Dividends and Bank Capital in the Financial Crisis of 2007-2009

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Abstract

The headline numbers appear to show that even as banks and financial intermediaries suffered large credit losses in the financial crisis of 2007-09, they raised substantial amounts of new capital, both from private investors and from government-funded capital injections. However, on closer inspection the composition of bank capital shifted radically from one based on common equity to that based on debt-like hybrid claims such as preferred equity and subordinated debt. The erosion of common equity was exacerbated by large scale payments of dividends, in spite of widely anticipated credit losses. Dividend payments represent a transfer from creditors (and potentially taxpayers) to equity holders in violation of the priority of debt over equity. The dwindling pool of common equity in the banking system may have been one reason for the continued reluctance by banks to lend over this period. We draw conclusions on how capital regulation may be reformed in light of our findings.

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I. Introduction

Financial intermediaries were at the center of the financial crisis that began in August 2007. They bore the lion's share of the credit losses from securitized subprime mortgages, even though securitization was intended to parcel out and disperse credit risk to investors who were better able to absorb losses.[1] The capacity to lend suffered as intermediaries attempted to curtail their exposure to a level that could be more comfortably supported by their capital.[2] As the credit crisis hit real activity, banking assets across the board suffered especially subprime mortgages, commercial real estate and household debt, ranging from credit card loans to auto loans.

The accumulated losses in the recent crisis have been very large, but so have been the headline figures for the amount of new capital raised. Table 1 and Figure 1 illustrate this "catching up" of capital with losses incurred.

The cumulative acknowledged credit losses for financial institutions worldwide since the beginning of the financial crisis in August 2007 to the end of 2009 stood at $1.72 trillion. Set against this, the headline figure for new capital raised was $1.45 trillion. On the surface, the new capital raised was substantial, almost matching the losses. We see from Table 1 that there are some regional variations, with new capital raised in the Americas being smaller relative to losses when compared to Europe. Although a substantial amount of new capital raised worldwide was in the final quarter of 2008 as a part of government-funded recapitalization of the banking sector, the raw numbers seem impressive.

However, a closer look at the numbers reveals a much less sanguine picture of the state of the banking sector. We highlight three features in particular that are worthy of closer scrutiny.

First, the *composition* of bank capital changed, with most of the new capital being raised in the form of debt or hybrid claims such as preferred equity. When leverage

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[1] In some cases, this appears to have been by design, e.g., in structured investment vehicles (SIVs) and asset-backed commercial paper (ABCP) conduits, where banks sold guarantees to securitization vehicles to game capital requirements. See Acharya, Schnabl and Suarez (2009) for detailed evidence of such "securitization without risk transfer". In other cases, it appears to have been a highly levered bet on the economy, e.g., as manifested in the holdings of AAA-rated mortgage-backed securities which banks held up to 39% of all such securities (Lehman Brothers, 2008).

[2] Ivashina and Scharfstein (2008) document that during the crisis, especially in the aftermath of Lehman's collapse, banks have made very few new loans and primarily honored drawdown on pre-arranged lines of credit.

is measured as the ratio of total assets to *common equity*, the leverage of the banking sector in the US and Europe rose relentlessly during the crisis, as we will show below. We argue that the continued reluctance of banks to lend may have been attributable (at least in part) to the high leverage of the banking sector.

Second, even as the banking system suffered the depletion of common equity through losses on the asset portfolio, banks continued to pay dividends throughout the crisis. As we will show, the outflow of common equity in the form of dividends was substantial in relation to total assets and total credit losses. This outflow deprived the banking system of much-needed common equity capital precisely when it was most needed. This erosion of common equity through dividends points to the breakdown of the priority of debt over equity. Banks that ultimately received public funding support and were in serious risk of failure continued to pay out dividends right from the period leading up to the crisis until the period after Lehman Brothers' bankruptcy. For a bank whose losses can be anticipated, it can be argued that dividends were paid to equity holders at the expense of the debt holders (including the taxpayers who fund bailouts). This represents a straight transfer in violation of the priority of debt over equity, which is sustained because of the slow-moving nature of book equity. In effect, the inertia in bank accounting makes even a distressed bank appear healthy in terms of its book capital ratios, enabling a transfer in violation of priority of debt over equity.[3] Eric Rosengren focused on this observation in his speech to the Boston Fed in 2010, where he remarked:

> "…if dividends had been halted at the SCAP banks once the LIBOR rate rose, nearly $80 billion would have been retained as capital. This represents close to 50 percent of the CPP funds used to recapitalize these banks in the fall of 2008. Clearly a proactive approach to dividend retention could have substantially reduced the need for an emergency infusion of public funds."

Adrian, Boyarchenko & Shin (2019) empirically analyze these questions in the current environment, and find continued dividend payouts even with lagging bank profitability in the presence of compressed net interest margins and low rates. Intermediaries, essentially manage the size of their book equity actively through dividend payout decisions.

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[3] The undesirable nature of dividend payments during crises has been commented on by Scharfstein and Stein. See Scharfstein, David S. and Jeremy C. Stein (2008) This Bailout Doesn't Pay Dividends, *The New York Times*, October 20, 2008. See also Wessel, David (2008) "Brainstorming about Bailouts" Wall Street Journal, March 13th 2008 http://online.wsj.com/article/SB120536045253831681.html

Last, but not the least, as common equity is paid out on the liabilities side of the balance sheet, the assets that get depleted on the asset side are the safe marketable assets – especially cash or government bond holdings. What gets left behind are the illiquid, riskier assets. This implies a type of risk-shifting or asset substitution that further favors the equity holders over the debt holders for the usual reason that equity holders' claims are convex claims over the asset payoffs, while debt holders have concave payoffs. Whereas traditionally risk-shifting has been discussed mainly in the context of new investments (as in the seminal work of Jensen and Meckling, 1976), we can see that risk-shifting can also be accomplished through changes in the capital structure of the bank. Paying out dividends in the form of cash leaves behind riskier assets on a thinner equity cushion, which benefits the shareholders once again, at the expense of the debt holders.

On a related point, since many of the equity holders are also employees of the bank, the diversion of funds from debt holders (including taxpayers) to equity holders is related to the thorny and politically charged issue of employee compensation in banks. In this sense, our paper can be seen as a contribution pointing out how the determination of bank capital structure and dividend policy can be seen as a part of the larger debate on compensation issues. The standard view on corporate governance that emphasizes shareholder value maximization may have unintended and adverse consequences for swift resolution of failing banks.

Our paper is primarily a descriptive study documenting in a comprehensive way the time profile of losses, amount and type of new capital raised by banks in recent years, and especially since the beginning of the recent financial crisis. Although our study is by design a "fact-finding" study, we believe that it contributes on two fronts. First, the facts themselves are striking, and we have attempted to present the evidence in a unified way that conveys the big picture. More importantly, the facts uncovered imply important conclusions both for the way that banks took decisions in the crisis and future reform of the rules governing bank regulation.

In particular, we believe that the dwindling pool of common equity may have been an important reason for the continued reluctance of banks to extend credit in spite of the large-scale injection of bailout capital. Most of the public injections of bank capital in the United States through the TARP program took the form of preferred equity rather than common equity (even though in some cases, preferred equity is ultimately converted to common equity). As a consequence, banks' leverage relative to common equity increased relentlessly. To the extent that the common equity cushion was subject to increasing compression, the stake of the controlling equity holders shrunk

in accordance. This led banks to take an extremely conservative attitude toward taking up the slack in intermediation left by the collapse of the securitization market as they would rather wait for the fortunes of their beleaguered assets and thinly capitalized balance sheets to resurrect than extinguish that option for lower risk loans (see also Diamond and Rajan (2009) for a related theoretical point).

In a speech by Bill Dudley in 2009, the President of the Federal Reserve Bank of New York, noted that executives at banks and government-sponsored enterprises told regulators "repeatedly over the past 18 months" that "now is not a good time to raise capital". He went on to say:

> "This desire to postpone capital raising stems in part to the fact that bank executives often do not want to dilute existing shareholders, which of course include themselves. […] The self-interested thing to do is avoid the dilution and hope for a good state of the world."

The fear of dilution leads incumbent shareholders to under-invest in raising new common equity capital, an agency problem that is a variant of the Myers (1977) debt overhang problem (again, not in the context of new investments).[4] This juxtaposition of agency problems at failing banks – underinvestment in issuance of new capital and erosion of existing capital through dividend distributions – poses some of the most difficult questions for bank resolution policy.

This divergence in the interests of the incumbent controlling shareholders from the broader public interest also raises questions on what should be the proper notion of regulatory capital. Under the current system of bank regulation, capital is regarded as a buffer against loss for senior creditors, and especially retail depositors. Hence, under the current system, regulatory capital includes subordinated debt and preferred equity. We believe that a serious re-think is necessary on whether such hybrid claims should qualify as part of regulatory capital. In future, regulators may have no choice but to employ intervention thresholds that are tied to market value of equity – since that is what affects decisions of bank management – and market-

[4] Some others, see for example Tucker (2008), argue that the reluctance may be due to banks wanting to avoid sending an adverse signal to markets and suffering dilution due to lemon's premium (as in the Myers and Majluf, 1984, model of costly equity issuance). Tucker also raises the possibility that bankers may believe that many of their assets are in fact "under-valued" and thus be avoiding building up of excess capital, but hastens to add that this is at odds with almost perfect dearth of buyers for these supposedly under-valued assets.

imposed leverage constraints such as the extent of repo haircuts faced by a financial institution in the market for borrowing.

Before we discuss these policy implications, we provide descriptive evidence on capital raised by 23 large banks in the United States, the United Kingdom and Europe, and Fannie Mae and Freddie Mac, the two government sponsored enterprises in the United States, focusing especially on the type of capital issued, and on the dividend policies and capital structure of these banks, in the period 2000-2009.[5]

II. Evidence on Bank Capital and Dividends

Table 2A shows the total capital raised by each bank/GSE in our sample, during the period 2000 to 2006, by the type of instrument – common equity, preferred equity or debt. For the period preceding the crisis, a total of $1.38 trillion of capital was issued by the 25 large financial firms in our sample. Despite the large quantity of capital raised, a staggering $1.41 trillion (102% of capital) was in fact raised in the form of debt. Preferred equity accounted for $46.3 billion (3%). Capital *outflow* to common shareholders was at $75 billion (5%). Common equity is the equity issuance net of buybacks. Thus, overall, banks were in fact net buyers of common equity rather than issuers. During this period, the 25 large financial firms of the US, UK and Europe, had negative common equity issuance – that is, more of share buybacks than share issuance – of $116 billion. This pattern is remarkable since this was a period over which bank balance-sheets grew significantly. So it must be that, as documented by Adrian and Shin (2008), this growth was funded by a combination of (primarily) debt and (to a lesser extent) preferred equity.

