The benefits are at the tail: uncovering the impact of macroprudential policy on growth-at-risk

JORGE E. GALÁN

Summary of Banco de España Working Paper no. 2007

I uncover heterogeneous effects of macroprudential policy on the GDP growth distribution by bringing together the literature on the impact of macroprudential policy and recent developments on the use of quantile regressions to identify effects on growth-at-risk. I identify important benefits of macroprudential policy on the left-tail of the GDP growth distribution, which contrast with the negative effects found in the median. I find that the impact of macroprudential policy is highly dependent on the position in the financial cycle, the direction of the policy, the type of instrument, and the time elapsed since its implementation. Tightening capital measures during expansions may take up to two years in evidencing benefits on growth-at-risk, while the positive impact of borrower-based measures is rapidly observed. This suggests the need of implementing capital measures early enough in the cycle; while borrower-based measures can be tightened in more advanced stages. Conversely, in downturns the benefits of loosening capital measures are more immediate, while those of borrower-based measures are limited. Overall, this study provides a useful framework to assess the impact of macroprudential policy in terms of GDP growth and to identify the term-structure of specific types of instruments.

The global financial crisis has evidenced the high costs of the accumulation of financial imbalances for the real economy. Aikman *et al.* (2019) estimate that financial vulnerabilities built-up during the previous years to the great recession explain around three-quarters of the subsequent output loss in the US. Moreover, they identify that the magnitude of the negative impact could have been significantly reduced by the active use of macroprudential policies. Certainly, macroprudential policy is aimed at increasing the resilience of the financial sector to negative

shocks, limiting the incentives for risk-taking and taming the financial cycle. This allows preventing and mitigating severe negative effects of systemic risk on economic growth, which is considered as the ultimate objective of macroprudential policy (FSB-IMF-BIS, 2011; ESRB, 2015).

Against this background, most of previous studies have identified benefits of macroprudential policy in different dimensions such as curbing credit and house prices growth (Claessens *et al.*, 2013; Cerutti *et al.*, 2017), reducing the probability of systemic crises (Dell'Ariccia *et al.*, 2016), increasing the probability of survivor of firms in a crisis (Jiménez *et al.*, 2017), or decreasing the probability of banks' default (Altunbas *et al.*, 2018). However, the few studies measuring the impact of macroprudential policy on GDP growth, have identified negative effects. Kim and Mehrotra (2018) identify a negative impact of macroprudential policy on output after analysing an aggregation of many different instruments in Asian economies. Richter *et al.* (2019) find that borrower-based measures have negative effects on output growth over a four-year horizon. Noss and Toffano (2016) identify a negative impact of tightening capital measures on GDP growth in the short-run. These negative effects have been associated to the costs of macroprudential policy.

Nonetheless, those studies have focused on the impact on the conditional mean of GDP growth, but if macroprudential policy effectively reduces systemic risk, one could expect that these benefits are observed in a reduction of the downside risk rather than on the mean. Thus, I extend the recent proposal by Adrian *et al.* (2019) on the use of quantile regressions of GDP growth conditional on financial conditions in order to identify the effects of macroprudential policy on the shape of the GDP growth distribution, and particularly, on growth-at-risk. The concept of growth-at-risk makes reference to the economic growth rate that would be observed under an adverse scenario that occurs with a low probability. Thus, it represents a low quantile of the GDP growth distribution, usually the 5th percentile, as it is also defined in this study. For this purpose, I use a broad sample of 27 EU countries over the period 1970-2018 to estimate fixed effects panel quantile regressions of GDP growth conditional on financial
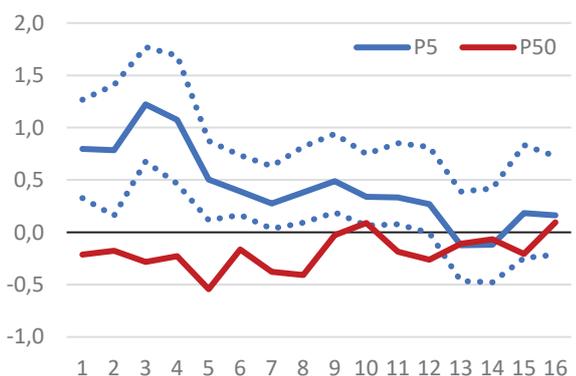
Chart 1

RESPONSE OF GROWTH-AT-RISK (5th PERCENTILE) AND MEDIAN GROWTH (50th PERCENTILE) TO THE IMPLEMENTATION OF CAPITAL AND BORROWER-BASED MEASURES OVER THE CYCLE

