C MICRO- VERSUS MACRO-PRUDENTIAL SUPERVISION: POTENTIAL DIFFERENCES, TENSIONS AND COMPLEMENTARITIES[1]

This special feature discusses the potential differences, tensions and complementarities between micro- and macro-prudential policies. It argues (i) that in spite of the frictions that may arise between them, micro- and macro-prudential policies overall complement each other, and (ii) that the two policy domains play an equally important role in ensuring financial stability. To benefit most from their complementarities, it is essential that there is constructive cooperation and information sharing between micro- and macro-supervision.

INTRODUCTION

Micro- and macro-prudential policies share a number of instruments, but have a different, albeit related, focus

The Basel III accords have significantly changed prudential supervision, with a view to complementing micro-prudential supervision with a macro-prudential dimension designed to address systemic risk.[2]

This special feature discusses the inter-relations between micro- and macro-prudential supervision. Micro- and macro-prudential policies share a number of instruments, but have a different, albeit related, focus. The focus of micro-prudential policy is the stability of individual financial institutions. By contrast, the focus of macro-prudential policy is the stability of the financial system as a whole.

Complementarities

Complementarities between the two policy domains may arise primarily because they do not rely on exactly the same set of tools (e.g. counter-cyclical capital buffers are in the realm of macro-prudential supervision only). To give an example of complementarity: the counter-cyclical nature of some macro-prudential measures may have the unintended effect of leading banks to collectively take on risk ex ante. Micro-prudential measures may deter such collective behaviour by preventing excessive risk-taking at the level of individual banks.

Potential tensions

Tensions may arise primarily because micro-prudential supervision does not necessarily internalise the potential adverse effects that it may have at the macroeconomic scale. Frictions between micro- and macro-prudential policies are most likely to emerge during downturns.

DIFFERENCES BETWEEN MICRO- AND MACRO-PRUDENTIAL POLICIES

This section highlights that micro- and macro-prudential policies rely on similar instruments applied at the level of individual financial institutions and have a different, albeit related, focus.

Different focus

Micro-prudential supervision focuses on safeguarding individual financial institutions from idiosyncratic risks

The main focus of micro-prudential supervision is to safeguard individual financial institutions from idiosyncratic risks and prevent them from taking too much risk. However, the recent financial crisis has shown that the stability of individual financial institutions alone is not enough to ensure the stability of the financial system as a whole. This is why policy-makers and academic circles alike have been

1 Prepared by Frederic Boissay and Lorenzo Cappiello.

2 This special feature refers to micro- and macro-prudential supervision, rather than to micro- and macro-prudential supervisory authorities. Indeed, in practice, micro-prudential supervisors may also take into consideration risks to financial stability as a whole, and macro-prudential supervisors may also be concerned with the soundness of individual financial institutions, in particular systemically important financial institutions. See, for example, Hansen, L.P., "Challenges in identifying and measuring systemic risk", *NBER Working Papers*, No 18505, National Bureau of Economic Research, November 2012.

Macro-prudential supervision has a general equilibrium perspective

developing a complementary *macro*-prudential approach to financial supervision.[3] Macro-prudential supervision takes into account the interactions among individual financial institutions, as well as the feedback loops of the financial sector with the real economy, including the costs that systemic risk entails in terms of output losses. More often than not, such risk is generated endogenously during expansionary phases of the credit and business cycles. In those times, financial institutions' perceptions of risk tend to recede, and financial institutions may not internalise the adverse externalities which their increased risk-taking behaviour may generate on the economy as a whole. By taking a general equilibrium perspective, macro-prudential supervision internalises those externalities.[4] Moreover, macro-prudential policies have – by definition – a preventive role aimed at avoiding the excessive build-up of systemic risk over time, which in practice may also give these policies a macroeconomic stabilisation dimension. For example, it is likely that within their mandate, macro-prudential authorities will ease their policy stance during downturns and tighten it during upturns. In this sense, macro-prudential policies may also embed a counter-cyclical component.