Figure 2A plots this division of capital issued into security type for individual banks for the period preceding the crisis, from 2000 to 2006. There are some differences that stand out. Citigroup had a high debt to equity ratio of 21.49. Of note, JP Morgan, Wachovia, Wells Fargo, Bear Stearns, Merrill Lynch, Morgan Stanley, Bank of America, Goldman Sachs, UBS, Fannie Mae and Freddie Mac had negative debt to equity ratios representing a capital *outflow* to common equity holders. HBOS, one of the beleaguered UK banks during the crisis, had a debt to common equity ratio of 10.43. Even with the benefit of hindsight, the relationship between type of capital issued and the ex post performance of banks is hard to ignore.

[5] Complete details are provided in the Appendix. Appendices A and B describe the variables we employ and their sources and the frequency of their measurement.

During the crisis period from 2007-2009 (see Table 2B and Figure 2B), the large financial firms raised nearly $823 billion of capital. The proportion of debt fell to 36% of total capital and accounted for $296 billion of total capital. Common equity share stood at $263 billion and accounted for 32% of capital. In contrast to pre-crisis trends, more than 32% ($263 billion) of capital was issued in the form of preferred shares.

Figure 2C shows the TARP funds received by banks and the total amount paid back from 3Q07 to 4Q09. The figure shows some striking results. All the banks (excluding the GSEs), which received TARP funding, paid at least 34% of the amount as dividends in this period. JPMorgan, paid out $9 billion dollars, 36% of the TARP funds it eventually received from the government. Similarly, Bank of America and Citigroup, both of which received $45 billion in TARP funds, had paid out $11 billion and $16 billion respectively between 3Q07 to 4Q09 (Also refer to Table 2C for data on Quarterly Capital Raised by large financial firm).

Tables 3A, 3B, 4A and 4B show that the evidence thus far masks one important fact – banks had in fact been paying out significant dividends, not just during 2000-2006 but also during the crisis period of 2007-2009, particularly towards the beginning of the crisis. From Table 3A, we see that US banks maintained quarterly dividends (measured as a percentage of total assets) between 0.09% and 0.06% from 3Q07 to 4Q08, before cutting dividends to 0.01% in 2009. In the pre-crisis period from 2000 to 2006, dividends averaged 0.08% as a percentage of total assets. Non-US banks cut dividends earlier, beginning in 2008 (see Table 3B). When we look at the combined trends in dividends for all banks in our sample (not shown in the tables), bank dividend payouts, measured as a percentage of assets, were at 0.26% in 2002. In 2008, during the peak of the crisis, dividend levels fell to 0.17% and eventually to 0.05% in 2009. In effect, bank management did not drastically reduce their dividends in the first twelve months of the worst crisis to have hit them.

Table 4 gives the dividends paid by the 25 large financial institutions. The largest dividends were paid by Bank of America and Citigroup, with their dividends showing no slowdown till 3Q08. While dividend payments slowed for both banks from 4Q08 to 4Q09, Bank of America continued to pay dividends till the end of 4Q09. Citigroup, on the other hand, cut its dividends only in 4Q08 and paid zero dividends from 2Q09 to 4Q09. Merrill Lynch almost doubled its dividends in 4Q08 (to $699 million) compared to the year earlier in 4Q07 ($361 million). Similarly, Lehman increased its dividends from $95 million in 2Q08 to $118 million in 3Q08, right before it went bankrupt. Bear Stearns also increased dividends from $36 million in 4Q07 to $47 million in 1Q08. Of particular note is Goldman Sachs, which continued to pay dividends until the end of 2009. It *increased* its dividends from $639 million in 2007

(annual) to $642 million in 2008 (annual) and to $717 million in 2009 (annual). On the other hand, while Morgan Stanley cut its dividends to zero in 1Q09, it resumed dividends beginning 2Q09. However, these 2Q09 dividends were only $80 million, 28% of dividends paid out in 2Q08.

In contrast to investment banks, Wachovia and Washington Mutual cut their dividends drastically in the quarters leading up to their failure. Wachovia cut its dividends from $808 million in 2Q08 to $108 million in 3Q08. Similarly, Washington Mutual cut its dividends from $130 million in 1Q08 to $10 million in 2Q08. These numbers highlight the difference in dividend payout between investment banks and commercial banks. Similarly, the GSEs Fannie Mae and Freddie Mac cut their dividends to zero in 4Q08 and 3Q08 respectively.

Table 5 gives the quarterly losses incurred by the financial firms in our analysis. This table highlights the fact that these financial firms were struggling during this period and yet continued to pay dividends as described above. Particularly, Lehman, which increased dividends in 3Q08, posted losses of $5.3 billion in 2Q08 and $7.0 billion in 3Q08, before filing for bankruptcy. Bear Stearns, which increased dividends in 4Q07, posted losses of $1.9 billion in 4Q07 and $0.6 in 1Q08. Fannie and Freddie Mac posted losses of $138.7 billion and $115.1 billion respectively, for the period from 3Q07 to 4Q09. Wachovia, which cut dividends in 3Q08, reported $29.4 billion in losses, a jump of 124% from a loss of $13.1 billion in the previous quarter. Similarly, Washington Mutual, which cut dividends in 2Q08 reported losses of $30.9 billion in 3Q08, representing a 462% increase from $5.5 billion losses in the previous quarter.

In summary, the analysis in this section highlights three important points. First, while it appears banks raised capital as the crisis progressed, a large part of the newly raised capital came from debt-like hybrid claims such as preferred equity and subordinated debt. Second, the erosion of common equity was exacerbated by large scale payments of dividends (particularly towards the first-half of the crisis). Third, these effects were particularly striking for the investment banks compared to the commercial banks. In Section III, we explore the difference between Basel capital and pure equity capital, which can explain why the newly raised capital was mostly in the form of debt-like hybrid claims. In Section IV, we explore the differential payouts of commercial versus investment banks. In Section V we look at the implications of the analysis for financial reform. Section V1 concludes.

III. Two Notions of Capital

To understand the significance of common equity and its role in bank resolution, it is important to distinguish between two different notions of bank capital. There is, first,

the notion of bank capital (implicit in the Basel approach) as a buffer against loss that protects depositors. Under this notion of bank capital, hybrid claims such as preferred equity or subordinated debt are counted as bank capital, since both are claims that are junior to depositors. Indeed, under the Basel capital accord, subordinated debt counts as Tier 2 capital.

However, there is a second, contrasting notion of bank capital as the claim held by the owners of the bank who have control over the bank's operations. Hybrid claims such as preferred shares or subordinated debt do not qualify as bank capital under this second notion of bank capital, as they can be seen as junior forms of debt. We could dub this second notion of capital as "pure equity capital". This notion of capital can be thought of as the equity demanded by creditors as a safeguard against losses on their stake. It is analogous to the margin requirement set by creditors on leveraged traders, and is exemplified by the "haircut" demanded by creditors in a repurchase agreement. In contrast to the Basel capital requirement (which is a regulatory capital requirement), we could characterize the pure equity requirement in the margin or haircut set by a creditor as the "market-determined" capital requirement. Just as with repo haircuts and margin requirements, the market determined capital requirement fluctuates over time with shifts in market conditions and the balance sheet capacity of leveraged traders.

The key difference between the Basel notion of capital as a buffer to protect depositors and pure equity capital as the market-determined haircut lies in the behavior of those owners who have control over the bank. When the bank has too little pure equity capital, the owners' incentives reflect their highly leveraged balance sheet. When faced with a dwindling stake in a leveraged entity, controlling owners have little to lose, and everything to gain by engaging in risk-shifting bets on the bank. The increased haircut imposed by the capital market during distress episodes could be seen as the increased margin demanded by creditors in the capital market to changed incentives, or the reduction in funding capacity of an asset in anticipation of the attendant risk-shifting problem.[6]

The market-determined capital requirement reflected in the repo haircut is a constraint imposed by the capital market, and reflects the terms on which creditors are willing to lend to those with control over the leveraged entity. One plausible channel through which the constraint operates is the wish by creditors to avoid being

[6] Archarya and Viswanathan (2007) build a model of funding of liquidity of financial institutions tied to such a risk-shifting problem.

embroiled in a lengthy and costly bankruptcy settlement after the borrower has defaulted. When a bank breaches the maximum leverage ratio permitted by the market, the bank must take remedial action to reduce its leverage, or face a run by its creditors.

We have seen that throughout the recent crisis, banks lost pure equity capital through credit losses and dividend payouts, but did not replenish the lost pure equity capital through the issuance of new common equity. Instead, the lion's share of new capital raised have in the form of hybrid claims such as preferred shares and subordinated debt. In particular, government-sponsored capital injections took the form of preferred equity, especially in the United States under the TARP program. The consequence was that pure equity capital continued to dwindle.

It would be reasonable to conjecture that the continuing stringency in credit conditions reflects, at least in part, the lack of pure equity capital in the banking system. The market-determined capital requirement is binding as hard as ever, even though the constraints of the Basel capital requirements are relaxed through the injection of hybrid claims. Without concerted efforts to relax the market-determined capital requirements that are pressing down on the banks, it would have been difficult to expect much headway in freeing up credit conditions towards greater willingness of the banks to extend credit during the period.

Leverage

The distinction between Basel capital and pure equity capital can also be seen through the evolution of various bank leverage ratios. The examination underscores the earlier evidence that asset growth of banks during 2000-2007 was funded primarily through debt, especially through short-term debt, and not through buildup of common equity capital.

Table 6 shows the leverage ratios for the 25 large financial firms in our sample – divided into commercial banks, investment banks and GSEs – for the fiscal years 2000 through 2009. The numbers reported are averages within each division. Figures 3A-3D are based on the time-series evolution of four of these ratios, which we focus on in our discussion.

Figure 3A shows the corporate finance measure of leverage – the debt/shareholder equity ratio, and Figure 3B shows another measure – the assets/common equity ratio (common equity being shareholder equity minus preferred equity). In both cases, the pattern is similar. For both commercial and investment banks (y-axis on the left-hand

side), the capital structure was getting increasingly levered from 2000 to 2007. The debt/ shareholder equity ratio for commercial banks increased from around 5.19 in 1Q00 to 6.79 in 4Q07, whereas for investment banks, it increased from 16.19 to 19.39. For GSEs, this ratio decreased from 30.92 to 21.62 (y-axis on the right-hand side). The assets/common equity ratio for commercial banks grew from 15.0 to 22.51, and for investment banks this ratio grew from 26.90 to 35.85 for the same period. For GSEs, this ratio increased from 39.59 to 41.85.

Figure 3C shows the asset/shareholder equity ratio for large US financial firms. For commercial banks, this ratio increased from 14.68 to 22.11. For investment banks, the 1Q00 ratio was much higher at 26.13 and increased to 33.91 in 4Q07. For GSEs, this ratio decreased from 32.8 to 23.57 during the same period. To summarize, the levering up of commercial and investment banks is evident across the three ratios we have shown. For GSEs, the assets/common equity ratio captures this.

Table 7 and the corresponding Figure 4 show the change in asset to common equity ratio during the crisis for the large US financial firms in our sample. This ratio increased from 1Q07 to the peak of the crisis in 2Q and 3Q08 for most firms. Of note, the ratio for Citigroup increased from 16.69 in 1Q07 to 27.32 in 4Q08. The ratio for Lehman also increased from 29.73 in 1Q07 to 33.16 in 2Q08 just before it went bankrupt. This increase in asset to common equity ratio was even more dramatic for the GSEs as they became distressed. The ratio for Fannie Mae peaked in 3Q08 at 67.47, from a much lower 25.32 in 1Q07. For Freddie Mac, asset to common equity ratio increased from 34.62 to a staggering 853.44 in 2Q08.

