

Cross-border spillovers from macroprudential policy in the euro area

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In the context of the International Banking Research Network (IBRN) project for 2015 (see Buch and Goldberg, 2016), our study aims at understanding and measuring cross-border effects of macroprudential regulation in euro area. Understanding such cross-border spillovers is important for at least three reasons. First, cross-border spillovers may reduce (negative spillovers) or increase (positive spillovers) the efficacy of macro-prudential policy in containing systemic risk. Second, while achieving the same objectives, various macroprudential instruments may differ in the size of cross-border spillovers, calling for the use of the instrument that exerts less cross-border effect, as the European Systemic Risk Board recommends in the European context. Third, cross-border spillovers may increase in magnitude as financial markets and sectors become more integrated, which gradually took place in the euro area after the introduction of the common currency and is likely to be reinforced after the introduction of the banking union, in particular the Single Supervisory Mechanism. Accordingly, understanding and measuring the cross-border impact of macroprudential policy could shed some light on the need for coordination, in particular in the form of reciprocity arrangements, among macroprudential authorities in order to limit negative spillovers and reap the benefits from positive ones.

In this study (see Nocciola and Żochowski (2016) for details), we focus on inward cross-border spillovers, namely on the reaction of banks located in the domestic economy to changes of macroprudential policy abroad.³ In particular, we consider two different channels of propagation: first, the transmission of foreign macroprudential policy to the lending of domestic banks (see Figure 1, left-hand panel); and second, the transmission of the home countries (the countries where the parent banks reside) macroprudential regulation to the lending of foreign-owned banks located in the domestic economy (see Figure 1, right-hand panel).

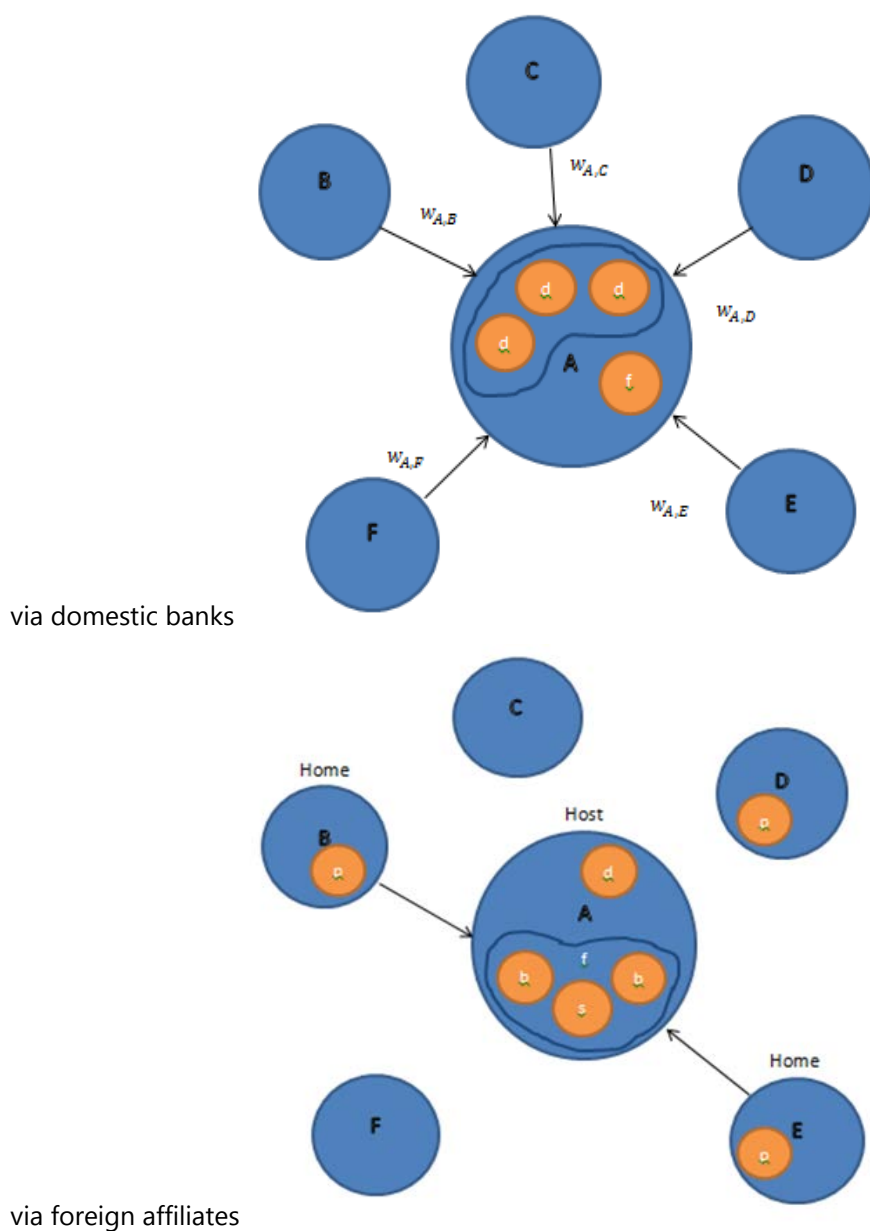
For the first channel, we characterize the strength of linkages in the European Union (EU) network using country-level lender exposure weights, while for the second channel, we construct a database with the information on the ownership structure of each Monetary Financial Institution (MFI) in order to identify the home countries and the respective regulations.

