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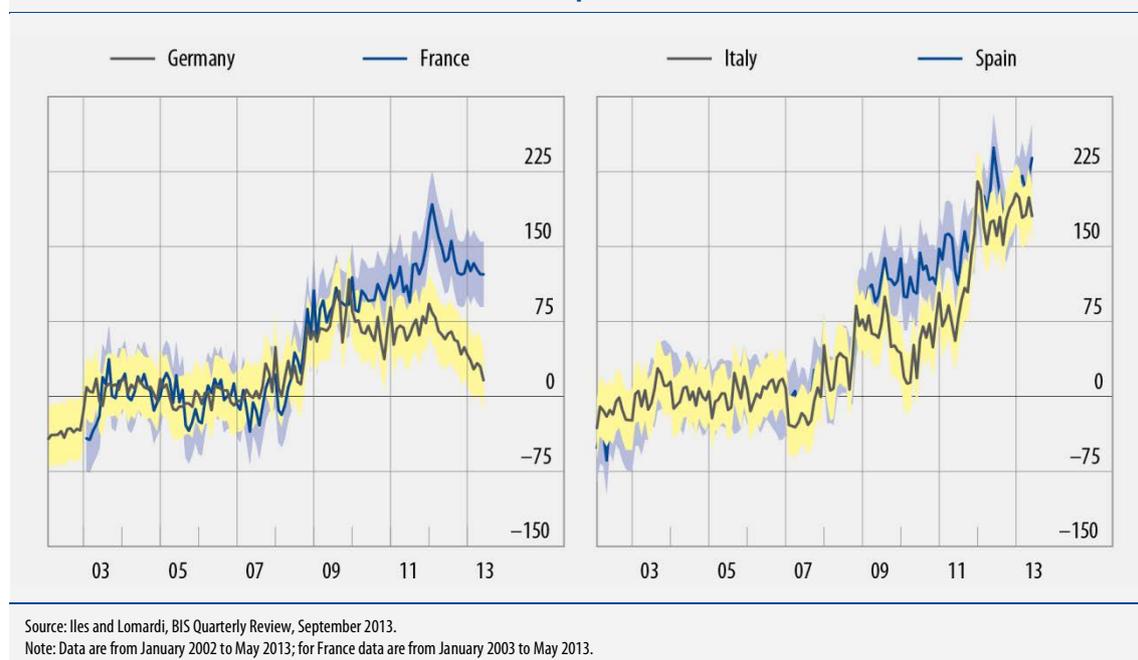
## **Bank capital regulation and monetary policy transmission**

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The importance of bank capital adequacy for ensuring bank solvency is well understood. Bank capital is a loss-absorbing buffer that protects depositors and taxpayers against potential losses resulting from bank insolvency.

However, bank solvency is not the only reason why central bankers should be concerned about adequate bank capital. Bank capital is the basis of the bank's lending activity, and bank capital that ensures solvency may not be enough to ensure adequate lending. For central bankers, adequate bank capital therefore takes on an importance that extends well beyond their role (if any) as prudential regulators. Well-capitalised banks are essential for the transmission of monetary policy. Bank capital is therefore a matter of effective monetary policy, not just the prudential regulation of banks.

**Figure 1 – Spread between actual loan rate to non-financial firms and predicted rate from pre-crisis data (basis points)**



To illustrate the point, Figure 1 shows the spread between the actual loan interest rate to non-financial firms and the predicted rate based on a pre-crisis sample up to August 2008 from a cointegrating model of interest rates. The charts come from Iles and Lomardi (2013)<sup>1</sup>, and the bands indicate 90% confidence intervals. We see that lending rates to non-financial firms rose above their historical levels relative to other interest rates in the economy with the onset of the 2008 crisis. The left-hand panel shows that lending rates in Germany began to come back in line with the historical average from 2012, but those in France remained stubbornly high. Most notably, the lending spreads in Italy and Spain continued to rise above historical levels.

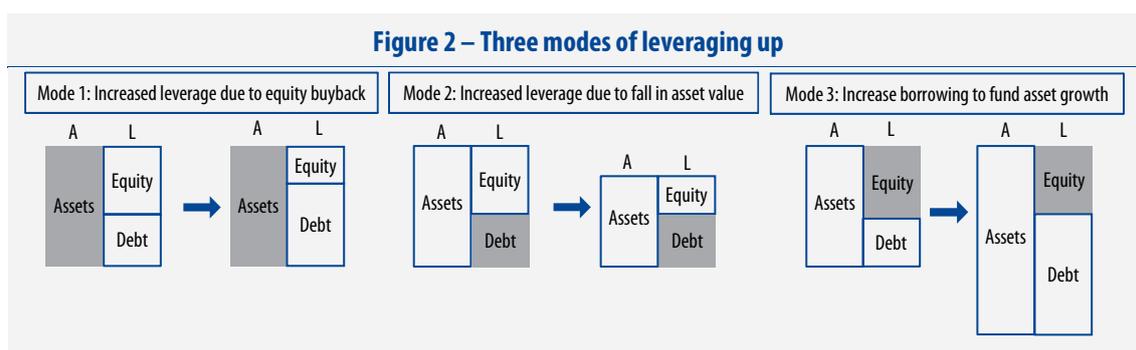
To understand the role of bank capital in banks' lending decisions, we need to understand more fully the balance sheet decisions of banks. The role of bank capital as a loss-absorbing layer is well understood.