It is clear, thus, that the asset growth that banks experienced during 2000 to 2007 was increasingly funded by debt. What kind of debt? To shed light on this, we plot in Figure 3D the ratio of commercial paper to total assets for commercial banks, investment banks and GSEs in our sample. While investment banks were always financed in a significant way through unsecured short-term commercial paper, what is striking is that commercial banks increased their reliance on commercial paper nine-fold from fiscal year 2000 to fiscal year 2007. In 4Q07, commercial paper was 3% of assets for commercial banks. This is comparable to investment banks with a ratio of 2.88% in 4Q07.

Further, while the growth in loans and assets was primarily of the long-term type – for mortgages to a large extent and corporate and private equity finance to some extent – the nature of non-deposit debt financing was in fact of the short-term type. That is, bank capital structures were not only looking increasingly levered and funded through non-deposit type debt, they were also experiencing a rise in maturity

mismatch (or duration gap between assets and liabilities) and were thus vulnerable to economy-wide shocks that generally tend to cripple the markets for short-term financing.

This short-term aspect of bank leverage is captured in Tables 8 and 9, and corresponding Figure 5. Table 8 shows the worldwide quarterly outstanding amounts for commercial paper – usually of 90-day maturity and more than 75% of which tends to be issued by financial institutions. From a steady issuance of around $1.4-$1.5 trillion during 2000-2004, the amount rose sharply to a peak of $2.15 trillion during 2Q07. Following the money-market freeze of August 9, 2007, this figure fell sharply from its peak to around $1.62 trillion in 3Q08 (picking up somewhat in 4Q08 due to guarantees, for example, by the Federal Reserve). In 2009, commercial paper issuance declined further and in 4Q09 this figure was around $1.15 trillion.

Viewed from any dimension – overall leverage, deposit versus non-deposit leverage, and maturity of leverage – banks were pursuing a risk-shifting strategy, and importantly, not just through their choice of assets, but also through their capital structures.

There is one important lesson for bank regulation in all this. While standard corporate finance measures of capital, dividend distribution and leverage were individually and jointly implying that bank behavior reflected a serious conflict of interest between shareholders and creditors, regulatory measures of capital adequacy – for example, the ratio of capital to risk-adjusted assets – hardly moved (see, for example, Box 1.3 of IMF, 2008 report). Why was this so? While some of this had to do with the large holdings of AAA-rated tranches of mortgage-backed securities on bank balance-sheets, which attracted little capital charge and thus kept the level of risk-adjusted assets (the denominator) to a low figure, the measurement of capital (the numerator) was also problematic.

IV. Commercial versus Investment Banks

Lessons from private contracting

Consistent with the summary statistics in Section II, anecdotal evidence too highlights the reluctance of banks to cut dividends or even reduce their amount.[7] Lehman

[7] See Table 4 for bank by bank history of dividend distributions. Also see the press articles: *Dividends Cut Fastest Since 1950s as Citigroup Conserves Cash* (Bloomberg, November 26, 2009); *JPMorgan Cuts Dividend 87 Percent to 5 Cents a Share* (Bloomberg, February 23, 2009), *Fed Urges Banks to Put Bailout*

Brothers Holdings announced a 13% increase in its dividend and a $100 million share repurchase in January 2008; Citigroup cut its dividend close to zero only in November 2009; JPMorgan and Wells Fargo, while recipients of the TARP capital in Fall 2008, cut dividends as late as February and March 2009 respectively; and even as the Federal Reserve was urging banks receiving bailout funds to cut dividends, Goldman Sachs and Morgan Stanley did not cut dividends throughout the crisis period.

This is to be compared to the fact that 61 components of the Standard & Poor's 500 stock index cut their dividends during 2008. Most corporate debt has covenants which prevent banks from paying out dividends when negative earnings are reported. This constraint prevents firms from transfer of funds to equity holders at the expense of debt holders.

Additionally, firms cut dividends to avoid the debt overhang problem (Myers (1977)). A debt overhang emerges if a company is unable to make new investments on account of failure to raise new debt, as lenders are unwilling to lend to highly levered firms. Firms anticipating such opportunities maintain an equity cushion and thus cut dividends in times of distress.

In contrast, banks continued to pay out dividends even during the crisis. This can be attributed to the short-term nature of their funding and the implicit and explicit guarantees provided by the government. Banks are typically funded by short-term debt. As a result, if they were to announce a dividend cut, rollover debt can "run" as it did on investment banks. The fear of "runs" leads banks to continue paying dividends even when it would be prudent for them in the long-run to cut dividends.

Further banks benefit from the explicit and implicit guarantees provided by the government. The explicit government guarantees provided on deposits for commercial banks ensures that the banks are protected even in the event of a failure. Similarly, many financial institutions may have the implicit government guarantee for firms which are considered too-big-to-fail. Thus, banks are unlikely to cut dividends, figuring that in the event that they do fail, they would most likely be bailed out.

The contrast between stressed depository institutions (such as Wachovia and Wamu) and investment banks (such as Lehman, Merrill Lynch) is informative. While depositories were subject to a "prompt corrective action" resolution regime, such

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Funds Into Loans, Not Dividends (Bloomberg, February 24, 2009), *Wells Fargo Cuts Its Dividend 85%* (Wall Street Journal, March 7, 2009).

orderly wind-down plans were absent for investment banks. Hence, the implicit too-big-to-fail guarantee for investment banks was virtually free of any end-game restrictions, allowing them to pay dividends even as they were failing.

The contrasting behavior of banks versus non-financial firms provides important lessons for reform of governing bank regulation. Regulators have realized that banks need to be explicitly prevented from paying out dividends in times of distress to avoid such transfers in violation of priority of debt over equity. As Lawrence Summers, Director-designate, national Economic Council notes in his letter on the Senate and House of Representative (January 12, 2009):

> "Those receiving exceptional assistance will be subject to tough but sensible conditions that limit executive compensation until taxpayer money is paid back, ban dividend payments beyond de minimis amounts, and put limits on stock buybacks and the acquisition of already financed strong companies"

While this is a step in the right direction, more needs to be done. In later sections, we further draw on the lessons learnt from private contracting and provide recommendations for the design of prompt corrective measures for governing bank regulation.

Evidence for the signaling versus risk-shifting story

Now we try to distinguish between two possible explanations as to why banks increased or did not cut dividends. In a dividend signaling story, issuance of dividend increase should be perceived as good news for the firm (both debt and equity). Hence, the share price and creditor reaction should be positive around the announcement of an increase of dividends.

Typical dividend signaling models are, however, without leverage or risk-shifting considerations. In a risk-shifting story, issuance of dividend increase should be perceived as good news for only equity but not debt. If the signal being conveyed is about the value of the firm rather than an attempt to just raise value of the equity (as in the risk-shifting story), then the news of the announcement should be good news for creditors of the firms as well. In contrast, if there is no good news about the firm (or potentially the news is bad for the firm), but simply good for equity, then the announcement should benefit shareholders but hurt the creditors as it is a transfer of value across firm claimants rather than overall increase in value of the firm.

Thus, examining debt price reactions around dividend change announcements can shed light on the question of whether the dividend changes are purely a signaling attempt or (also) an attempt to shift risks towards creditors. However, government guarantees and presence of FDIC's interventions can distort creditor responses.

We exploit the stock market and creditor response for investment bank versus commercial bank differences to potentially get around this problem. Specifically, we look at the abnormal returns after a dividend increase/no reduction versus dividend cuts, separately for investment and commercial banks. Then we repeat the analysis for CDS spreads. This will help us determine the value to equity versus creditors and thus possibly differentiate a risk-shifting story from a pure signaling story.

In Table 10, Panel A, we see that relative to the market, stock prices increased by 0.5% after the announcement of a dividend increase (or no change in dividends) for commercial banks and by 0.6% for investment banks. Similarly, a dividend cut is accompanied by a stock price decline of 0.3% for commercial banks and a striking 3.1% decline for investment banks. This finding, that an increase in stock prices when dividends are increased/maintained and a decline in stock prices when dividends are cut, is consistent with both a signaling story as well as a risk-shifting story.

We now turn to how the creditors responded to distinguish between the two alternative hypotheses. Panel B in Table 10 shows that CDS spreads (relative to the average market CDS) declined by 1.19 basis points for commercial banks when they increased (or maintained) their dividends, indicating that the creditors of commercial banks perhaps believed that firm value increased. This is consistent with a signaling story for commercial banks. In contrast, a dividend increase for investment banks was accompanied by an increase in CDS spread of 5.85 basis points, indicating that equity value increased at the expense of creditors. This is consistent with a risk-shifting story for investment banks.[8]

To summarize, the differential response of creditors of commercial banks relative to investment provides evidence of a risk shifting story for investment banks and a signaling story for commercial banks. We see that dividend increase for commercial banks results in a decrease in CDS spreads. In contrast, for investment banks, a

[8] The findings on creditor response to dividend cuts are distorted by the presence of government guarantees and FDIC intervention for commercial banks. We see that a dividend cut for investment banks was accompanied by a lower increase in CDS spreads of 3 basis points. In contrast a dividend cut for commercial banks resulted in a *decrease* in CDS spreads of commercial banks which is not completely consistent with a signaling story. Creditors may be pricing in the fact that the presence of government guarantees and FDIC interventions for commercial banks imply that the banks are protected even in the event of a failure.

dividend increase results in an increase in CDS spreads. When we look at stock prices, an increase in dividends by banks is associated with an increase in stock price for both commercial and investment banks. In Section II, indeed, we saw that the dividend-increase problem in face of adverse funding conditions was predominantly a feature for investment banks, and commercial banks often cut or maintained dividends (which could potentially be due to the fear of FDIC interventions).

V. Implications for reform of Financial regulation

The distinction between Basel capital and pure equity capital emphasized in this paper have important implications for the reform of financial regulation and the resolution of problematic banks that can lead to a speedy recovery in lending.

To some extent, some inertia is inevitable in the valuation of bank assets, even in a world where the rigorous application of mark-to-market valuation rules are the preferred norm. Even under the original version of accounting standards such as the US accounting standard 157 of the FASB, or the International Accounting Standards Board rule IAS 39, full and immediate marking to market of assets is infeasible due to the lack of transparent markets. There is the larger issue of whether full marking to market is even desirable from a financial stability viewpoint. Here, we will not address this particular debate. However, even for a fervent supporter of full marking to market as an ideal, the practical limitation of marking to market of bank assets means that inertia is an inevitable feature of bank balance sheet accounting.

In a world where bank balance sheets lag market conditions, or where the accounting values do not anticipate further credit losses from foreseeable weakening of macroeconomic activity, an early suspension of dividends and capital preservation would seem to be one of the first steps that a regulator must take in order to forestall greater problems with capital erosion in the future. The FDIC could replicate a "covenant" style private contract, which restricts banks from paying out dividends when certain thresholds are reached. There should be an explicit role in the covenant thresholds for simple leverage measures such as asset to common equity ratios, loans to deposits and short-term debt to assets. Additionally, market measures such as equity retention implied by repo haircuts may provide more timely information and prevent further equity erosion by forcing banks to stop paying out dividends in times of distress.

