



On book equity: why it matters for monetary policy

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The book value of equity plays a central role in discussions of bank capital adequacy. Yet in academic circles among researchers in empirical corporate finance, it is common to hear the claim that book equity is a stale and backward-looking measure of the market value of the firm's equity, and that researchers should therefore use the market capitalisation of the firm and ignore book equity whenever the market capitalisation measure is available. It is also common for empirical papers to discard financial firms from the dataset at the outset. For both reasons, banks' book equity ends up being neglected by researchers.

Today, I would like to redress the balance in favour of book equity, especially for banks. Indeed, I will argue that the importance of book equity goes beyond its role as a loss-absorbing buffer that protects depositors and taxpayers against potential losses. Book equity is also the foundation for bank lending, so that adequate book equity plays a central role in the provision of credit to the real economy. For this reason, adequate book equity is critical for the effective transmission of monetary policy. After all, solvent banks can still refuse to lend. Equity that is sufficient to induce banks to lend could turn out to be considerably higher than equity that ensures solvency.

Let us start by reminding ourselves of some basic definitions. The enterprise value of a firm is the sum of its market capitalisation and debt. The enterprise value of a bank addresses how much the bank is worth to its stakeholders. A bank's enterprise value is the theoretical sum of money that would be needed to buy out the shareholders and debt holders. In contrast, the total assets of the bank address how much the bank lends, either directly as loans or through other claims. Both enterprise value and total assets convey useful information, but they address different questions.

Figure 1 illustrates how different total assets and enterprise value can be. The left-hand panel plots the weighted average percentage change in assets of a group of eight US commercial banks and broker-dealers against the weighted percentage change in leverage of these same banks, where leverage is defined as the ratio of assets to book equity. The figure is taken from Adrian and Shin (2014).² The right-hand panel of Figure 1 is the analogous scatter chart using enterprise value and "enterprise value leverage", where enterprise value leverage is defined as the ratio of the enterprise value to market capitalisation.

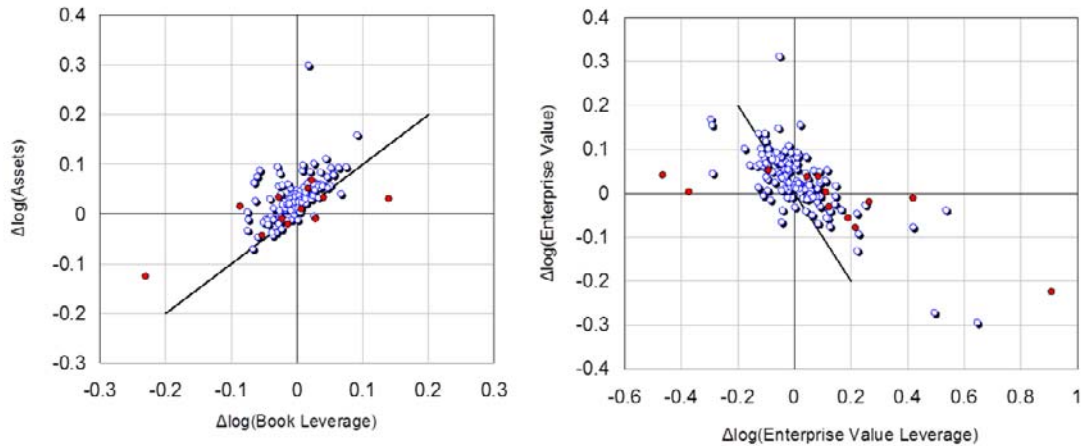
¹ The views expressed here are my own, and not necessarily those of the Basel Committee on Banking Supervision or the Bank for International Settlements.

² T Adrian and H S Shin, "Procyclical leverage and value-at-risk" *Review of Financial Studies*, vol 27, no 2, 2014, pp 373–403.



The scatter chart in Figure 1 reveals that, while book leverage is procyclical, enterprise value leverage is countercyclical. That is, book leverage is high when assets are large, but enterprise value leverage is low when enterprise value is high.