<sup>1</sup> Iles, A. and Lomardi, M. (2013), "Interest rate pass-through since the financial crisis", *BIS Quarterly Review*, September.

However, more relevant for monetary policy is the bank's lending decision. For this, we need to understand the determination of bank leverage.

## Basics of the corporate finance of banking

Assuming that leverage is defined as the ratio of total assets to the equity of a firm, Figure 2 shows three ways that a firm (financial or otherwise) can increase its leverage. In each case, the grey shaded area represents the balance sheet component that does not change.

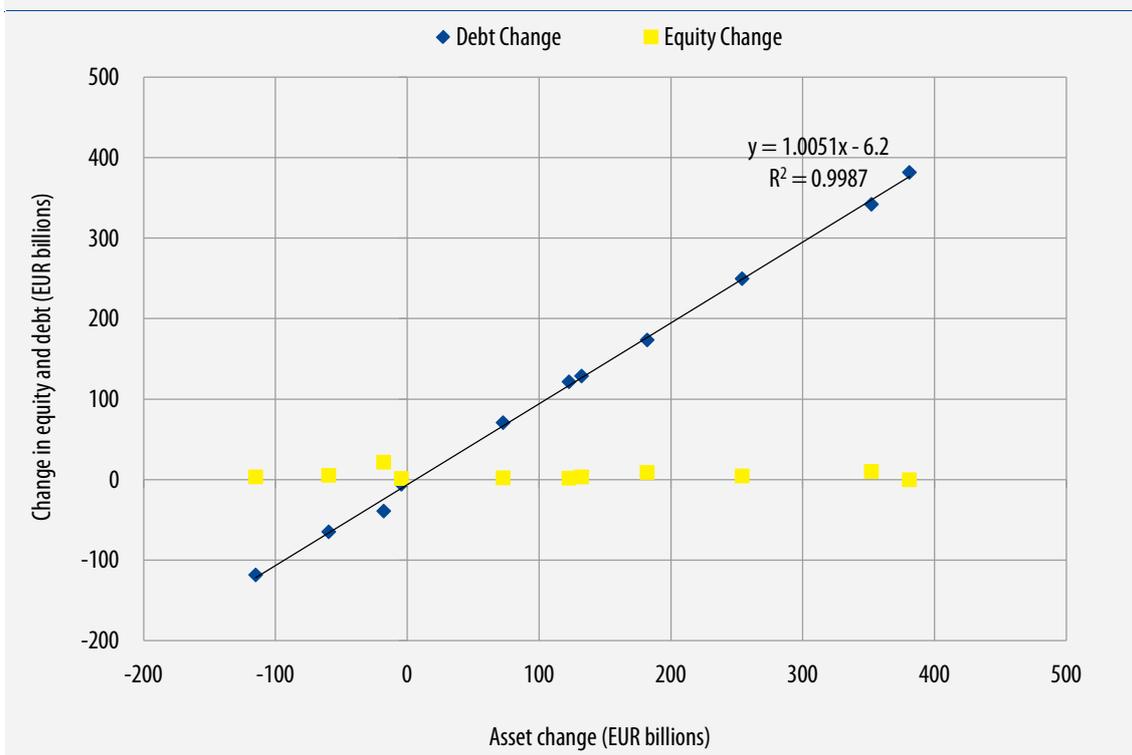


Mode 1 on the left is the case typically dealt with in MBA textbooks on corporate finance. It depicts a financial operation where the firm issues debt and buys back equity financed with the proceeds of the debt issue. The assets of the firm are unchanged. This is the way, for instance, that a private equity fund would acquire a target firm.

Mode 2 depicts the consequences of a drop in the value of assets of the firm – say, through a dividend paid to shareholders financed by an asset sale. The leverage goes up because the notional debt remains unchanged, but the firm's assets shrink in value. The shrinking of the asset value could reflect just a decline in the price of the assets, so that the increase in leverage is the result of market value changes.

For banks, however, neither Mode 1 nor Mode 2 turns out to be the right picture. Banks adjust their leverage as in Mode 3, where new assets are financed by issuing new debt, with equity remaining much less variable.