From the point of view of overall financial system stability and the externalities imposed by one constituency on the system as a whole, an early suspension of dividends can be justified by the prevention of negative spillover effects imposed by

incumbent controlling shareholders of weakening banks on the rest of the system. Although such interference in the management of the firm runs counter to the autonomy of the controlling shareholders in determining the financial decisions of the firm, it should be borne in mind that banking has always offered exceptions to this rule. The fact that banks have been regulated reflects their special status. They exert externalities on the rest of the financial system so that the affairs of the bank affect a very broad constituency that go beyond the traditional domain of the owners and creditors of the firm. They affect the broader economy and are supported by both explicit and implicit public funding support in case of difficulties. The very fact that banks are regulated, and special legal regimes exist to deal with problems of distress reflect their special status. Our proposal for an early suspension of dividends is merely re-drawing the line between the private and public domains of actions.

Thus, an early imposition of regulatory sanctions against the paying of dividends (for instance, as part of an increasing "ladder of sanctions" that are based on market or common-equity based notions of bank leverage) may have an important place in the agenda for reform of the regulatory system. The proposals in the Geneva Report (Brunnermeier et al., 2009) argue for such a ladder of sanctions. Acharya, Mehran, and Thakor (2010) suggest creating a capital account by diverting dividends during good times which are then transferred to a regulator when the bank goes bankrupt.

VI. Conclusion

In this paper, we have delved deeper into the evolution of bank capital during the recent global financial crisis. The crisis which initially erupted in 2007 in the subprime mortgage sector in the United States led to a decline in real economic activity, leading to further credit losses in other mainstream credit categories such as prime mortgages, commercial real estate, corporate debt and other household debt such as credit card loans and auto loans.

Even as banks and financial intermediaries suffered large credit losses as the financial crisis gathered pace, the headline numbers obscure important shifts in the composition of bank capital, and hence on the constraints banks face in their daily operations. We have shown that the bulk of the new capital raised both from private investors and from government-funded capital injections were in the form of debt-like hybrid claims such as preferred equity and subordinated debt, and not in the form of common equity. Furthermore, banks continued to pay large sums in the form of dividends that further eroded the common equity base.

As a result, there was a relentless increase in the leverage of the banking sector, when leverage is measured with common equity on the denominator. We have argued that common equity is the more appropriate notion of bank capital when we want to capture the idea of market-based capital requirements that creditors would like to impose on borrowers. The alternative notion of bank capital which includes subordinate debt and hybrid claims (as a buffer against loss for depositors) is less appropriate, even though this latter notion of capital is what is enshrined in the current banking regulations.

We argue that continuing dividend payments during the crisis represent a transfer from creditors (and taxpayers) to equity holders of banks in violation of the priority of debt over equity. We further argue that the increased riskiness of the remaining assets of the bank represents a type of risk-shifting that benefits equity holders at the expense of creditors (and taxpayers).

In general, the events of the financial crisis of 2007-2009 have posed several challenging questions on the proper notion of bank capital that should inform bank regulation. We offer our paper as a small step in this important debate.

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Table 1A Credit Losses and Write downs incurred (all financial firms including banks, brokers, insurers and GSEs) during 2007-2009

(USD 'Billions)	3Q07	4Q07	1Q08	2Q08	3Q08	4Q08	1Q09	2Q09	3Q09	4Q09	Total
Worldwide	58.7	216.7	220.9	174.6	263.6	385.1	140.7	147.3	35.2	80.5	1,723.3
Americas	42.9	128.3	135.1	112.5	205.6	243.3	101.0	99.5	28.9	48.2	1,145.3
Europe	14.5	76.9	74.3	58.3	52.2	137.5	36.1	47.7	6.7	32.8	537.0
Asia	1.3	11.4	11.4	3.7	5.7	4.4	3.6	0.1	-0.4	-0.6	40.6

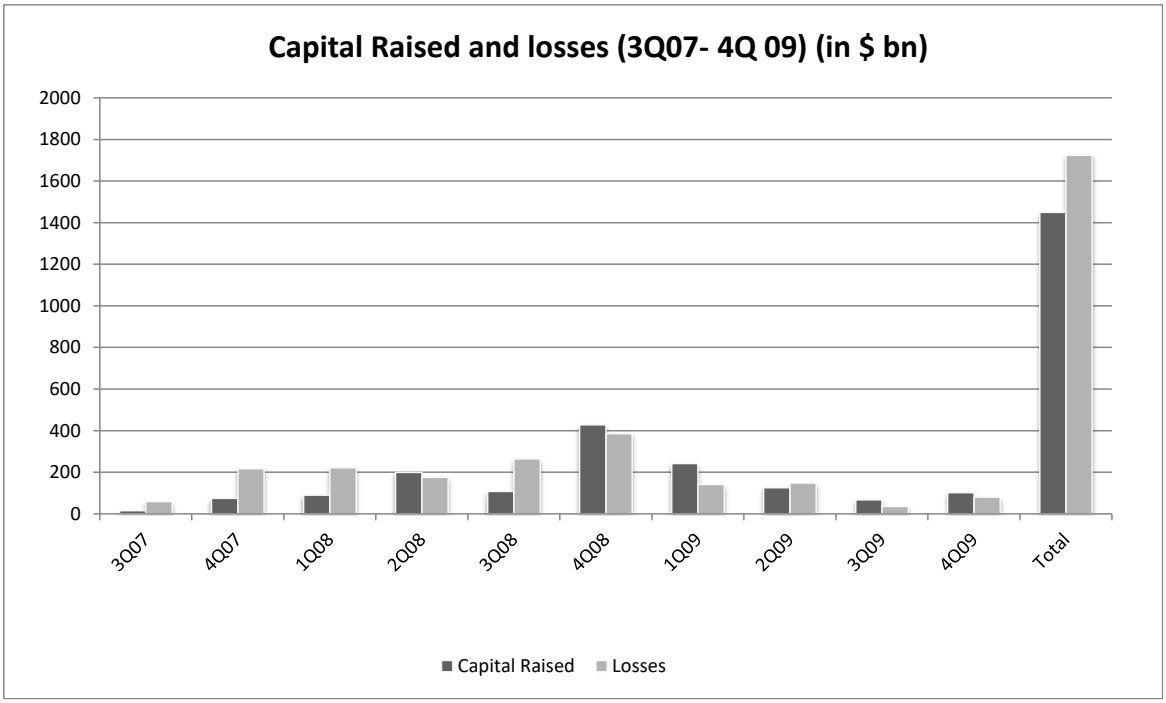
Source: Bloomberg WDCI

Table 1B Capital Raised (WDCI) - for all financial firms including banks, brokers, insurers and GSEs during 2007-2008

(USD 'Billions)	3Q07	4Q07	1Q08	2Q08	3Q08	4Q08	1Q09	2Q09	3Q09	4Q09	Total
Worldwide	14.8	74.1	89.7	199.4	107.7	427.9	241.1	125.8	66.8	101.6	1,448.9
Americas	3.1	47.1	63.0	103.8	44.1	266.6	122.0	91.8	16.1	21.1	778.7
Europe	11.7	26.9	23.0	82.0	54.9	132.7	99.6	13.7	30.7	75.1	550.3
Asia	0.0	0.0	3.7	13.5	8.7	28.6	19.5	20.3	20.0	5.4	119.7

Source: Bloomberg WDCI

Figure 1 Capital Raised vs. Credit Losses incurred by worldwide financial institutions



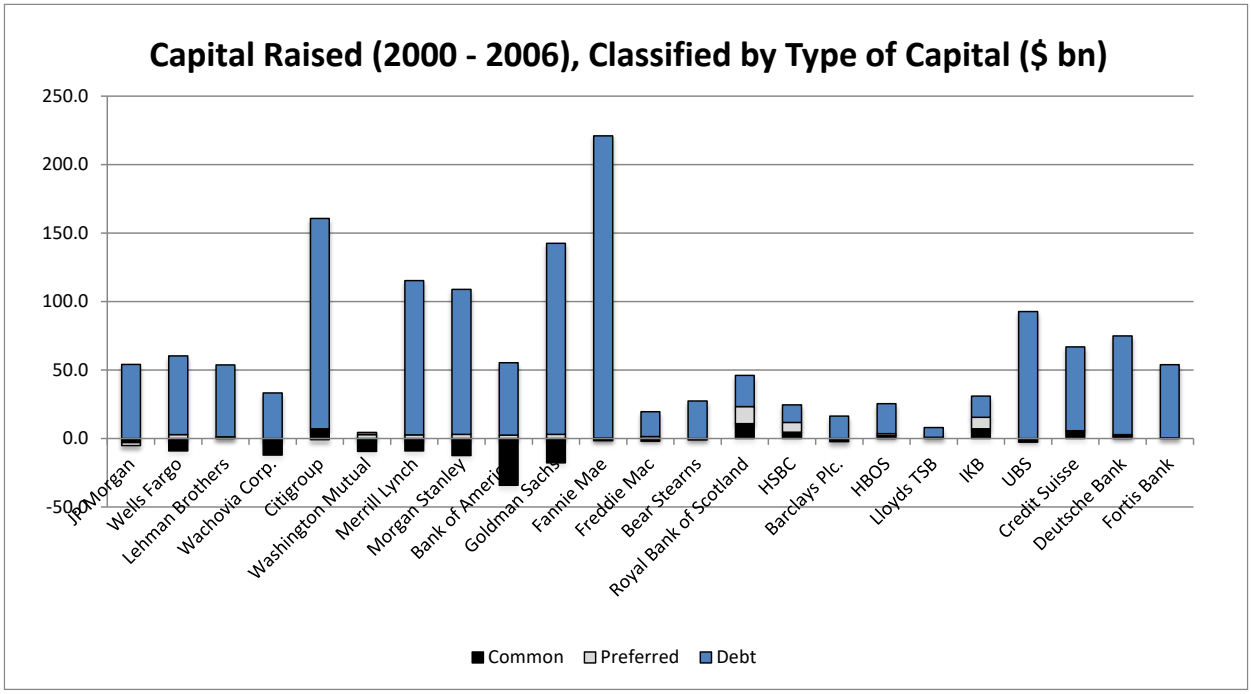
Source: Bloomberg WDCI

Table 2A Capital Raised by Type of Instrument for 25 large financial firms from 2000 – 2006