Differences in the timing of policy interventions

The "paradox of financial instability"

Because micro- and macro-prudential supervision have a different focus, the timing of their policy interventions may differ over the credit or business cycles. Charts C.1 and C.2 illustrate this point. Chart C.1 shows the evolution of an indicator of bank default against the evolution of the outstanding amount of loans to non-financial corporations in the euro area and in the United States. During the credit boom that preceded the recent financial crisis, the one-year-ahead expected default frequency (in the euro area) and the number of bank defaults (in the United States) were negligible. This suggests that credit booms are not necessarily a source of concern for micro-prudential supervision, as banks, taken in isolation, look healthy during boom periods. When asset prices go up, indicators such as leverage ratios tend to decrease; also, market volatility is typically muted and risk tend to be under-priced. Even though vulnerabilities often reach their apex around peaks of the credit and business cycles, in those times the financial system seems stable – a phenomenon referred to as the "paradox of financial instability".[5] In these circumstances, it is likely that the risk assessment of a micro-prudential supervisor would be quite positive.

Risks build up long before they materialise, i.e. during good times

However, empirical evidence suggests that risks build up long before they materialise, i.e. during good times. Schularick and Taylor (2012), among others, argue that banking crises can be caused by the credit booms that precede them.[6] One reason why credit booms may turn into banking crises is that, during those booms, credit grows in excess of what economic fundamentals justify. Excess credit may, for

3 See, for instance, Kashyap, A., Tsomocos, D. and Vardoulakis, A., "How does macro-prudential regulation change bank credit supply?", *Working Paper Series*, The University of Chicago Booth School of Business, February 2014; Boissay, F., Collard, F. and Smets, F., "Booms and systemic banking crises", *Working Paper Series*, No 1514, ECB, February 2013; Kashyap, A., Goodhart, C., Tsomocos, D. and Vardoulakis, A., "An integrated framework for analyzing multiple financial regulations", *International Journal of Central Banking*, January 2013, pp. 109-143; Kashyap, A., Goodhart, C., Tsomocos, D. and Vardoulakis, A., "Financial regulation in general equilibrium", *Working Paper Series*, The University of Chicago Booth School of Business, March 2012; Hanson, S., Kashyap, A. and Stein, J., "A macro-prudential approach to financial regulation", *Journal of Economic Perspectives*, Vol. 25, No 1, 2011, pp. 3-28; Kashyap, A., Berner, R. and Goodhart, C., "The macro-prudential toolkit", *IMF Economic Review*, Vol. 59, 2011, pp. 145-161; Shin, H., "Macro-prudential policies beyond Basel III", Policy Memo, Princeton University, November 2010; Committee on the Global Financial System, "Macro-prudential instruments and frameworks: a stocktaking of issues and experiences", *CGFS Papers*, No 38, Bank for International Settlements (BIS), May 2010; Committee on the Global Financial System, "Operationalising the selection and application of macro-prudential instruments", *CGFS Papers*, No 48, BIS, December 2012; *Key aspects of macro-prudential policy*, International Monetary Fund (IMF), June 2013 and the companion background paper of the same date; *Flagship Report on macro-prudential policy in the banking sector*, European Systemic Risk Board (ESRB), March 2014.

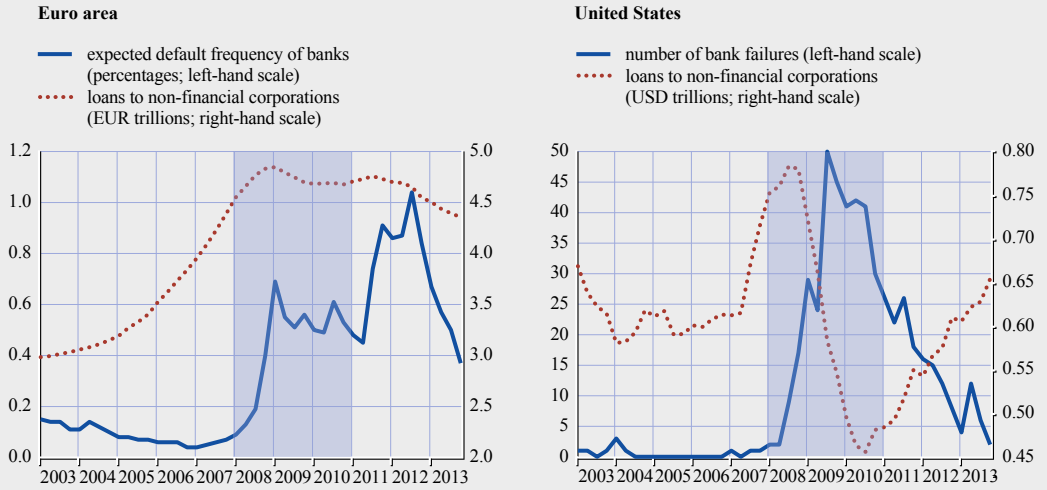
4 There are many sorts of externalities. De Nicolò et al., for instance, classify the externalities that lead to systemic risk into three categories: those related to strategic complementarities, those related to fire sales, and those related to bank interconnectedness. De Nicolò, G., Favara, G. and Ratnovski, L., "Externalities and macro-prudential policy", *IMF Staff Discussion Notes*, June, 2012.