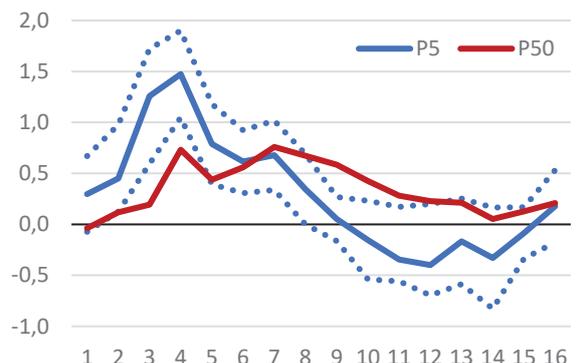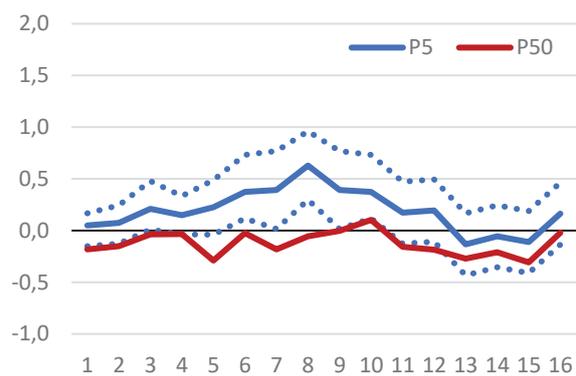1 TIGHTENING IN EXPANSIONS
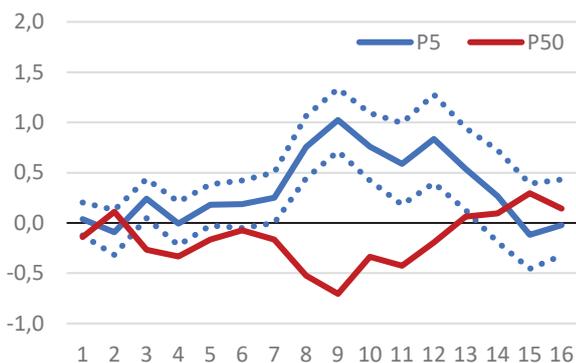
1.1 CAPITAL MEASURES

2 LOOSENING DURING FINANCIAL CRISES

2.1 CAPITAL MEASURES

1.2 BORROWER-BASED MEASURES

2.2 BORROWER-BASED MEASURES

NOTE: The blue and red lines represent the estimated coefficients of the MPI on quantile regression at the 5th and 50th percentiles on the conditional GDP growth distribution from 1 to 16 quarters ahead. The dotted lines represent the 95% confidence bands obtained using bootstrapped standard errors with 500 replications.

stress, cyclical risk, macroprudential policy and its interaction with the financial cycle.

Results confirm large heterogeneous effects of macroprudential policy on the different quantiles of the GDP growth distribution and uncover important benefits of macroprudential policy on growth-at-risk. Moreover, the direction of the policy and the position in the financial cycle have a relevant role on determining the magnitude and speed of the effects of macroprudential policy on the downside risk of GDP growth. In particular, the benefits of

tightening macroprudential policy during expansionary phases of the financial cycle are only observed in the mid-term, while loosening measures have a more immediate positive effect on growth-at-risk during crises.

I also identify differences depending on the type of macroprudential instrument implemented. While the benefits of borrower-based measures on growth-at-risk are manifested very rapidly and tend to be persistent, the positive effects of capital measures present a lag of around 8 quarters (see Chart 1). These results have important policy

implications. Although, both types of measures are found to be effective on reducing the downside risk of GDP growth, capital measures should be implemented early enough in the cycle, while borrower-based measures could be tightened also in advanced stages given that their benefits are perceived more rapidly. Conversely, during crises the benefits of releasing capital buffers are more immediate, while those of loosening borrower-based measures are very limited. Certainly, releasing capital buffers during busts allow banks to increase their resilience immediately, while softening caps on lending standards may not have real effects given that banks have incentives to tight their credit conditions due to the unfavourable macrofinancial environment.

Overall, this study uncovers the benefits of macroprudential policy on growth-at-risk by bringing together the literature on the impact assessment of macroprudential policy and recent developments in the use of quantile regressions to identify effects on growth-at-risk. The findings suggest the importance of timing in macroprudential policy. Moreover, the presented framework has very useful implications for taking macroprudential policy decisions over the cycle and for a complete assessment of these policies in terms of GDP growth.

REFERENCES

Adrian, T., N. Boyarchenko, and D. Giannone (2019). Vulnerable Growth, *American Economic Review,* 109(4): 1263-89.

Aikman, D., J. Bridges, A. Kashyap and C. Siegert (2019). Would Macroprudential Regulation Have Prevented the Last Crisis?, *Journal of Economic Perspectives,* 33(1): 107-130.

Altunbas, Y., M. Binici and L. Gambacorta (2018). Macroprudential policy and bank risk, *Journal of International Money and Finance,* 81: 203-220.

Cerutti, E., S. Claessens and L. Laeven (2017). The use and effectiveness of macroprudential policies: New evidence, *Journal of Financial Stability,* 28: 203-224.

Claessens, S., S. Ghosh and R. Mihet (2013). Macro-prudential policies to mitigate financial system vulnerabilities, J*ournal of International Money and Finance,* 39: 153-185.

Dell'Ariccia, G., D. Igan and L. Laeven (2016). Credit booms and macro-financial stability, *Economic Policy,* 31: 299–355.

European Systemic Risk Borad (ESRB) (2015). Annual Report 2014. Frankfurt am main, July.

Financial Stability Board (FSB), International Monetary Fund (IMF) and Bank of International Settlements (BIS) (2011). Macroprudential Policy Tools and Frameworks. Progress Report to G20, October.

Jiménez, G., S. Ongena, J. L. Peydró and J. Saurina (2017). Macroprudential Policy, Countercyclical Bank Capital Buffers, and Credit Supply: Evidence from the Spanish Dynamic Provisioning Experiments, *Journal of Political Economy,* 125(6): 2126-2177.

Kim, S. and A. Mehrotra (2018). Effects of Monetary and Macroprudential Policies-Evidence from Four Inflation Targeting Economies, *Journal of Money, Credit and Banking,* 50(5): 967-992.

Noss, J. and P. Toffano (2016). Estimating the impact of changes in aggregate bank capital requirements on lending and growth during an upswing, *Journal of Banking and Finance,* 62: 15-27.

Richter, B., M. Schularik, and I. Shim (2019). "The Costs of Macroprudential Policy." J*ournal of International Economics,* 118: 263-282.