Geography	Name	Type of Instrument						Total Capital Raised
		Common		Preferred		Debt		
		($ Bn)	% of total	($ Bn)	% of total	($ Bn)	% of total	($ Bn)
U.S	JP Morgan	-3.0	-6%	-2.2	-4%	54.1	110%	49.0
U.S	Wells Fargo	-9.0	-18%	2.9	6%	57.4	112%	51.3
U.S	Lehman Brothers	0.7	1%	0.5	1%	52.5	98%	53.7
U.S	Wachovia Corp.	-12.1	-57%	0.0	0%	33.2	157%	21.1
U.S	Citigroup	7.1	4%	-0.9	-1%	153.5	96%	159.7
U.S	Washington Mutual	-9.4	191%	2.9	-60%	1.6	-32%	-4.9
U.S	Merrill Lynch	-9.0	-8%	2.7	3%	112.6	106%	106.3
U.S	Morgan Stanley	-12.5	-13%	3.1	3%	105.8	110%	96.3
U.S	Bank of America	-34.2	-162%	2.6	12%	52.7	250%	21.1
U.S	Goldman Sachs	-17.7	-14%	3.1	2%	139.6	112%	124.9
U.S	Fannie Mae	-1.7	-1%	0.4	0%	220.6	101%	219.3
U.S	Freddie Mac	-2.0	-11%	1.5	8%	18.2	103%	17.6
U.S	Bear Stearns	-1.0	-4%	0.0	0%	27.4	104%	26.3
U.K	Royal Bank of Scotland	10.8	23%	12.4	27%	22.8	50%	46.0
U.K	HSBC	4.6	19%	7.1	29%	12.8	52%	24.5
U.K	Barclays Plc.	-1.9	-13%	-0.4	-3%	16.4	117%	14.1
U.K	HBOS	2.1	8%	1.5	6%	21.9	86%	25.5
U.K	Lloyds TSB	0.8	11%	0.0	0%	7.1	90%	7.9
Europe	IKB	7.1	23%	8.3	27%	15.5	50%	31.0
Europe	UBS	-2.7	-3%	0.0	0%	92.7	103%	90.0
Europe	Credit Suisse	5.7	8%	0.0	0%	61.3	92%	66.9
Europe	Deutsche Bank	2.0	3%	0.9	1%	72.0	96%	74.9
Europe	Fortis Bank	0.5	1%	0.0	0%	53.5	99%	53.9
	TOTAL	**-74.8**	**-5%**	**46.3**	**3%**	**1405.2**	**102%**	**1376.5**

Source: Annual statements of Banks, SEC Filings and Bloomberg
Note: Data not available for BNP Paribas and ABN AMRO

Figure 2A Capital Raised, classified by Type of Instrument for 25 large financial firms from 2000 - 2006



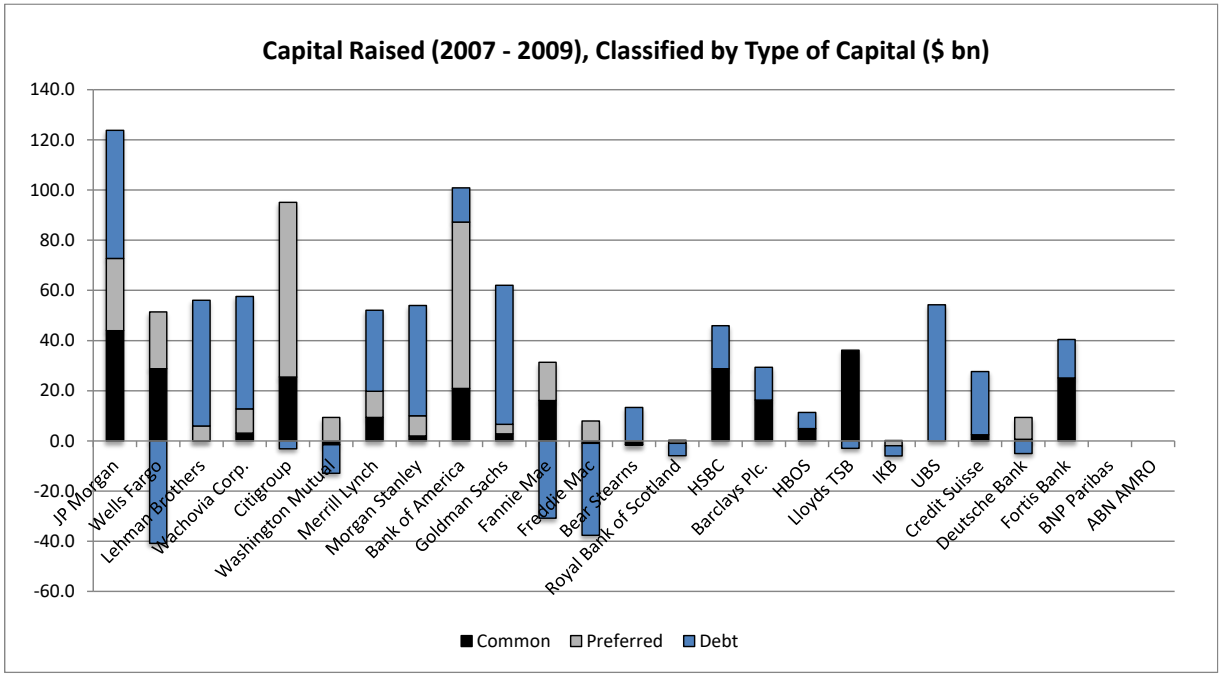
Source: Annual statements of Banks, SEC Filings, Compustat and Bloomberg

Table 2B Total Capital Raised by Type of Instrument for 25 large financial firms from 1Q07 - 4Q09

Geography	Name	Type of Instrument						Total Capital Raised	Losses Incurred*
		Common		Preferred		Debt			
		($ Bn)	% of total	($ Bn)	% of total	($ Bn)	% of total	($ Bn)	($ Bn)
U.S	JP Morgan	44.0	36%	28.7	23%	51.1	41%	123.8	62.8
U.S	Wells Fargo	28.8	273%	22.7	215%	-40.9	-389%	10.5	43.0
U.S	Lehman Brothers	0.1	0%	5.9	10%	50.1	89%	56.0	16.2
U.S	Wachovia Corp.	3.1	5%	9.7	17%	44.8	78%	57.5	101.8
U.S	Citigroup	25.4	28%	69.6	76%	-3.2	-3%	91.9	123.9
U.S	Washington Mutual	-1.5	43%	9.4	-267%	-11.4	324%	-3.5	45.1
U.S	Merrill Lynch	9.4	18%	10.4	20%	32.3	62%	52.1	55.9
U.S	Morgan Stanley	1.9	4%	8.0	15%	44.0	81%	54.0	23.4
U.S	Bank of America	20.9	21%	66.3	66%	13.7	14%	100.9	89.2
U.S	Goldman Sachs	2.8	4%	3.8	6%	55.5	89%	62.1	9.2
U.S	Fannie Mae	16.1	3318%	15.3	3161%	-30.9	-6379%	0.5	138.7
U.S	Freddie Mac	-1.0	3%	7.9	-26%	-36.7	123%	-29.8	115.1
U.S	Bear Stearns	-1.5	-13%	0.0	0%	13.3	113%	11.8	3.2
U.K	Royal Bank of Scotland	0.2	-4%	-0.9	17%	-5.0	87%	-5.7	56.7
U.K	HSBC	28.8	63%	0.0	0%	17.1	37%	45.9	55.8
U.K	Barclays Plc.	16.2	55%	0.0	0%	13.1	45%	29.4	39.7
U.K	HBOS	4.8	43%	0.0	0%	6.5	57%	11.3	26.3
U.K	Lloyds TSB	36.2	109%	0.0	0%	-3.0	-9%	33.2	3.2
Europe	IKB	0.2	-3%	-1.9	33%	-4.1	70%	-5.8	12.5
Europe	UBS	0.0	0%	0.0	0%	54.2	100%	54.2	57.0
Europe	Credit Suisse	2.4	9%	0.0	0%	25.2	91%	27.7	18.9
Europe	Deutsche Bank	0.6	14%	8.7	205%	-5.1	-119%	4.3	19.5
Europe	Fortis Bank	25.1	62%	0.0	0%	15.4	38%	40.5	8.0
Europe	BNP Paribas	-	-	-	-	-	-	-	19.1
Europe	ABN AMRO	-	-	-	-	-	-	-	1.9
	TOTAL	**262.9**	**32%**	**263.6**	**32%**	**296.1**	**36%**	**822.6**	**1146.1**

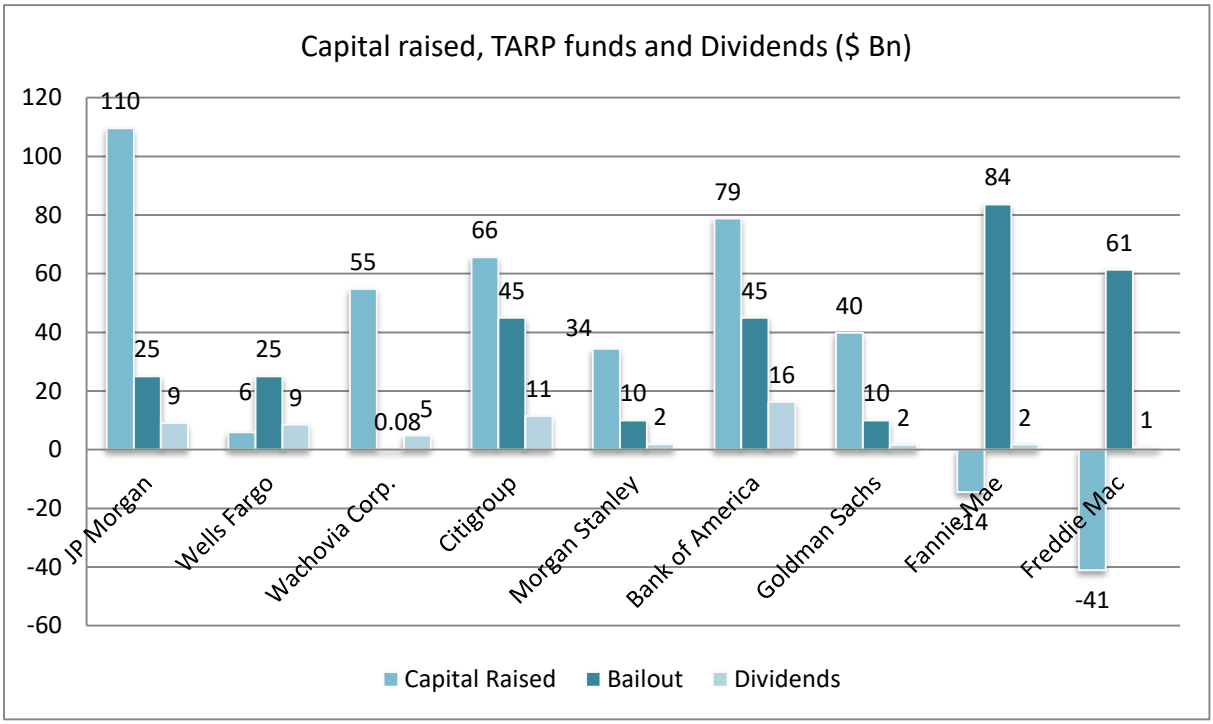
Source: Annual statements of Banks, SEC Filings, Compustat and Bloomberg Capital Raised data not available for BNP Paribas and ABN AMRO;
** Losses incurred for the crisis period from 3Q2007 to 4Q2009, quarterly breakdown is shown in Table 5*

Figure 2B Capital Raised, classified by Type of Instrument for 25 large financial firms from 2007-09



Source: Annual statements of Banks, SEC Filings, Compustat and Bloomberg

Figure 2C Capital Raised, dividends (3Q07 to 4Q09) and TARP funds for large financial firms in the U.S.



