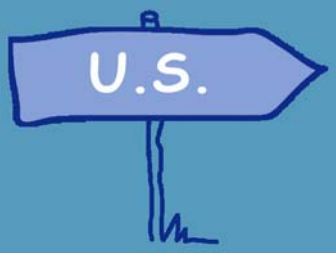
Economic Research Department

BBVA



Banking Observatory

May 28th, 2009

Deleveraging and the aftermath of overexpansion

- The deleveraging process for commercial banks is likely to last years and overshoot compared to fundamentals
- A strong procyclical correlation exists between asset growth and leverage growth over the past 75 years
- At the level of the firm, boom times generate decreasing collateralization rates and increasing average loan sizes
- Given two-year loan losses of $1.1tr and leverage declines of -5% to -7.5%, we expect deleveraging to curtail commercial bank credit by $646bn and $687bn per year for 2009-2010

Trends in deleveraging and commercial banking over time

Deleveraging is the process whereby commercial banks reduce their ratio of assets to equity capital, thus bringing down their aggregate exposure to the economy. Many commentators point to this process as an eventual destination for the US commercial banking system, but few have described where or how we arrive at a more deleveraged commercial banking system.

Over the past seventy years, the commercial banking sector's aggregate balance sheet has demonstrated a strong positive correlation between leverage and asset growth. For the banking industry, 2004 was an exceptionally unusual year, with equity increasing yoy by 22%. A considerable part of this increase related to a merger boom during the year, with goodwill in the banking system increasing by $117bn, a gain of 74% yoy.

Additionally, banking crises sometimes lead to industry-wide declines in assets alongside significant deleveraging. When adjusted for inflation, the savings and loan crisis of 1989-1991 is viewed as a period of significant decline in assets. During this era roughly 1,000 banking institutions closed or were assisted by the Federal Deposit Insurance Corporation (FDIC). Leverage increased in each year from 1990 to 1993, with total assets declining by 3.6% in inflation-adjusted dollars. A similar period of deleveraging occurred from 1980 to 1984 and 1975-1976, with assets declining 4% in 1975.

Recent research into banking conditions during the Great Depression also demonstrates asset declines and deleveraging.[1] Banks during this era faced a lack of deposit insurance which promoted bank runs and significant stigma attached to external capital raising. As a result, loan liquidation was costly and lengthy. Data on New York City Federal Reserve member banks revealed a roughly 30% drop in assets between 1929 and 1933. Aggregate loans dropped by roughly half during the same period.

[1] Calomiris, Charles, Wilson, Berry, (2004) "Bank Capital and Portfolio Management: The 1930's 'Capital Crunch' and the Scramble to Shed Risk," Journal of Business, 77:3:421-455.

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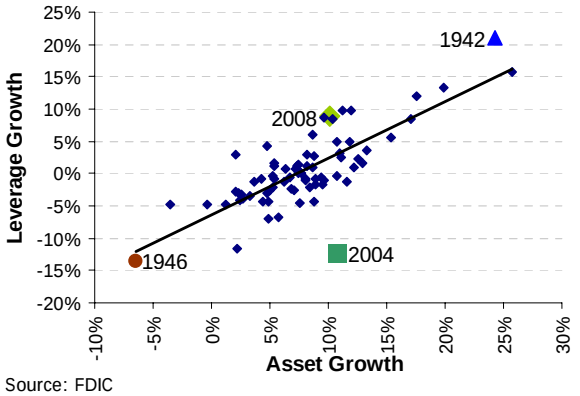
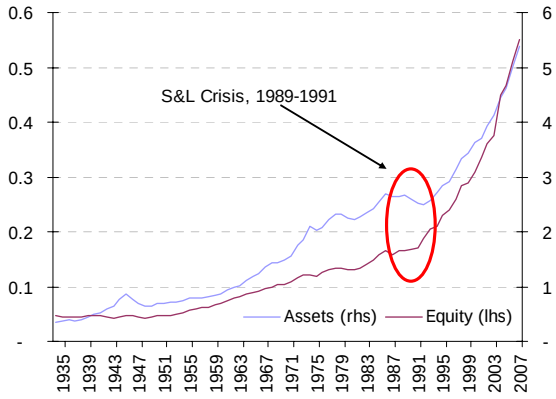
Banking System Asset and Leverage Growth
Nominal Values, 1934-2008