Figure 1: Book leverage is procyclical, enterprise value leverage is countercyclical



Source: T Adrian and H S Shin (2014) cited above.

The two charts are perfectly compatible in that they have very different meanings. The left-hand panel of Figure 1 shows that banks reduce lending by reducing their debt – that is, by deleveraging. Hence, leverage is low during downturns and high during booms. The right-hand panel shows that most of the value of the bank is in the hands of the debt holders during downturns, as the share price of the bank falls. Hence, enterprise value leverage is high during downturns.

Both charts in Figure 1 are of interest, but the left-hand panel is of special concern to central bankers and macroeconomists, as their primary concern is with the supply of credit. Enterprise value is of more concern to investment bankers and private equity firms, whose concern is with how much the bank is worth. Indeed, there is now considerable evidence that book leverage is an important determinant of asset returns, and more informative than market capitalisation in explaining asset returns.³ These results derive from the role of book leverage as an indicator that captures credit conditions, and hence of risk premiums.

Let us now look more closely at the role of book equity in banks' lending decisions. As a first step, we need to understand more fully the balance sheet adjustment of banks. The role of bank capital as a loss-absorbing layer is well understood. However, more relevant for monetary policy is the bank's lending decision.

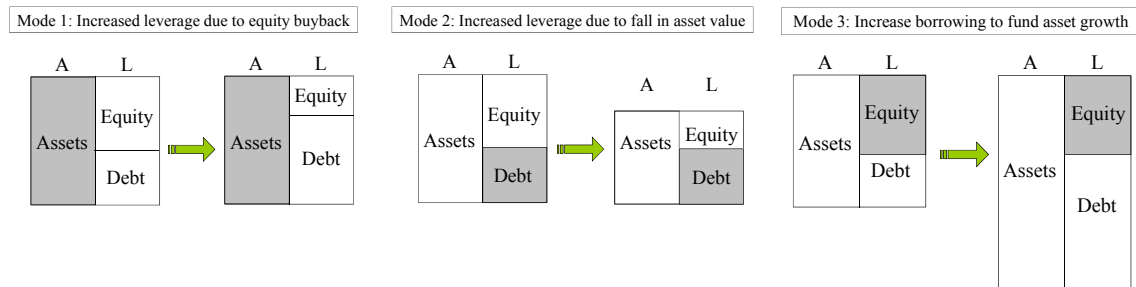
³ T Adrian, E Moench and H S Shin, "Dynamic leverage asset pricing" Federal Reserve Bank of New York staff report 625, 2014



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Recall that we are defining book leverage as the ratio of total assets to the book 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.

Figure 2: Three modes of leveraging up



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 finance the acquisition of 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.