Source: Annual statements of Banks, SEC Filings and Bloomberg

Table 2C Quarterly Capital Raised by large financial firms from 1Q07 to 4Q09

Geography	(USD 'Billions)	1Q07	2Q07	3Q07	4Q07	1Q08	2Q08	3Q08	4Q08	1Q09	2Q09	3Q09	4Q09	Total Capital Raised
U.S	JP Morgan	1.2	13.0	21.4	-0.2	2.3	18.5	4.0	62.3	-1.2	-14.8	-4.2	21.6	123.8
	In %	1%	11%	17%	0%	2%	15%	3%	50%	-1%	-12%	-3%	17%	100%
U.S	Wells Fargo	2.0	2.6	-0.1	1.1	0.5	2.1	4.8	33.6	-13.6	-8.4	-19.0	4.9	10.5
	In %	19%	24%	-1%	10%	5%	20%	46%	320%	-129%	-80%	-180%	47%	100%
U.S	Lehman Brothers	12.8	10.7	16.4	0.2	8.1	7.8	-	-	-	-	-	-	56.0
	In %	23%	19%	29%	0%	14%	14%	-	-	-	-	-	-	100%
U.S	Wachovia Corp.	3.6	-0.9	16.4	4.7	18.1	16.7	-1.1	-	-	-	-	-	57.5
	In %	6%	-2%	29%	8%	32%	29%	-2%	-	-	-	-	-	100%
U.S	Citigroup	9.8	16.6	13.5	13.2	11.8	12.7	-18.9	29.4	-8.7	2.2	13.1	-2.8	91.9
	In %	11%	18%	15%	14%	13%	14%	-21%	32%	-9%	2%	14%	-3%	100%
U.S	Washington Mutual	-1.5	1.6	-1.1	-0.8	-7.8	6.0	0.0	0.0	0.0	0.0	0.0	0.0	-3.5
	In %	43%	-47%	30%	22%	221%	-169%	0%	0%	0%	0%	0%	0%	100%
U.S	Merrill Lynch	23.7	20.4	30.1	-1.8	-1.0	19.5	-18.6	-20.2	0.0	0.0	0.0	0.0	52.1
	In %	46%	39%	58%	-4%	-2%	37%	-36%	-39%	0%	0%	0%	0%	100%
U.S	Morgan Stanley	14.5	9.8	3.5	10.8	5.2	8.8	-1.8	-2.9	5.0	-4.7	2.7	7.6	58.6
	In %	25%	17%	6%	19%	9%	15%	-3%	-5%	9%	-8%	5%	13%	100%
U.S	Bank of America	4.7	17.4	13.3	1.8	13.1	13.4	-9.1	36.1	19.5	6.3	0.1	-16.0	100.9
	In %	5%	17%	13%	2%	13%	13%	-9%	36%	19%	6%	0%	-16%	100%
U.S	Goldman Sachs	11.3	10.9	19.2	8.0	11.7	8.2	-3.1	4.8	6.3	-5.3	-2.5	-7.3	62.1
	In %	18%	18%	31%	13%	19%	13%	-5%	8%	10%	-9%	-4%	-12%	100%
U.S	Fannie Mae	5.0	10.0	-7.5	-38.3	-97.4	101.0	-8.4	-11.6	54.8	12.4	-0.8	-18.6	0.5
	In %	1033%	2060%	-1554%	-7922%	-20121%	20858%	-1732%	-2405%	11331%	2556%	-164%	-3840%	100%
U.S	Freddie Mac	0.0	11.2	-13.9	-29.9	16.8	35.5	364.1	-443.0	78.2	-16.9	-12.6	-19.5	-29.8

	In %	0%	-38%	47%	100%	-56%	-119%	-1221%	1486%	-262%	57%	42%	65%	100%
U.S	Bear Stearns	4.1	2.8	3.2	0.8	0.8	-	-	-	-	-	-	-	11.7
	In %	35%	24%	27%	7%	7%	-	-	-	-	-	-	-	100%
U.K	Royal Bank of Scotland	-	-	-	5.9	-	-	-	1.1	-	-	-	-12.7	-5.7
	In %	-	-	-	-105%	-	-	-	-19%	-	-	-	224%	100%
U.K	HSBC	-	-	-	10.1	-	-	-	9.1	-	-	-	26.7	45.9
	In %	-	-	-	22%	-	-	-	20%	-	-	-	58%	100%
U.K	Barclays Plc.	-	-	-	9.2	-	-	-	20.3	-	-	-	-0.1	29.4
	In %	-	-	-	31%	-	-	-	69%	-	-	-	0%	100%
U.K	HBOS	-	-	-	6.5	-	-	-	4.8	-	-	-	0.0	11.3
	In %	-	-	-	57%	-	-	-	43%	-	-	-	0%	100%
U.K	Lloyds TSB	-	-	-	0.2	-	-	-	1.5	-	-	-	31.5	33.2
	In %	-	-	-	1%	-	-	-	5%	-	-	-	95%	100%
Europe	IKB	-	-	-	4.4	-	-	-	1.0	-	-	-	-11.2	-5.8
	In %	-	-	-	-75%	-	-	-	-18%	-	-	-	192%	100%
Europe	UBS	-	-	-	42.8	-	-	-	9.5	-	-	-	2.0	54.2
	In %	-	-	-	79%	-	-	-	18%	-	-	-	4%	100%
Europe	Credit Suisse	-	-	-	14.0	-	-	-	23.0	-	-	-	-9.3	27.7
	In %	-	-	-	51%	-	-	-	83%	-	-	-	-34%	100%
Europe	Deutsche Bank	-	-	-	-0.8	-	-	-	4.6	-	-	-	0.4	4.3
	In %	-	-	-	-18%	-	-	-	108%	-	-	-	11%	100%
Europe	Fortis Bank	-	-	-	46.7	-	-	-	-0.8	-	-	-	-5.4	40.5
	In %	-	-	-	115%	-	-	-	-2%	-	-	-	-13%	100%
	TOTAL	**91.3**	**126.1**	**114.6**	**108.6**	**-17.7**	**250.0**	**312.0**	**-237.4**	**140.4**	**-29.3**	**-23.1**	**-8.1**	**827.2**

Source: Annual statements of Banks, SEC Filings, Compustat and Bloomberg
Note: Capital Raised data not available for BNP Paribas and ABN AMRO

Table 3A Quarterly Dividends Paid by US Banks and GSEs

Quarterly dividends paid in cash as reported in the Balance Sheet of the banks

(USD 'Billions)	2000-2006 per Quarter Average	1Q07	2Q07	3Q07	4Q07	1Q08	2Q08	3Q08	4Q08	1Q09	2Q09	3Q09	4Q09
Total Dividend Paid	6.38	10.45	10.64	11.21	11.19	9.71	9.20	8.45	6.35	1.97	0.72	0.78	0.78
Quarterly Dividends as % of Assets*	0.08%	0.09%	0.08%	0.09%	0.09%	0.07%	0.07%	0.07%	0.06%	0.02%	0.01%	0.01%	0.01%

Source: Annual statements of Banks, SEC Filings, Compustat and Bloomberg
**Calculated as Total dividends paid by all banks as % of sum of assets of all banks. Other ratios are computed in similar manner in the tables that follow.*

Table 3B Semi-Annual Dividends Paid by Non - US Banks

Semi-Annual dividends paid in cash as reported in the Balance Sheet of the banks

(USD 'Billions)	2000-2006 per Half-Yearly Average	1H07	2H07	1H08	2H08	1H09	2H09
Total Dividend Paid	5.98	12.57	30.11	6.99	11.77	2.80	8.71
Semi-Annual Dividends as % of Assets*	0.07%	0.07%	0.14%	0.03%	0.06%	0.01%	0.05%

Source: Annual statements of Banks, SEC Filings, Compustat and Bloomberg
**Calculated as Total dividends paid by all banks as % of sum of assets of all banks. Other ratios are computed in similar manner in the tables that follow.*

Table 4A Quarterly Dividends paid by each US Bank (numbers from Balance Sheet)

($ mm)	JP Morgan	Wells Fargo	Lehman Brothers	Wachovia Corp.	Citigroup	WaMu	Merrill Lynch	Morgan Stanley	Bank of America	Goldman Sachs	Fannie Mae	Freddie Mac	Bear Stearns
2000-2006	25,603	19,438	1,053	14,879	42,237	9,876	4,308	5,107	38,756	2,632	2,741	2,848	2,943
1Q07	1,197	948	81	1,071	2,682	477	294	272	2,502	163	390	335	38
2Q07	1,328	937	81	1,066	2,671	484	292	269	2,494	161	490	326	38
3Q07	1,320	1,034	81	1,215	2,690	486	288	271	2,829	150	489	324	37
4Q07	1,320	1,036	81	1,265	2,690	482	361	270	2,830	165	487	167	36
1Q08	1,326	1,024	94	1,274	1,676	130	341	276	2,859	157	344	162	47
2Q08	1,362	1,026	95	808	1,753	10	344	280	2,858	156	343	162	-
3Q08	1,462	1,128	118	108	1,746	-	469	281	2,929	155	54	0	-
4Q08	1,483	1,134	-	107	875	-	699	273	1,610	174	0	0	-
1Q09	242	1,443	-	-	54	-	0	0	64	167	0	0	-
2Q09	163	214	-	-	0	-	0	80	86	180	0	0	-
3Q09	207	234	-	-	0	-	0	65	88	184	0	0	-
4Q09	208	238	-	-	0	-	0	65	88	186	0	0	-
2007-2009	11,618	10,396	-	-	-	-	-	-	-	-	2,597	1,457	196

Table 4B Semi Annual Dividends paid by each Non-US Bank (numbers from Balance Sheet)

($ mm)	Royal Bank of Scotland	HSBC	Barclays Plc.	HBOS	Lloyds TSB	IKB	UBS	Credit Suisse	Deutsche Bank	Fortis Bank	BNP Paribas	ABN AMRO
2000-2006	20,169	44,839	16,540	11,451	21,799	512	2,625	5,605	8,596	10,397	12,936	12,058
1H07	1,911	3,982	1,440	1,226	1,245	-	0	0	0	1,269	0	1,497
2H07	4,215	6,511	3,094	2,443	2,833	-	0	2,328	3,091	1,435	4,159	0
1H08	0	2,113	1,445	-	1,280	-	0	0	0	2,154	0	0
2H08	4,002	5,600	301	-	0	-	0	109	420	0	1,342	0
1H09	0	2,800	0	-	0	-	0	0	0	0	0	0
2H09	0	3,101	288	-	0	-	0	2,190	650	0	2,479	0
2007-2009	10,129	24,107	6,569	3,669	5,358	-	0	4,627	4,161	4,859	7,980	1,497