The first channel, operating via the adjustment of the balance sheet of domestic banks to changes in the foreign macroprudential environment, is shown conceptually in the left-hand panel of Figure 1. Each blue circle represents a country, while the orange one represents a bank. As an example, in country A (left-hand panel) four

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³ For a comprehensive description of channels of cross-border propagation from macroprudential policy, see Fahr and Żochowski (2015).



Note: The left-hand panel depicts a stylised inward spillover from exposure-weighted foreign regulation through domestic banks. Each blue circle represents a country, while each orange circle a bank. d and f stand for domestic and foreign, respectively. w_{ij} is the cross-border lender-exposure weight of country i lending to country j . Arrows represent the impact of changes in macroprudential policy abroad on country A. The right-hand panel shows a stylised inward spillover from home-country regulation through foreign-owned banks. b and s inside the set of foreign affiliates f stand for branches and subsidiaries, respectively. p stands for the ultimate parents of f . Arrows represent the impact of changes in macroprudential policy in the home countries on lending activity of b located in country A.

banks operate, three domestic (d) and one foreign (f), which in turn could be either a branch or a subsidiary. In this example, we consider as an inward spillover the effect that foreign regulation activated in country B, C, D, E and F has (arrows) on loan growth by the three domestic banks in country A. The impact of the respective regulations on domestic banks operating in A is weighted by country A's cross-border

loan exposures to other countries. This weighing concept is extended to other countries. In effect we build a two-layer network of banks and countries.

The second potential channel of propagation through which regulation may have cross-border impact is an inward transmission through foreign affiliates. This channel is shown conceptually in the right-hand panel of Figure 1. In country A (right-hand panel) there are four banks: one domestic (d) and three foreign (f), of which one is a subsidiary (s) and the remaining two are branches (b). The domestic bank and foreign subsidiary are considered as subject to the regulation of the host country A, while the foreign branches (b) would be, according to the legal status of a branch in the European context, subject to the regulation of the countries (B and E) where the respective parent banks (p) reside. The inward externality via the second channel arises when the macroprudential regulations applied in countries B and E influence the lending of foreign branches (b) in country A. As indicated in the right panel, the overall effect of regulation on the subset of foreign affiliates placed in country A now depends on both the host (A) and the home countries' (the countries of the parent banks, B and E) regulations.

