

# How do macroprudential policies affect industrial growth?



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I analyse the causal impact of macroprudential policies on industrial growth, across 89 countries for the period 1990 to 2021. I find that macroprudential tightening measures negatively impact manufacturing growth, but only for industries with high external finance dependence. This effect is stronger for advanced economies and for borrower restrictions. Policy easing during banking crises has a positive growth effect. Furthermore, prudential policies implemented before the Covid-19 pandemic mitigated the fall in growth.

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## Finding a causal effect of macroprudential policies

Previous literature has found that macroprudential policies are effective in controlling excessive credit and house price growth (Akinci and Olmstead-Rumsey 2018, Biljanovska et al. 2023). However, causal effects of financial policies on aggregate output growth are hard to find, since regulators consider the effect of their decisions on the economy (Kim and Mehrotra 2022). My work (Madeira 2024) estimates the effect of macroprudential policies on the real growth of 23 manufacturing industries across 89 countries. The small size of each industry implies that it is not a major factor behind the financial regulators' decisions, with the median industry value-added representing just 0.32% of national GDP. Therefore, the microdata analysis here avoids reverse causality issues, since aggregate outcomes such as banking crises and prudential policy are fairly exogenous to the industries' activity (Dell'Ariccia et al. 2008).

To find the causal effects of prudential policies, I estimate a difference-in-difference model of real industrial growth, conditional on several macroeconomic factors (such as GDP growth and inflation) and industry-country and time fixed effects. The real growth for 23 manufacturing industries across 89 countries is obtained from the United Nations Industrial Development Organization (UNIDO). The data are then combined with a macroprudential policy index from the IMF (Alam et al. 2019), corresponding to the net sum of policy changes (+1 for tightening, 0 no change, -1 easing) across 17 indicators.

Finally, I estimate how the effect of macroprudential policy on growth changes with the external finance dependence (EFD) of each industry. EFD is measured by the fraction of capital expenses that cannot be covered by companies' past corporate earnings and therefore must be financed from external sources (Rajan and Zingales 1998). It is expected, therefore, that industries with a greater EFD should be more affected by financial regulations, since these are the industries that are required to request funds from banks or asset markets to invest in their activities.

The article measures how external finance-dependent industries (i) are affected by the prudential policy net tightening index of each country (c) over time (t). I thus estimate  $\gamma_l \times EFD_i \times MaPP_{c,t-l}$ , with  $\gamma_l$  corresponding to the growth effect of prudential measures announced in the current or previous years. A few industries have zero or negative finance dependence. However, most industries have a positive EFD, with values of 0.28 and 0.34 for the median and the average industry, respectively.

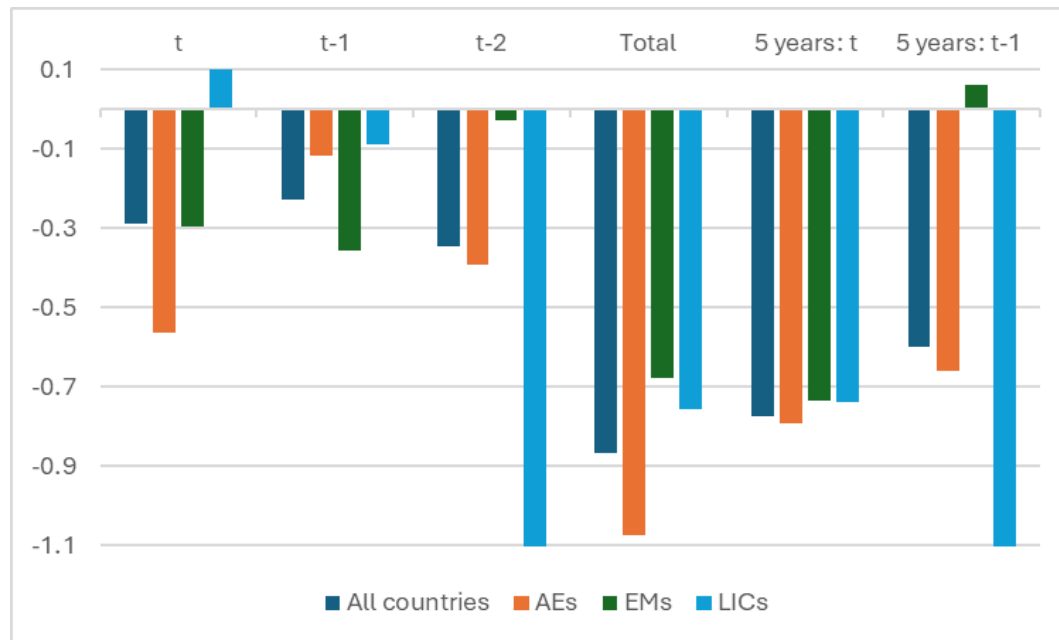
## Effects of macroprudential policies on industrial growth across countries

I estimate an industry-country panel data model across the samples of: i) all 89 countries, advanced economies (AEs, 35 countries), ii) emerging markets (EMs, 29 countries) and iii) low-income countries (LICs, 25 countries).