5 Borio, C. and Drehmann, M., "Towards an operational framework for financial stability: "fuzzy" measurement and its consequences", *Working Paper Series*, No 284, BIS, June 2009.

6 Schularick, M. and Taylor, A., "Credit booms gone bust: monetary policy, leverage cycles, and financial crises, 1870-2008", *American Economic Review*, Vol. 102, Issue 2, April 2012, pp. 1029-61.

Chart C.1 Bank defaults and loan developments in the euro area and the United States

(Q1 2003 – Q4 2013)



Sources: Moody's and ECB.
Note: The expected default frequency is measured at a one-year horizon.

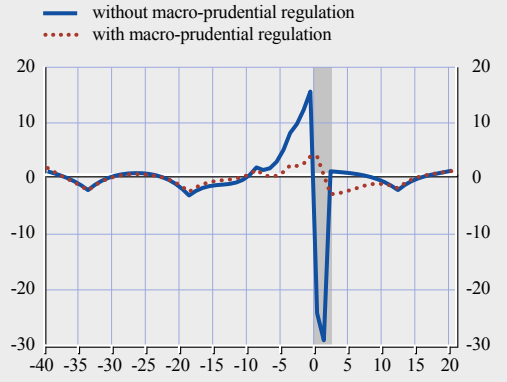
Sources: Federal Deposit Insurance Corporation and US flow of funds accounts.
Note: Non-financial corporate business; loans from depository institutions.

example, be due to banks taking on excessive risks. Keys et al. (2010), inter alia, show that US banks significantly relaxed their screening of borrowers between 2003 and 2007 because they could securitise their loans and shift the excess risk elsewhere in the financial system.[7] At the time, banks did not internalise that, as they unravelled, those credit risks would harm the economy as a whole and have an impact on them by ricochet.

This analysis suggests that it is important that macro-prudential actions be taken in good time, i.e. already during booms. Chart C.2 reports the simulations of the credit cycle around a banking crisis in the Boissay-Collard-Smets (2013) model, where a crisis is defined as a sudden freeze of the wholesale financial market that is accompanied by a deep and long-lasting recession.[8] In the chart, the blue line shows the evolution of credit in the absence of macro-prudential supervision. The resulting excessive credit growth is responsible for a crisis which breaks out in period 0. The dotted red line shows

Chart C.2 Externalities over the credit cycle

(percentages)



Source: ECB.
Notes: Simulation of the credit (Hodrick-Prescott) cycle around the typical banking crisis (period 0) in the Boissay-Collard-Smets (2013) macro model. The blue line denotes the decentralised equilibrium allocation (without policy intervention) around banking crises (period 0). The dotted red line denotes the central planner allocation around the same dates. The difference between the two allocations reflects the role of externalities in the model. The underlying economic fundamentals are the same in the two cases.

It is important that macro-prudential actions be taken in a timely manner, i.e. already during booms

7 Keys, B., Mukherjee, T., Seru, A. and Vig, V., "Did securitisation lead to lax screening? Evidence from subprime loans", *Quarterly Journal of Economics*, Vol. 125, Issue 1, 2010, pp. 307-362.
8 Boissay, F., Collard, F. and Smets, F., op. cit.

the evolution of credit that would prevail if a supervisor addressed the negative externalities linked to this credit boom. In this case, macro-prudential policy could reduce the frequency or the depth of crises by curbing credit growth during the expansionary phase.