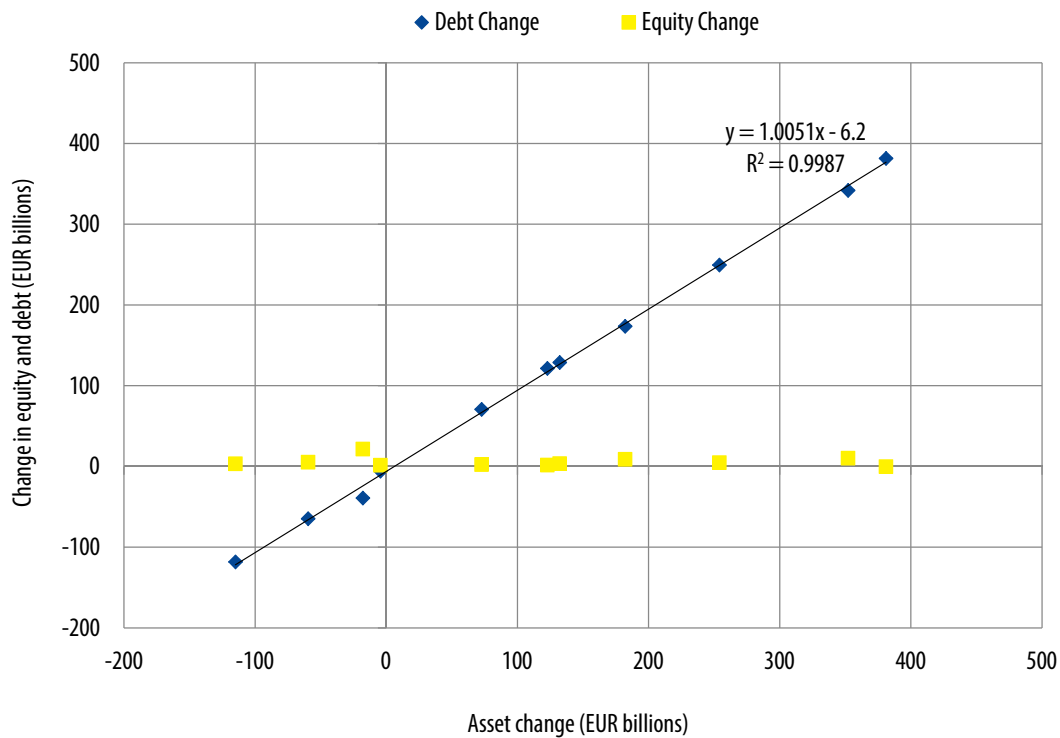
Figure 3 shows the scatter plot of the change in total assets of a large euro area bank where we plot the annual changes in assets (in billions of euro) against annual changes in equity, as well as annual changes in assets against changes in debt. This plot is typical of banks irrespective of jurisdiction and level of development.⁴

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.

⁴ See T Adrian and H S Shin (2014) cited above



Figure 3: One-year change in assets, equity, debt and risk-weighted assets of a large euro area bank, 1999–2000



Source: Bankscope.

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 is the leverage and the greater is the amount of lending done by the bank. 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 risk weights.

Some recent work of mine with my colleague Leonardo Gambacorta provides further insights that back up the analogy between book equity and the foundations of a building. The presentation slides provide further details. In panel regressions using data from 109 banks drawn from around the world, the elasticity of total lending with respect to book equity is very close to one once we put in time fixed effects accounting for the cyclical variation that affects all banks. The unit elasticity is measured with a high degree of statistical confidence. The unit elasticity also holds between total exposures of the bank and its equity, and is unaffected by the inclusion of other macro controls.

Previous research in banking has taught us that lending by well-capitalised banks is less sensitive to monetary policy shocks as compared to that by less well capitalised banks. In my recent work with Leonardo Gambacorta, we find the source of the difference in the fact that better capitalised banks have access to funding at cheaper rates, and are able to access more of the funding. These findings shed light on why a solid foundation of equity is so important for a bank in its lending decision. As the bank borrows in order to lend, its access to funding is crucial for lending. A larger foundation (high capital) supports a larger loan book because the financing constraint faced by the bank is less severe.



Figure 4: Sutyagin house in Archangel, Russia
(left-hand panel, circa 2007; right-hand panel, circa 2008)



Figure 4 shows the celebrated Sutyagin House in Archangel in Russia, reputed to have been the tallest wooden structure in the world when it was completed. The left-hand photo shows its heyday from around 2007, while the right-hand photo is from around 2008 after the building was condemned as a fire risk and its upper floors were dismantled. The building's multi-layered architecture in its heyday 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.

The eventual fate of the Sutyagin house is something of a parable for excessive leverage. After having its upper floors dismantled in 2008, it eventually burned down in a fire in 2012.⁵ The dates with the banking crisis are coincidental, but the analogy gains added poignancy.

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. The evidence points to procyclicality in lending that goes beyond the availability of viable projects in a frictionless world.