Figure 1 shows the effect of macroprudential policies on the real growth of industries with full EFD (that is, industries that fund all its capital expenses using external funds). These are consistently negative across the samples. The results are economically sizeable and persist over three years. Besides the annual frequency results, the figure also shows the coefficients from regressions with five-year periods, which can be interpreted as a long-term growth impact of prudential policies.

**Figure 1: Effect on real industrial growth of a macroprudential policy tightening**

Value in the current year (t), previous year (t-1), two years before (t-2), and total (sum of t, t-1, t-2) across country groups. Long-term policy tightening coefficients from regressions with five-year periods are shown, with effects for the current and previous half-decades.



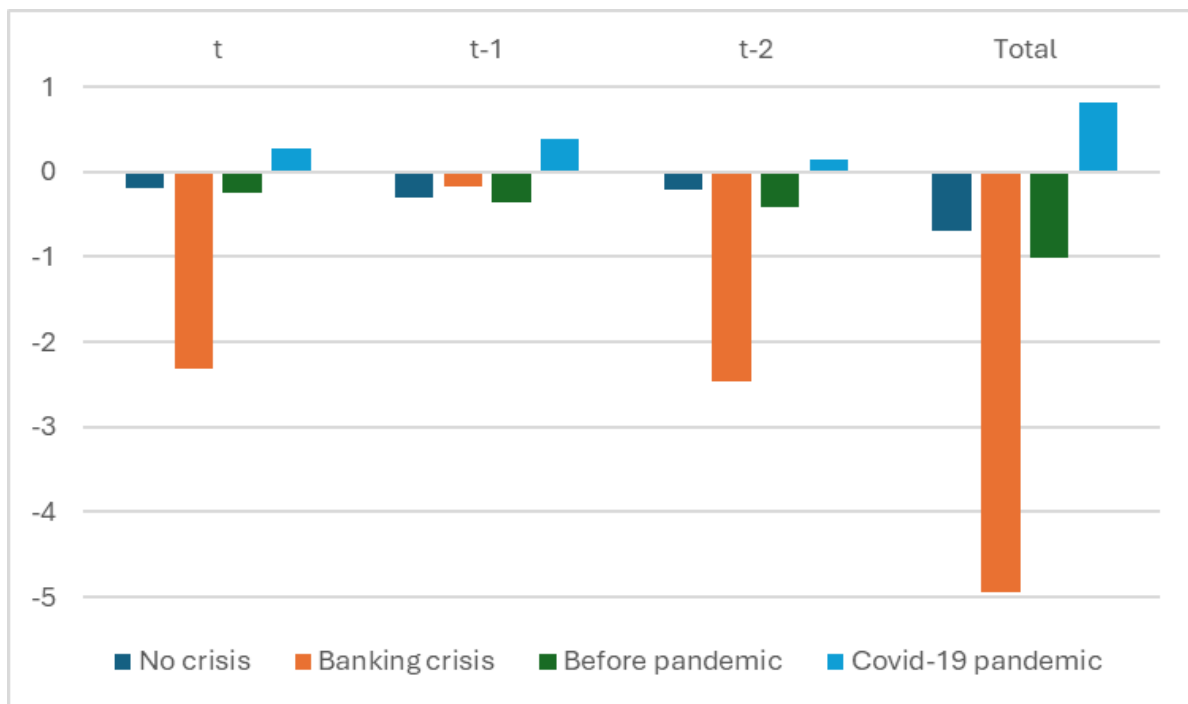
The results differ by EFD. For industries with full external dependence (EFD=1), there is a reduction in growth of 0.3%, 0.2% and 0.35% for each macroprudential tightening implemented in the current year, previous year or two years before. Each case of policy tightening reduces industrial growth by 0.9% over a three-year period. Across country groups, each prudential tightening reduces growth by 1.1%, 0.7% and 0.8% for AEs, EMs and LICs over a three-year period. AEs are the most affected country group and experience the fastest impact, with a strong reduction in growth observed in the first year and still having an effect two years later. EMs only experience a growth effect in the first two years. LICs only experience an effect after two years, possibly due to delayed implementation of the policies.

### Prudential policy effect during normal periods, banking crises and Covid pandemic

Figure 2 shows that prudential policy is powerful during crises. A policy easing (that is, a negative net tightening) has a total positive effect on growth of 4.9% over a three-year period during a banking crisis, a much larger impact than the 0.7% growth effect in non-crisis periods. Macroprudential policies had a positive effect during the Covid-19 pandemic, possibly due to its effect in attenuating the economic and financial cycle prior to the pandemic. Each net policy tightening had a 0.8% increase in growth over three-years during the pandemic, while before the pandemic it implied a 1% reduction in growth.