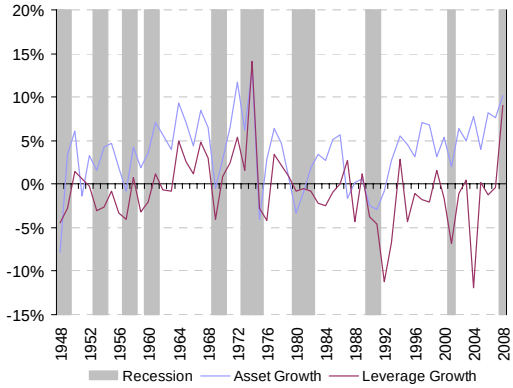
Source: FDIC

Commercial Bank Assets and Equity
Adjusted for Inflation by CPI, $tr



Source: BBVA ERD and FDIC

Leverage and Asset Growth
Adjusted by CPI, 1948-2008



Source: BBVA ERD, NBER and FDIC

Deleveraging at the firm level

The procyclical historical process described above between leverage and asset growth can be viewed at the level of the firm in two major ways. First, in parallel with the aggregate FDIC data, the balance sheets of major banks exhibit strong positive correlation between leverage and asset growth. Second, the lending practices of banks are procyclical, with banks assuming higher leverage when they experience asset growth. As assets become more valuable, collateral becomes easier to obtain, haircuts on margin borrowing decline, and financial agents extend more loans. However, when a banking crisis occurs, all of these effects go in reverse: collateral is worth less, haircuts increase, and fewer loans are originated. The financial system is in effect working in a procyclical manner: the economic downturn is exacerbated by a decline in lending as a result of deleveraging.

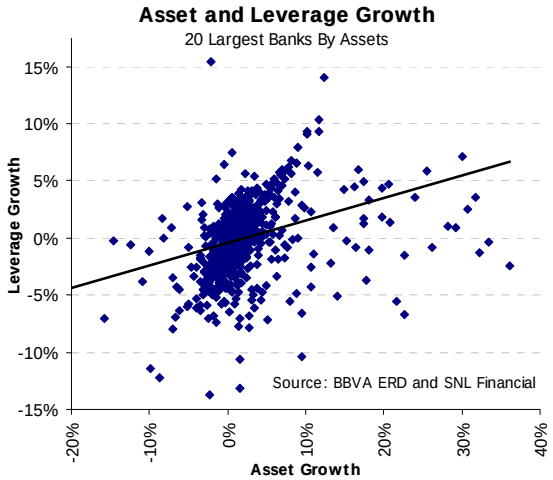
Using quarterly data on the 20 largest US commercial banks from 1990 to 2009, we generate roughly 1500 observations between leverage and asset growth. The relationship between these two variables is clearly positive and procyclical, but with significant noise from mergers and other agglomerations between firms.

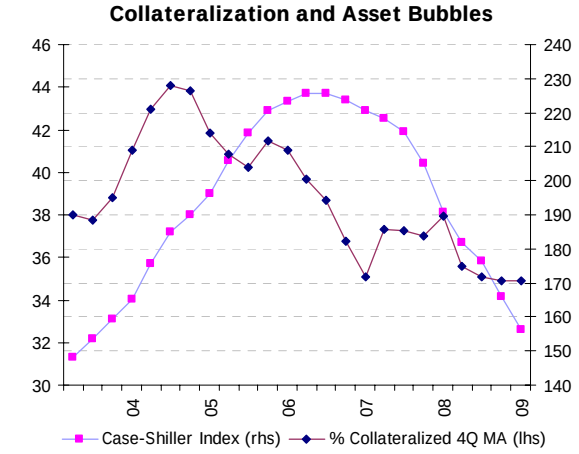
Another means of conceiving the leverage cycle is through the Federal Reserve's E2 Release on the Survey of Terms of Lending. This data is compiled by the Federal Reserve to understand the disposition of loans at US commercial banks. The extent to which loans are collateralized, or backed by real assets, represents an indication of asset quality. As assets increase in value – the Case-Shiller Housing Price Index represents one proxy for asset bubbles – banks extend loans increasingly-less collateralized by assets. In recessions, banks require high levels of collateralization due to risk aversion and this in turn causes collateralization to vary in a procyclical manner over time. Similarly, as a boom progresses, banks extend larger size loans. As a result, the average loan size increases in step with the Federal Reserve Funds Rate. Notably, the rapid cutting of the key rate by the Federal Reserve has moved faster than the four-quarter moving average can respond, suggesting a lagged effect on average loan size from interest rate cuts.

