paper focuses on cyclical risks that are primarily associated with elevated asset prices and excessive credit growth and makes three contributions to the literature: First, it develops a new set of indexes of macroprudential policies in 57 advanced and emerging countries covering the period from 2000:Q1 to 2013:Q4. Second, it documents how these macroprudential policy indexes are correlated with other policy measures, such as monetary policy and capital flow management policies. Third, it uses these indexes in a dynamic panel data model to investigate the effectiveness of macroprudential policies in restraining the growth of credit and of asset prices. Domestic bank credit growth, housing credit growth, and house price appreciation have often been the target of macroprudential policy because of their links to boom-bust financial cycles.² Hence the paper focuses on

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¹ Prior to the global financial crisis, the general consensus was that monetary policy was not well-suited to address financial stability concerns. Since the crisis, many policymakers remain reluctant to shift monetary policy away from targeting core macroeconomic objectives such as inflation and output stabilization, preferring

to retain monetary policy as a last line of defense against financial instability risks, with cyclical macroprudential tools constituting the first line of defense.

² Recent literature, for example, [Schularick and Taylor \(2012\)](#); [Gourinchas and Obstfeld \(2012\)](#) and [Mendoza and Terrones \(2012\)](#), suggests that credit and asset price boom events often end in financial crises.

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these three variables to measure the effect of macroprudential policy changes.

In this paper we construct several macroprudential policy indexes for different types of macroprudential policy tools (e.g. capital requirements, and caps on LTV or DSTI ratios) as well as an aggregate index, with tightening and easing actions in a given month coded separately. The aggregate index used in the baseline dynamic panel data model characterizes the macroprudential policy stance in each country by cumulating the number of tightenings net of easings since 2000. The dependent variables (quarterly growth rate of real bank credit, real housing credit, and real house prices) are regressed on various indexes of macroprudential policy and on control variables, including real GDP growth, the change in the nominal monetary policy rate, and a global risk aversion variable proxied by the VIX.

The main findings of the paper are: (1) Macroprudential policies have been used far more actively after the global financial crisis in both advanced and emerging economies, with the number of tightening actions significantly outweighing the easing actions in the last decade. (2) These policies have primarily targeted the housing sector, especially in the advanced economies. (3) Macroprudential policies are usually changed in tandem with bank reserve requirements, capital flow management measures, and monetary policy. (4) Empirical analysis suggests that macroprudential policy variables exert a statistically significant negative effect on bank credit growth and house price appreciation. (5) Targeted policies specifically intended to limit house price appreciation seem to be more effective, especially in economies where bank finance is important. For example, we find that the negative effect of the macroprudential policy variables on housing loans and house price appreciation is driven entirely by measures directed at the housing market. The effects of macroprudential policy measures are economically significant as well. Our counterfactual exercise reveals that if the authorities had not used these measures, average credit growth and house price appreciation over the period from 2011 to 2013 would have been significantly higher.³

In addition to macroprudential policies, authorities in several countries have used other policy measures such as capital flow management tools and changes in reserve requirements, in part to deal with financial instability concerns. In particular, capital flow management tools – such as portfolio and banking inflow restrictions – have been included in the policy toolkit in several emerging economies to deal with fast-growing bank credit. However, our baseline regressions on the effectiveness of macroprudential policies control only for monetary policy changes (besides non-policy control variables, such as income and global risk aversion), due to the fact that data for these additional policy control variables are available only for subset of countries. An extension of our model that uses these additional policy variables as controls in the regressions for a subset of countries⁴ reveals that macroprudential tightening continue to exert a statistically significant negative effect on credit growth when capital flow management tools and changes in reserve requirements are also considered.

This paper is related to a growing body of empirical research on financial stability. Recent evidence about the effectiveness of macroprudential policy is mixed and still preliminary. Most empirical work on the subject relies on the 2011 IMF survey data presented in Lim et al. (2011). Using this database, Lim et al. (2011) find that several different macroprudential tools reduce the procyclicality of credit growth by reducing the correlation between

credit growth and GDP growth. IMF (2012) explores the relationship between monetary and macroprudential policies using the same IMF survey. Focusing on capital requirements, reserve requirements, and LTV and DSTI caps, that paper finds that capital requirements and reserve requirements constrain credit growth but that the effects differ in credit busts versus credit booms for capital requirements. By reviewing case studies, DellAriccia et al. (2012) find that some macroprudential policies can help soften the blow of financial crises.

Although our database suggests that the use of macroprudential policy measures has increased significantly since 2011, only a few papers use more recent data on these tools. For example, Cerutti et al. (2015a) uses a 2013 IMF survey to create an annual dataset of macroprudential policies in 119 countries. This dataset records, for each year, whether different types of policies were in place, without capturing if and when the instrument was adjusted. They find that an index summing all the different types of policies is correlated with lower credit growth, especially in emerging market economies. Another recent paper by Bruno et al. (2014) uses a Bank for International Settlements (BIS) macroprudential policy database presented in Shim et al. (2013) and a database of capital flow management policies to study the effects of these policies on credit, banking flows, and bond flows in 12 Asian countries. They find that monetary policy, banking inflow controls, and macroprudential policies were used as complements in Asia from 2004 to 2013 and that bank inflow controls reduced the growth of bank inflows from 2004 to 2007, but not recently.

More empirical work has been done with regard to housing markets. Several studies using panel data for different regions find that housing measures may reduce mortgage credit booms (Zhang and Zoli, 2014; IMF, 2014). Case studies from emerging Europe (Vandenbussche et al., 2012) and Asia (Craig and Hua, 2011) show that macroprudential tools, especially housing measures, limited house price growth in those regions. On the other hand, Kuttner and Shim (2013) use the BIS database presented in Shim et al. (2013) of macroprudential measures covering as far back as 1980 for some countries. Using three different econometric techniques, they find evidence for the economic and statistical significance of DSTI and housing taxes on house price appreciation. LTV caps, limits on banks' exposure to the housing market, and housing taxes are also found to be significant in curbing housing credit, but only in the panel data approach. Of all the macroprudential measures considered, only housing-related taxes are found to affect house price growth.

Other studies use bank-level data rather than country-level data. Such micro-level evidence is also mixed: For example, Claessens and Ghosh (2014) use balance-sheet data to argue that credit growth declines when credit growth ceilings, LTV and DSTI caps are put in place. Zhang and Zoli (2014) present bank-level data on 74 Asian banks in addition to their country-level data to demonstrate that macroprudential policies limited the supply of credit from Asian banks. However, Aiyar et al. (2014) use bank-level data from the UK to show that bank capital requirements were somewhat ineffective due to increased lending from resident foreign bank branches. Similarly, Acharya (2013) finds that risk weights imposed to achieve macroprudential goals can perversely lead to the buildup of financial risks because higher risk weights on certain asset classes – such as mortgages – encourage the buildup of exposure to other assets that are not deemed as risky, but that can contribute to vulnerability due to such concentrated exposure.

The literature has clearly not reached a consensus about which policies, if any, are effective. Our panel dataset – which includes a variety of advanced and emerging economies, a longer history than most studies, and the recent period in which macroprudential policy use has become much more common – allows us to

³ In the counterfactual exercise we restrict our attention to the last three years of the sample period when macroprudential measures were used most actively.

⁴ These countries are: Argentina, Brazil, Chile, Colombia, Czech Republic, Hungary, India, Indonesia, Israel, Korea, Malaysia, Mexico, Philippines, Poland, Romania, South Africa, Taiwan, Thailand, and Turkey.

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