**Figure 2: Effect on real industrial growth of a prudential policy tightening across periods**

(no crisis, banking crisis, before pandemic, Covid pandemic). Coefficients for policy tightening in the current year (t), previous year (t-1), two years before (t-2) and total.



### Effects of different macroprudential instruments

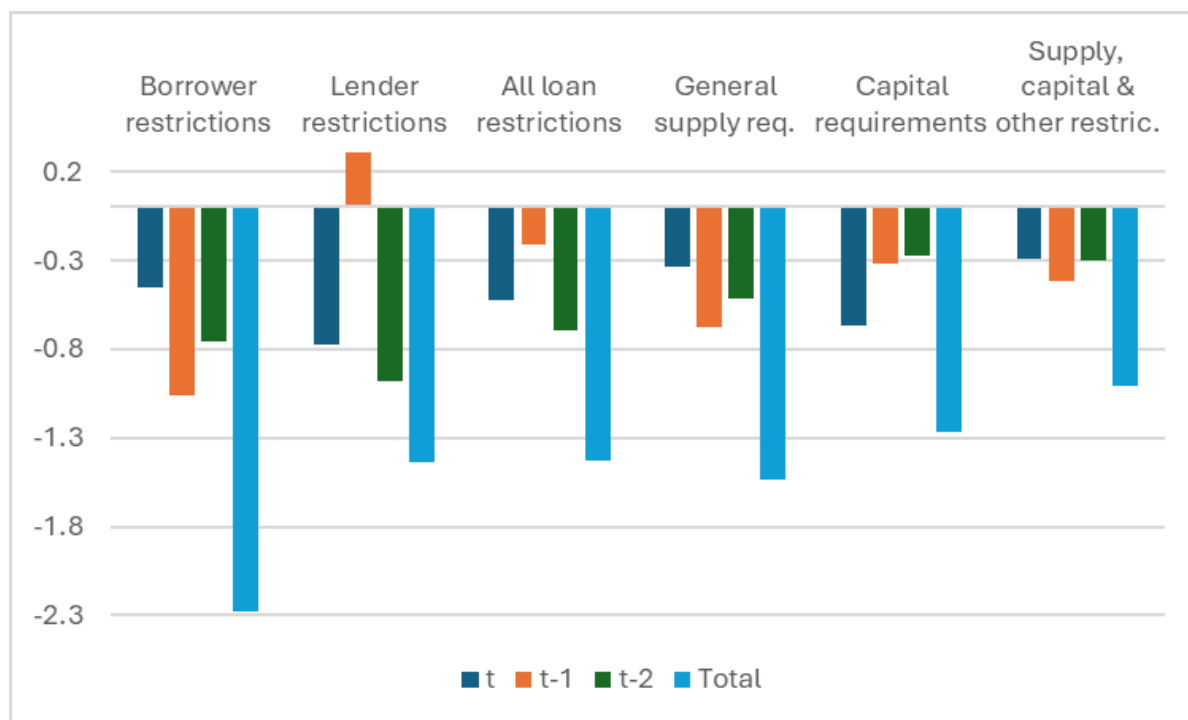
I then show the effect of each type of macroprudential instrument. Figure 3 shows that borrower restrictions (such as loan-to-value or debt to income) have the strongest effect, with a growth reduction of 2.3% for each net tightening over a three-year period. Lender restrictions and all loan restrictions (that is, both lender and borrower restrictions) imply a growth reduction of 1.4% over three years. General supply requirements show a growth reduction of 1.5% over three years, while capital requirements only reduce growth by 1.3% for each net tightening. Supply, capital and other institutional requirements (such as stress tests or dividend restrictions) imply a growth reduction of 1% over three years.

### Policy implications

I have analysed the causal impact of macroprudential policies on growth, using industry-level data for 89 countries for the period 1990 to 2021. I find that macroprudential tightening measures negatively impact manufacturing growth, but only for industries with high external finance dependence. This effect is stronger for advanced economies and for borrower restrictions. The effects are attenuated during periods of high private credit growth. However, macroprudential policy can also have powerful positive effect. Macroprudential policies implemented before the pandemic had a positive effect on industrial growth. Furthermore, policy easing during banking crises has strong effects. ■

**Figure 3: Effect on real industrial growth of different macroprudential instruments**

Coefficients for policy tightening in the current year (t), previous year (t-1), two years before (t-2) and total (sum of t, t-1, t-2 effects).



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**Carlos Madeira** is a senior economist at the Bank for International Settlements (BIS) and at the Central Bank of Chile. He has published research in monetary policy, household finance, financial regulation, expectations, and learning from lifetime shocks. Carlos holds a PhD from Northwestern University.

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