The deleveraging process is most visible in the behavior of asset-backed securities issuers and primary dealers and brokers. These firms are most sensitive to changes in collateral value, haircuts and liquidity in the securitization markets. As a result, their sensitivity to leverage is very strong and highly procyclical. Commercial banks, on the other hand, remain partially supported by their deposit base.

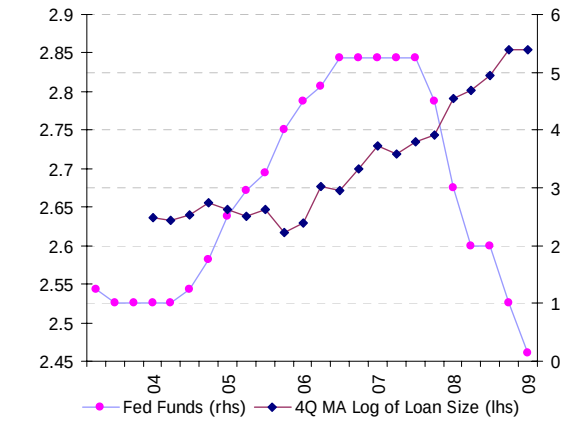
Equity write-downs, deleveraging and the balance sheet

The procyclical relationship between leverage and asset growth necessitates two key variables for our understanding of balance sheet effects: (1) the size of capital raised to match write-downs to equity and (2) the extent banks react to either new risks or a smaller overall credit market. These ideas are incorporated into a model by Greenlaw (2008), which is presented below:[2]

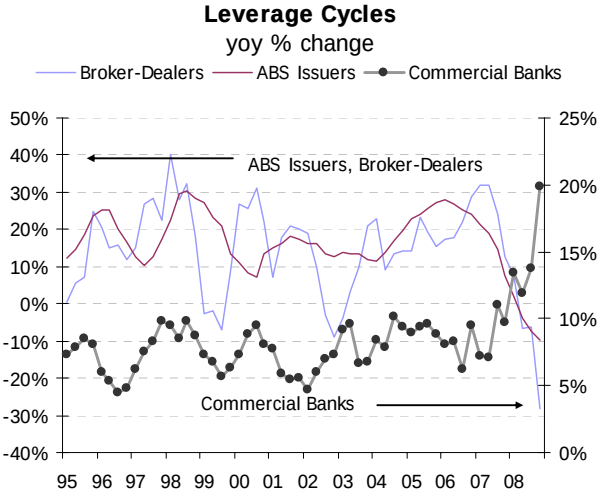




Source: Federal Reserve and Bloomberg



Source: Federal Reserve and BBVA ERD



Source: FED Flow of Funds

[2] Greenlaw, David, Hatzius, Jan, Kashyap, Anil, Shin, Hyun Song, "Leveraged Losses: Lessons from the Mortgage Market Meltdown," US Monetary Policy Forum Conference Draft, 29 February 2008.

$$\frac{A^*}{A} = \mu \times \frac{E^*}{E} = \mu \times \left(1 - \frac{L(1-k)}{E}\right)$$

where A*/A is the ratio of the new level of assets to the old level, E*/E is the ratio of the new level of equity to the old level, μ the ratio of new leverage to old leverage, L is the two-year loan loss rate and k is capital raised for equity. This allows us to examine both changes in asset levels as a result of write-downs to equity and also a decision to deleverage.

According to the FDIC's 2008Q4 statistics, the total assets of the commercial banking system are $12.312tr with $1.157tr in equity. Using these headline numbers and the above equation adjusted for different assumptions about capital raising, declines in leverage and two-year loss rates, we can determine the balance sheet effect of loan losses and deleveraging. Our estimate for capital shortfalls includes $700bn in TARP assistance, $75bn in capital raised as a result of stress-testing, and $25bn announced assistance for small banks; this is a total of $800bn raised. Two-year lost rates for the largest US banks have been estimated by the US Treasury at $950bn for the entire crisis. Since these banks represent roughly two-thirds of the banking system, it is reasonable to add additional losses up to $1.1tr for the entire system.

The balance sheet effect represents lost capacity as the result of write-downs and deleveraging. However, the entire balance sheet is not devoted to end-users of credit. Often commercial banks hold assets from other banks, securitized products and the government. As an approximation of the effect for end-users of credit, we use the proportion of deposits in domestic offices to total assets to get the reduction in credit each year.