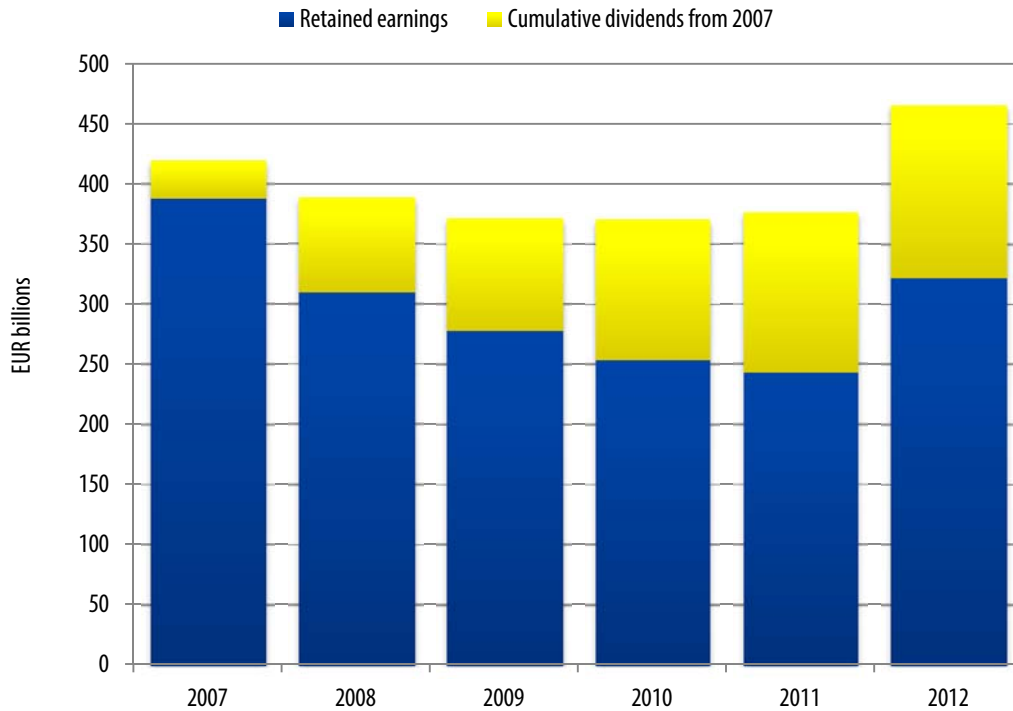
In any case, whatever the correct explanation for the procyclical nature of bank lending, one thing is clear. In the analogy between bank capital and the foundations of a building, anything that chips away at the foundations will weaken bank lending capacity and reduce credit supply to borrowers that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

⁵ http://en.wikipedia.org/wiki/Sutyagin_House.



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

Figure 5: Total retained earnings and accumulated dividends of a group of 28 euro area banks



Sources: Bankscope; BIS calculations.

Figure 5 is an illustration for the euro area, and plots the total retained earnings and accumulated dividends from 2007 of a group of 28 euro area banks.⁶ 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 (essentially 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

⁶ BNP Paribas, Crédit Agricole SA, Société Générale, Commerzbank AG, Deutsche Bank AG, Dexia, Deutsche Postbank AG, UniCredit SpA, Alpha Bank AE, Banco Comercial Português, Credit Mutuel, Bank of Ireland, BPCE SA, Banco Popular Espanol SA, Eurobank Ergasias SA, Erste Group Bank AG, Banco Espírito Santo de Investimento SA, Landesbank Hessen-Thüringen Girozentrale – HELABA, ING Groep NV, KBC Groep NV, Banca Monte dei Paschi di Siena SpA, National Bank of Greece SA, Raiffeisen Zentralbank Oesterreich AG – RZB, Intesa Sanpaolo, Banco Santander SA, RBS Holdings NV, Millennium bcp SA and Banco Bilbao Vizcaya Argentaria SA



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, as well as solvency.

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. In this sense, well capitalised banks are a matter of effective monetary policy, not just the prudential regulation of banks.

The importance of bank equity for monetary policy effectiveness is a timely reminder for policymakers at a time when all the focus has been on debt financing of one kind or another provided by central banks. If the objective of central bankers is to encourage greater lending, then equity is key, not more debt.