Source: Annual statements of Banks, SEC Filings, Bloomberg and Compustat

Table 5 Quarterly Losses incurred by Large Financial Firms

(USD 'Billions)	3Q07	4Q07	1Q08	2Q08	3Q08	4Q08	1Q09	2Q09	3Q09	4Q09	Total
JP Morgan	2.5	2.8	5.9	4.0	8.1	9.8	7.7	8.0	7.8	6.2	62.8
Wells Fargo	0.0	2.6	2.2	4.5	5.5	8.6	4.3	4.7	5.6	5.0	43.0
Lehman	0.7	0.8	2.4	5.3	7.0	-	-	-	-	-	16.2
Wachovia	1.7	3.3	4.5	13.1	29.4	49.8	0.0	0.0	0.0	0.0	101.8
Citigroup	5.6	18.2	19.6	12.2	12.8	19.7	13.8	10.3	5.6	6.1	123.9
WaMu	0.9	3.9	3.9	5.5	30.9	-	-	-	-	-	45.1
Merrill	9.4	18.0	7.6	8.9	12.0	0.0	-	-	-	-	55.9
Morgan Stanley	0.9	9.4	2.3	1.8	1.3	5.8	1.2	0.2	0.4	0.1	23.4
Bank of America	2.1	7.6	6.3	5.5	6.7	14.5	13.8	13.3	10.1	9.3	89.2
Goldman Sachs	1.5	-0.5	2.0	0.8	1.1	2.3	0.8	1.2	0.0	0.0	9.2
Fannie Mae	3.7	5.2	9.5	15.4	20.0	17.0	19.3	24.0	13.5	11.1	138.7
Freddie Mac	3.1	6.1	15.2	13.0	19.0	22.2	13.5	24.5	-6.1	4.6	115.1
Bear Stearns	0.7	1.9	0.6	-	-	-	-	-	-	-	3.2
RBS	0.0	2.8	0.0	9.9	0.3	17.2	0.0	15.8	1.0	9.7	56.7
HSBC	0.9	7.6	2.6	10.8	4.8	15.6	0.0	7.9	0.0	5.6	55.8
Barclays	0.0	3.5	1.5	4.4	0.0	11.1	3.4	8.2	0.0	7.6	39.7
HBOS	0.0	1.1	4.2	0.2	3.7	17.1	-	-	-	-	26.3
Lloyds TSB	0.0	0.4	-	-	-	-	-	-	-	-	-
IKB	0.0	0.0	12.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.5
UBS	4.7	14.6	19.5	6.0	4.7	4.0	3.5	0.2	-0.1	-0.1	57.0
Credit Suisse	1.9	4.0	5.3	0.0	2.9	3.3	1.4	0.0	0.1	0.0	18.9
Deutsche	2.6	0.1	3.3	2.8	2.6	3.8	1.7	1.2	0.6	0.8	19.5
Fortis	0.0	4.5	2.7	0.8	0.0	0.0	0.0	0.0	0.0	0.0	8.0
BNP	0.5	1.3	1.0	1.0	2.6	3.7	2.4	2.1	2.5	2.0	19.1
ABN AMRO	0.0	1.9	-	-	-	-	-	-	-	-	1.9

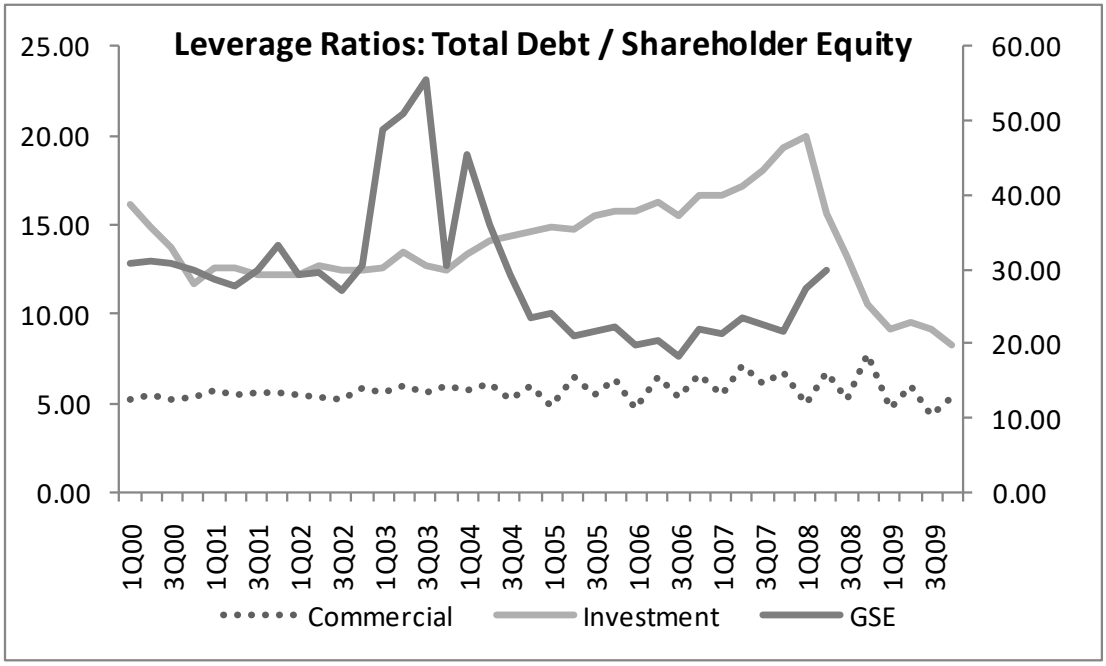
Source: WDCI, Bloomberg (numbers as of 31st December, 2009)

Table 6 Leverage ratios for all banks in the data set (all numbers are from balance sheets)

Leverage Ratios	Type of Bank	2000-2006 *	1Q07	2Q07	3Q07	4Q07	1Q08	2Q08	3Q08	4Q08	1Q09	2Q09	3Q09	4Q09
Total Debt / Shareholder Equity	Commercial	5.65	5.52	7.13	6.14	6.79	4.94	6.71	5.24	7.70	4.71	6.00	4.30	5.37
	Investment	13.88	16.66	17.20	18.00	19.39	20.01	15.60	13.20	10.52	9.13	9.50	9.10	8.22
	GSE	30.31	21.22	23.40	22.66	21.62	27.58	30.03	-379.04	-37.42	-70.72	-704.68	-352.85	-142.56
Total Assets/ Common Equity**	Commercial	17.77	19.83	24.61	19.49	22.51	24.00	25.06	20.66	27.93	25.29	23.84	19.29	19.55
	Investment	25.96	31.13	31.63	33.78	35.85	41.91	33.80	29.63	29.77	28.17	22.20	20.84	18.82
	GSE	39.23	29.20	33.08	33.30	41.85	68.23	85.28	40.40	18.19	15.37	14.56	12.85	10.83
Total Assets/ Shareholder Equity	Commercial	16.86	16.75	20.48	17.87	22.11	20.26	21.85	18.38	23.54	17.06	19.18	15.30	17.18
	Investment	25.33	29.59	30.09	32.05	33.91	37.58	29.50	27.43	23.44	21.40	19.81	18.74	17.01
	GSE	32.32	23.10	25.49	24.68	23.57	29.85	32.40	-398.83	-38.51	-74.85	-761.04	-385.79	-156.84
Commercial Paper / Total Assets	Commercial	0.72%	1.62%	0.82%	1.92%	3.00%	1.76%	0.83%	1.71%	2.46%	1.70%	0.67%	0.91%	1.10%
	Investment	0.57%	0.00%	0.18%	0.07%	2.88%	2.30%	0.00%	0.00%	3.22%	5.88%	3.19%	2.05%	3.88%
	GSE	0.12%	0.44%	0.37%	1.13%	1.11%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

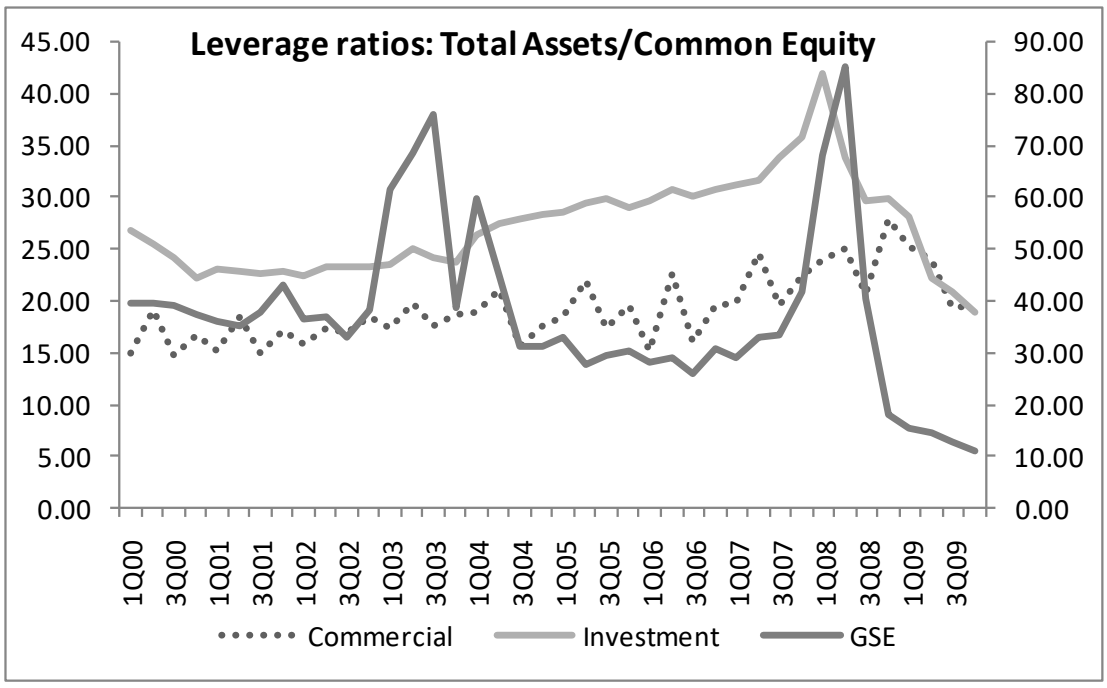
*Source: Balance Sheets of all banks, from Bloomberg, SEC filings, Annual reports; *2000-2006 numbers are average of the quarterly ratios from 2000 to 2006.*
*** Common Equity = Shareholder Equity – Preferred Equity as reported in Balance Sheet.*

Figure 3A Leverage Ratios – Total Debt/Shareholder Equity for large US financial firms