**Figure 3 – One-year change in assets, equity, debt and risk-weighted assets of a large euro area bank, 1999-2010**



Source: Bankscope.

Figure 3 shows the scatter plot of the change in total assets of a large euro area bank where we plot the annual changes in assets (in billions of euro) against annual changes in equity, as well as annual changes in assets against changes in debt. This plot is typical of banks irrespective of jurisdiction and level of development.<sup>2</sup>

The fitted line through the scatter plot between the change in assets and change in debt has a slope that is essentially equal to 1, meaning that the change in assets is almost all accounted for by the change in debt, just as in Mode 3. Consequently, total lending by the bank is determined by its leverage decision given a fixed, exogenous level of equity. Credit supply conditions are governed by the same forces that determine the bank's leverage.

A useful analogy that drives home the point is that of a building and its foundations. The bank's equity is like the foundations of a building. The leverage of the bank is the height of the building that stands on the foundations. The total size of the building, as measured by its volume is the total lending done by the bank. The scatter chart above suggests that the foundations of the building are established exogenously, and what changes is the height of the building that stands on those foundations. The higher the building, the higher the leverage and the greater the amount of lending done by the bank.

<sup>2</sup> See Adrian, T. and Shin, H.S. (2014) "Procyclical Leverage and Value-at-Risk", Review of Financial Studies, Vol 27 (2), February, pp. 373-403.

During boom times, the volume of the building increases by the bank adding new floors to the existing building. In other words, the bank increases its total assets by increasing its leverage with the equity being exogenous. The boom is associated with greater availability of credit and lower measures of risk.

**Figure 4 – Sutyagin house in Archangel, Russia**



Figure 4 is the celebrated Sutyagin House in Archangel in Russia, reputed to be the tallest wooden structure in the world when it was completed. The building's multi-layered architecture suggests that the builder added new floors to the existing structure as the construction progressed. The turret at the top seems very much to be the final flourish of the builder, added on top of an already precarious structure. The analogy would be with the subprime mortgage securitisations that came late in the credit boom.

The problem comes during the downturn. At this point, the bank wishes to reduce lending by reducing leverage. In terms of our analogy, this is akin to the bank wishing to reduce the size of the building by demolishing existing floors. However, contractions in lending are associated with reduced credit supply, tighter credit conditions and a refusal to lend even to solvent borrowers with the capacity to service their debt. As supply conditions tighten, the spread in bank lending remains stubbornly high, just as in Figure 1.

The availability of credit and how credit varies over the business cycle are clearly matters of great importance. Some cyclical variation in total lending is to be expected, even in a frictionless world, as there

are more positive net present value (NPV) projects that need funding when the economy is strong than when the economy is weak. The question is whether the fluctuations in lending are larger than would be justified by changes in the incidence of positive NPV projects.<sup>3</sup>

In any case, whatever the correct explanation for the pro-cyclical nature of bank lending, one thing is clear. In the analogy that suggests bank capital is the foundation of the building, anything that chips away at the foundations will weaken bank lending capacity and reduce credit supply to borrowers that are wholly reliant on bank lending (such as small and medium sized enterprises).

Dividends would be one way in which the bank's equity can be dissipated, reducing the size of the building's foundations. In practice, however, banks in the euro area have been paying dividends that are a large proportion of the existing common equity of the banks.