These differences in policy focus and timing imply that there are complementarities between the two policy domains, but also that tensions can arise.

COMPLEMENTARITIES BETWEEN MICRO- AND MACRO-PRUDENTIAL SUPERVISION

This section argues that complementarities exist between micro- and macro-prudential supervision and that the two policy domains play an equally important role in ensuring financial stability.

As mentioned above, complementarities may arise because the two policy domains have a different – albeit related – focus, and do not share exactly the same set of policy instruments. For example, unlike micro-prudential supervision, macro-prudential supervision can activate counter-cyclical capital buffers under the Basel III framework. Complementarities may also emerge because micro- and macro-supervision may not use their common instruments with the same degree of granularity. Overall, one can distinguish at least two levels of complementarity.

Macro-prudential policies are in some cases blunter than micro-prudential ones

First, macro-prudential policies are in some cases blunter than micro-prudential ones. For instance, if in bad times counter-cyclical macro-prudential policies are softened uniformly across all banks – as could be the case for counter-cyclical capital buffers – this may inadvertently keep unhealthy "zombie" banks alive. The congestion created by zombie banks may in turn reduce the profits for healthy banks, or generate counterparty fears that would discourage lending on the interbank market. Micro-prudential policies can address such undesired effects.

Macro-prudential policies may be vulnerable to "collective moral hazard" problems

Second, macro-prudential policies may be vulnerable to "collective moral hazard" problems.[9] By their nature, some macro-prudential policies are counter-cyclical. A typical counter-cyclical macro-prudential instrument is the counter-cyclical capital buffer, which is commonly released during downturns. If banks anticipate that during periods of financial distress, policy actions aimed at relieving regulatory requirements will be implemented, then they may have ex ante incentives to *collectively* invest in risky, high-yield assets. At the same time, it is precisely because banks take on collective risks that macro-prudential supervision may be forced ex post to implement this counter-cyclical policy measure. Of course, macro-prudential supervision could anticipate such herd behaviour and further increase counter-cyclical capital buffers ex ante. Ultimately, though, taming collective moral hazard may require large and potentially inefficient fluctuations in counter-cyclical capital buffers. In this respect, micro-prudential supervision can help avoid an inefficient outcome by implementing ex ante tough measures on those tail banks that invest the most in risky assets. Since micro-prudential supervision can tighten requirements on banks according to their individual risk, it would be ill-advised for a bank in isolation to take on too much collective risk in the first place.

POTENTIAL TENSIONS BETWEEN MICRO- AND MACRO-PRUDENTIAL SUPERVISION

During upturns potential tensions between micro- and macro-supervision are relatively muted

During upturns of the credit and business cycles, potential tensions between micro- and macro-supervision are relatively muted. Even though vulnerabilities may reach very high levels around peaks of the cycle, in those times individual financial institutions look sound. Therefore, if for

9 Farhi, E. and Tirole, J., "Collective moral hazard, maturity mismatch and systemic bailouts", *American Economic Review*, Vol. 102, Issue 1, February 2012, pp. 60-93.

instance, macro-supervision tightens its stance, e.g. by raising capital requirements uniformly across banks, this will be unlikely to lead to significant bank failures or be a source of tensions.[10]

During downturns diverging micro- and macro-prudential approaches could generate frictions

During downturns, by contrast, diverging micro- and macro-prudential approaches could generate frictions.[11] This, in turn, could lead to inefficient outcomes, especially as micro-prudential policies may inadvertently cause negative externalities on the financial system as a whole. As shown in Chart C.1, in bad times, banks' capital buffers may fall, which makes failures more likely. To increase banks' resilience, micro-prudential supervision may require banks to hold higher levels of capital, so as to prevent counterparty runs, notably of institutional depositors.[12] Assume, for instance, that capital requirements are tightened, even for only a few but systemically important banks. This may induce those banks to deleverage by reducing their demand for assets or by shedding assets at fire sale prices, which in turn may entail capital erosions for other banks. An increase in capital requirements for some banks may also suffice to alter the banking sector's beliefs about the state of the economy and amplify the slump.[13] Indeed, in an intriguing paper, Bebchuk and Goldstein (2011)[14] show how banks' beliefs and coordination failure among them can generate an inefficient freeze in the retail corporate loan market. Market freezes occur in equilibrium as banks may rationally avoid lending to non-financial firms with worthy projects because of self-fulfilling expectations that other banks will also withhold loans.[15] The macro-prudential approach is meant to take such externalities into consideration.