The results in Table 1 imply that under the adverse scenario, the credit reduction implied by deleveraging is between $646bn and $687bn per year for 2009-2010. On a historical basis, the average change in leverage for negative years on an inflation-adjusted basis is -3.2%, making a leverage reduction of -5% to -7.5% within historical experience. The average increase in leverage for positive years on an inflation-adjusted basis is 4.8%, but excluding 1940-1945 generates an average of 3.4%.

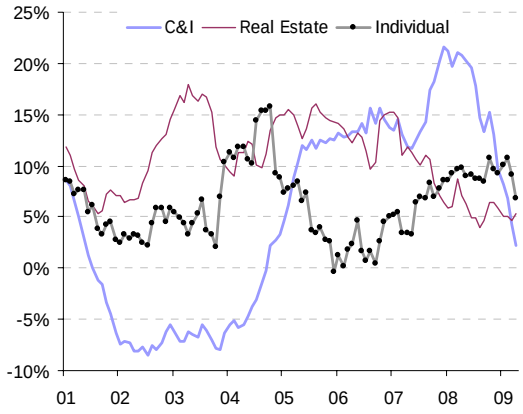
Just as banks take boom years as an opportunity to become overextended, banks also react to recessions to become highly restrictive in balance sheet management. This is precisely why some commentators argue that the credit system becomes a propagating mechanism for economic crises. As a result, some overshooting of deleveraging will occur.

Bottom line: switching leverage gears

The leverage cycle represents a rational economic response to market conditions, making the cycle that much more difficult to defeat. Regulations to encourage countercyclical action on the part of financial firms are essentially asking these firms to act in a manner contrary to the history of modern banking. Additionally, the temptation during good years for regulators to unleash the dogs of leverage will be very enticing. The deleveraging process will also reveal "excess capacity" in the banking system, typified by low profitability and high per unit operating expense relative to industry norms. Just as financial entities overshoot leverage on the upside, they will overshoot deleveraging on the downside.

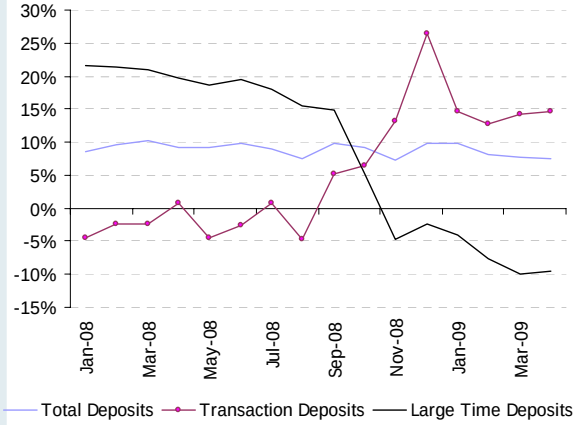
Table 1	2-Yr Loan Loss	Capital Shortfall	Leverage	Balance Sheet Effect	As % of Assets	Credit Reduction
	($tr)	%	%chng	($bn/year)	%	($bn/year)
Mild	0.95	15.8%	-5.0%	711	5.8%	378
	0.95	15.8%	-7.5%	800	6.5%	425
Adverse	1.1	27.3%	-5.0%	1216	9.9%	646
	1.1	27.3%	-7.5%	1292	10.5%	687
Liquidation	1.3	38.5%	-5.0%	1890	15.4%	1004
	1.3	38.5%	-7.5%	1948	15.8%	1035

US Commercial Bank Lending
yoy % growth



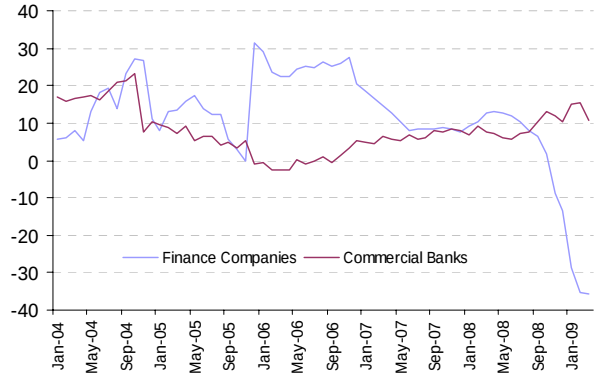
Source: Bloomberg

US Commercial Bank Deposits
yoy % growth



Source: Bloomberg, Federal Reserve

Consumer Revolving Credit
yoy % change



Source: Federal Reserve G.19 Release