To assess these two channels, we employ a panel dataset composed of individual MFIs covering 248 banks from 16 EA countries over the period from 2007Q3 to 2014Q4 along with information from the IBRN database on macroprudential policy changes in home and host countries, involving most of EU countries plus some additional countries in which the parent banks of some foreign affiliates reside. Using the panel of euro area banks, we estimate panel regressions and find evidence for inward cross-border spillovers from capital regulation (*capital requirements* and *sector-specific capital buffers*), liquidity measures (*reserve requirements*) and borrower-based measures (*loan-to-value limits*), along the two channels of transmission.

Concerning the first domestic channel, we find that following the exposure-weighted tightening of *capital buffers* in the EU countries, euro area domestic banks reduce lending on average by 5.8%. In contrast, when *loan-to-value limits* or *reserve requirements* are tightened, EU banks tend to, on average, increase their lending, by 7.2% and 5.5%, respectively. This evidence may suggest that domestic banks react to tightened foreign macroprudential policy by reducing lending possibly in reaction to an increase in lending by foreign banks residing in the domestic economy associated with a transfer of resources from domestic banks placed in the foreign economies where the regulation has become harsher or by rebalancing their cross-border portfolios in response to the tighter environment abroad on their foreign affiliates (balance sheet adjustments). This is because capital tightening abroad affects also the capital requirements of the bank on the consolidated level. Instead, when macroprudential instruments that operate locally are used, they seem to encourage banks to increase lending in other jurisdictions, possibly by rebalancing their lending portfolio in view of the changes in the relative price of lending among them. When considering a more comprehensive specification with interaction terms the *sector-specific capital buffers* also tend to lead to an increase in lending, similarly as in the case of other instruments that operate locally. In addition, we also find that banks in countries in the expansionary phase of the financial cycle increase lending to a larger extent when *sector-specific capital requirements* in other EU countries are tighter on average.

Turning to the second channel, which operates via the lending behavior of foreign affiliates, we also find that the tightening of *sector-specific capital buffers* leads

to an increase in lending by 1.7% and 3.7% after the first and the second quarter, respectively. This also seems to be confirmed by the joint test of significance of the sum of the contemporaneous term and two lags' coefficients, which suggests that the cut-cumulative index is significant at the 10% level. However, this finding is not confirmed by the comprehensive specification with interaction terms. The two other instruments considered in the second channel (*capital requirements* and *local reserve requirements*) do not seem to play a role in this transmission.

Taken together, our findings suggest that the sign of cross-border spillovers, ie whether the tightening of the instrument in the home country leads to an increase or decrease in lending by foreign affiliates is instrument-specific. It seems that instruments that are directed toward specific borrowers or sectors, such as *loan-to-value limits* or *sector-specific capital buffers* are prone to cross-border leakages, as EA banks seem to shift their foreign lending to other jurisdictions, while tightening of *capital requirements* leads to a decrease in lending also abroad.

Moreover, we find that bank characteristics play a role in the propagation of cross-border spillovers of macroprudential policy from the home countries on lending of euro area foreign banks: When looking at the first channel, we find that less liquid EA banks reduce lending by less when the exposure weighted capital requirements are tightened; we also find that better capitalized banks increase lending by more when sector-specific capital buffers in host countries are tightened. If loan-to-value limits in the host countries are tightened, larger (as measured by total assets) EA banks are also found, to increase lending more than other banks.

All in all, our results seem to confirm that cross-border spillovers play a role in affecting lending in the euro area. The sign and the magnitude of the spillovers seem to depend on several factors: the ownership structure of the bank (domestic or foreign; subsidiary or branch); the type of instrument, which determines which banks are affected and influences their incentives for adjusting cross-border lending; how the policy stance is measured (in changes or cumulatively); the timing of implementation (contemporaneous or lagged), the bank balance sheet and country characteristics. All these factors should be taken into account by the macroprudential policy maker when designing and implementing the policies. Our findings also speak for stronger reciprocity arrangements in order to mitigate leakages.

References

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