CONCLUDING REMARKS

Micro- and macro-prudential supervision play an equally important role in ensuring financial stability and they complement each other. But in some cases tensions may arise between them. In order to fully exploit the complementarities between the two policy domains, minimise frictions and ensure an efficient use of policy instruments, it is essential that there is constructive cooperation and an adequate flow of information between micro- and macro-supervision. A sound and shared diagnosis of the factors determining a crisis could serve as a basis for such cooperation. While it is important that the two policy domains coordinate on a regular basis, the benefits may be the greatest during recessions when tensions between micro- and macro-prudential policies are likely to arise.

10 The counter-cyclical capital buffer extends the capital conservation buffer, and thus goes beyond the minimum capital requirements. If the counter-cyclical capital buffer is set between 0% and 2.5% of risk-weighted assets, mandatory reciprocity requirements apply. However, when justified by the underlying risk, the counter-cyclical capital buffer can be set above 2.5%, in which case recognition of the higher buffer rate by other designated authorities is voluntary. Banks are meant to build such a buffer in good times and draw it down in bad times.

11 Osiński, J., Seal, K. and Hoogduin, L., "Macroprudential and microprudential policies: towards cohabitation", *IMF Staff Discussion Notes*, June 2013.

12 Institutional depositor runs turned out to be an important factor in the recent financial crisis – see Shin, H., *Risk and Liquidity*, Clarendon Lectures in Finance, Chapter 8, Oxford University Press, 2010.

13 Whether or not an increase in capital requirements affects lending is debated. On the one hand, some studies argue that higher capital requirements have a limited impact on lending; see Elliott, D., "Quantifying the effects on lending of increased capital requirements," mimeo, The Brookings Institution, 2009; or Hanson, S., Kashyap, A. and Stein, J., "An analysis of the impact of 'substantially heightened' capital requirements on large financial institutions", mimeo, The University of Chicago Booth School of Business, 2010. On the other hand, some other studies argue that reducing capital requirements during a recession may be beneficial to lending; see Jiménez, G., Ongena, S., Peydro, J.-L. and Saurina, J., "Hazardous times for monetary policy: what do 23 million bank loans say about the effects of monetary policy on credit risk-taking?", *Econometrica*, Vol. 82, No. 2, March 2014, pp. 463-505.

14 See Bebchuk, L. and Goldstein, I., "Self-fulfilling credit market freezes", *Review of Financial Studies*, Vol. 24, No 11, 2011, pp. 3519-55.

15 The analysis of Bebchuck and Goldstein (2011) is based on the assumption that operating non-financial firms are interdependent, and that they benefit from the success of other firms, which in turn depends on their ability to obtain external finance. In such a world, the study distinguishes between three scenarios. In the first scenario, fundamentals are poor and banks rationally do not lend to non-financial firms, independently of their expectations regarding the lending attitude of other banks. In the second scenario, fundamentals are good and therefore banks find it worth lending, regardless of their expectations of what other banks do. Finally, there is a scenario in which fundamentals lie in an intermediate range and multiple equilibria can arise. It is in this situation that an efficient lending equilibrium or an inefficient credit freeze equilibrium can materialise.

In this respect, the recent arrangements in Europe go into the right direction. The Supervisory Board of the Single Supervisory Mechanism (SSM) has been established to plan and carry out the ECB's supervisory tasks, undertake preparatory work, and propose complete draft decisions for adoption by the ECB's Governing Council. Adequate cooperation between micro- and macro-prudential supervision will be ensured by the composition of the Supervisory Board, which includes a Chair, a Vice-Chair (a member of the ECB's Executive Board), four ECB representatives and one representative of the national competent authority of each participating Member State.[16]

16 Where the competent authority is not a national central bank (NCB), the members of the Supervisory Board may decide to bring in a representative from their respective NCB, but any one Member State will have only one vote in the Supervisory Board. See Special Feature A "Preparatory work for banking supervision at the ECB", *ECB Financial Stability Review*, November 2013.