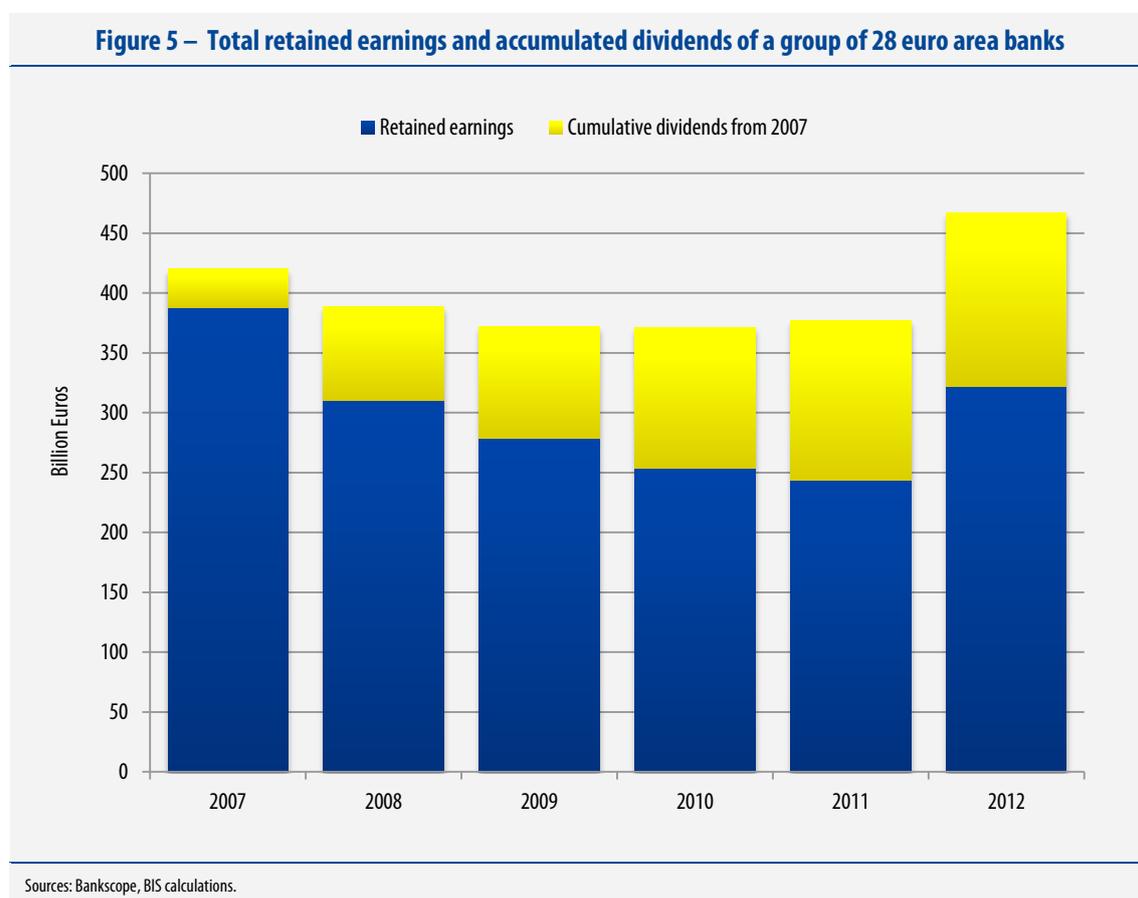


Figure 5 plots the total retained earnings and accumulated dividends from 2007 of a group of 28 euro area banks<sup>4</sup>

<sup>3</sup> Adrian and Shin (2014) delve deeper into the reasons for the pro-cyclicality of leverage and document the important explanatory role played by measured risks through the banks' value-at-risk figures.

Retained earnings are a stock that represents the accumulated value of retained earnings during the life of the bank. Retained earnings are the most important component of common equity.

We see from Figure 5 that the accumulated dividends paid from 2007 to 2012 add up to around EUR 150 billion, which represents around 50% of the retained earnings (or common equity) of the banks in the sample.

The dissipation of common equity due to dividends will be exacerbated by any equity buyback activity of the banks in the sample, meaning that the common equity of the banks would have been substantially higher had dividends and equity buybacks been suspended at the beginning of the crisis.

Figure 5 does not address the distribution of common equity across strong and weak banks, as it only plots the total. However, to the extent that interbank claims will help to cushion the impact of bank deleveraging pressures, any loss of bank capital of strong banks may contribute indirectly to the shrinking lending of weaker banks.

## Some lessons

The following are lessons of relevance for the relationship between bank capital adequacy and monetary policy transmission.

Dividends and share buybacks in the aftermath of a crisis should meet higher standards of capital adequacy than simply the solvency of the bank concerned. The externalities associated with the lending capacity of the banking system should be an important consideration.

Policies to conserve bank capital during the downturn will mitigate the contraction of lending. For contingent convertible bonds, conversion at higher thresholds of capital adequacy will help to replenish the going concern capital of banks and will mitigate the contraction of lending.

Most importantly, bank solvency is not the only issue when considering bank capital adequacy. A solvent bank may nevertheless refuse to lend. For central banks, solvency is only the first step. Bank capital is the basis for the bank's lending activity, and adequate lending is the cornerstone of the effective transmission of monetary policy to the economy as a whole.

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<sup>4</sup> BNP Paribas, Crédit Agricole S.A., Société Générale, Commerzbank AG, Deutsche Bank AG, Dexia, Deutsche Postbank AG, UniCredit S.p.A., Alpha Bank A.E., Banco Comercial Português, Credit Mutuel, Bank of Ireland, BPCE S.A., Banco Popular Espanol S.A., Eurobank Ergasias S.A., Erste Group Bank AG, Banco Espírito Santo de Investimento S.A., Landesbank Hessen-Thüringen Girozentrale – HELABA, ING Groep N.V., KBC Groep N.V., Banca Monte dei Paschi di Siena S.p.A., National Bank of Greece S.A., Raiffeisen Zentralbank Oesterreich AG – RZB, Intesa Sanpaolo, Banco Santander S.A., RBS Holdings N.V., Millennium bcp S.A. and Banco Bilbao Vizcaya Argentaria S.A.