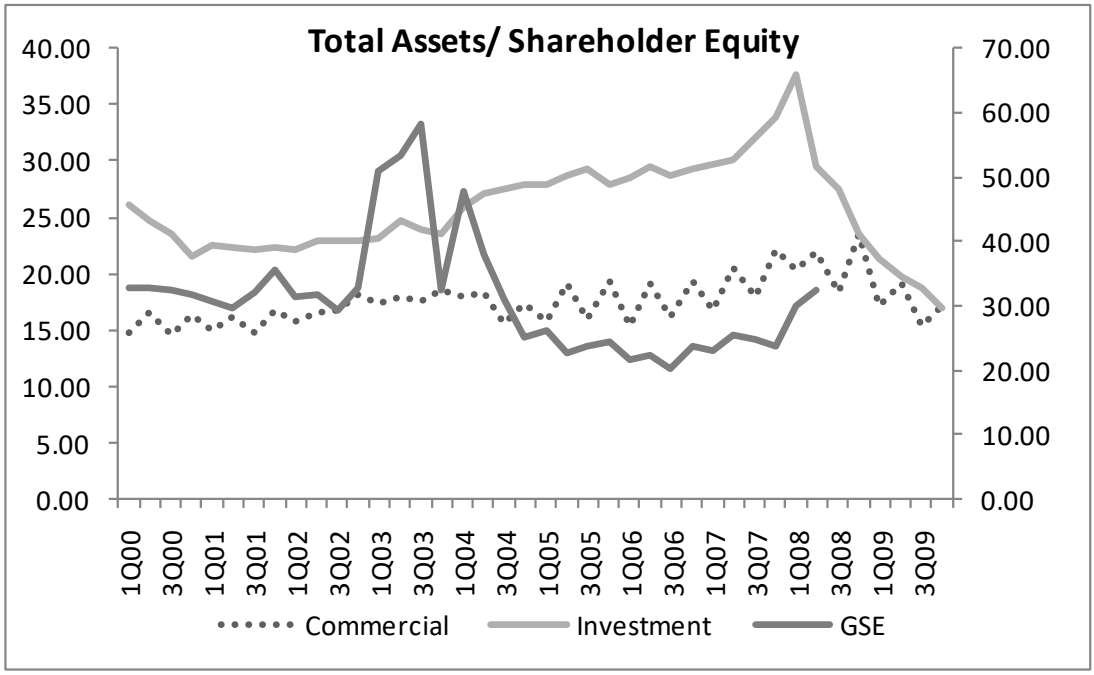
Source: Balance Sheets of all banks, from Bloomberg, SEC filings, Annual reports y-axis for the GSEs is on the secondary axis (right-hand-side)
Note: Commercial/Investment Bank Ratios are on the primary axis and GSE ratios on the secondary axis.
(Debt = Short term borrowings + Long Term borrowings. It does not include Deposits held by a bank.)

Figure 3B Leverage Ratios – Total Assets/Common Equity for large US financial firms



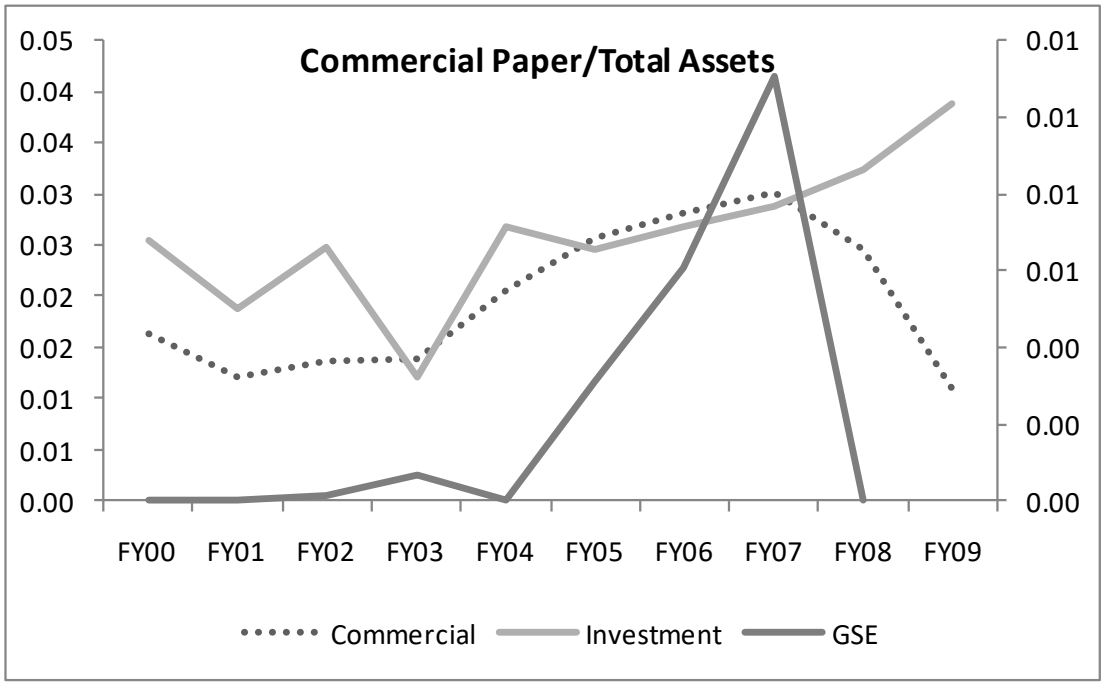
Source: Balance Sheets of all banks, from Bloomberg, SEC filings, Annual reports
Note: Commercial/Investment Bank Ratios are on the primary axis and GSE ratios on the secondary axis.

Figure 3C Asset/ Shareholder Ratio for large US financial firms



Source: Balance Sheets of all banks, from Bloomberg, SEC filings, Annual reports
Note: Commercial/Investment Bank Ratios are on the primary axis and GSE ratios on the secondary axis.

Figure 3D Commercial Paper/ Total Assets for large US financial firms



Source: Balance Sheets of all banks, from Bloomberg, SEC filings, Annual reports
Note: Commercial/Investment Bank Ratios are on the primary axis and GSE ratios on the secondary axis.

Table 7 Assets/Common Equity for large U.S financial firms

	1Q07	2Q07	3Q07	4Q07	1Q08	2Q08	3Q08	4Q08	1Q09	2Q09	3Q09	4Q09
JP Morgan	11.97	12.23	12.33	12.68	13.08	13.96	16.35	16.12	15.04	13.82	13.24	12.93
Wells Fargo	10.70	11.57	11.63	12.20	12.58	12.89	13.43	19.33	0.00	0.00	0.00	0.00
Lehman	29.73	30.24	31.94	32.30	35.99	33.16	0.00	0.00	0.00	0.00	0.00	0.00
Wachovia	9.69	9.94	10.27	10.05	10.74	11.89	17.71	0.00	0.00	0.00	0.00	0.00
Citigroup	16.69	17.47	18.58	19.26	20.21	19.27	20.78	27.32	25.43	23.15	13.24	12.00
Washington Mutual	12.06	11.71	12.51	13.06	13.92	11.64	0.00	0.00	0.00	0.00	0.00	0.00
Merrill	26.50	28.65	32.39	37.03	40.79	45.77	29.44	36.16	0.00	0.00	0.00	0.00
Morgan Stanley	32.07	31.24	34.70	34.65	33.90	30.88	28.48	20.80	20.87	16.17	18.05	17.86
Bank of America	11.38	11.55	11.69	12.05	12.49	12.39	13.38	13.05	13.96	11.47	11.32	11.45
Goldman Sachs	20.59	21.40	23.28	23.84	25.18	23.97	23.46	17.85	19.23	15.66	14.86	13.12
Fannie Mae	25.32	26.98	27.06	32.32	38.19	45.05	67.47	24.41	16.49	13.75	10.95	9.00
Freddie Mac	34.62	43.28	44.07	62.10	392.09	853.44	27.92	14.29	14.41	15.50	15.64	13.70
Bear Stearns	30.55	32.69	31.39	34.56	34.56	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Source: Bloomberg, SEC filings, Annual reports

Figure 4 Assets/Common Equity of US banks during the crisis

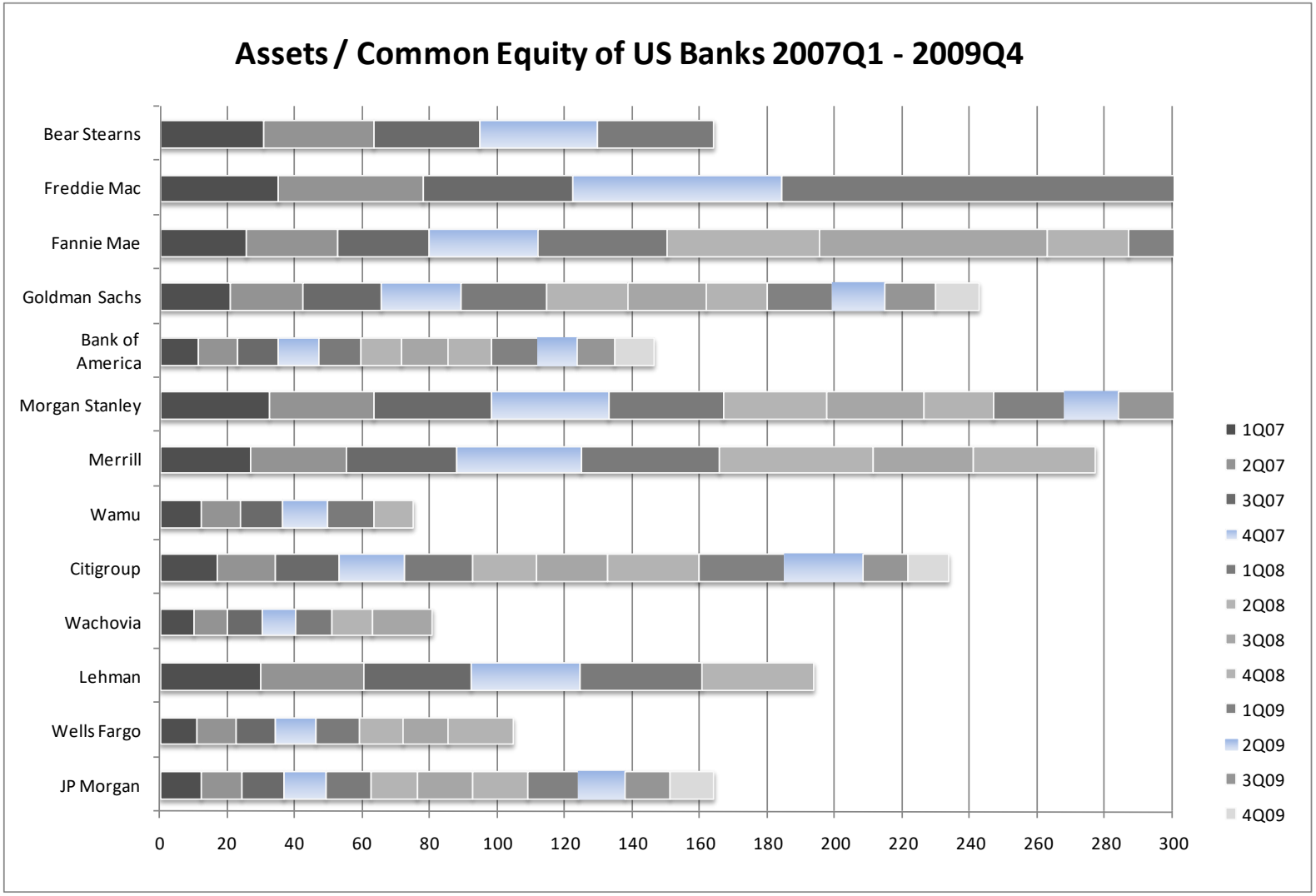


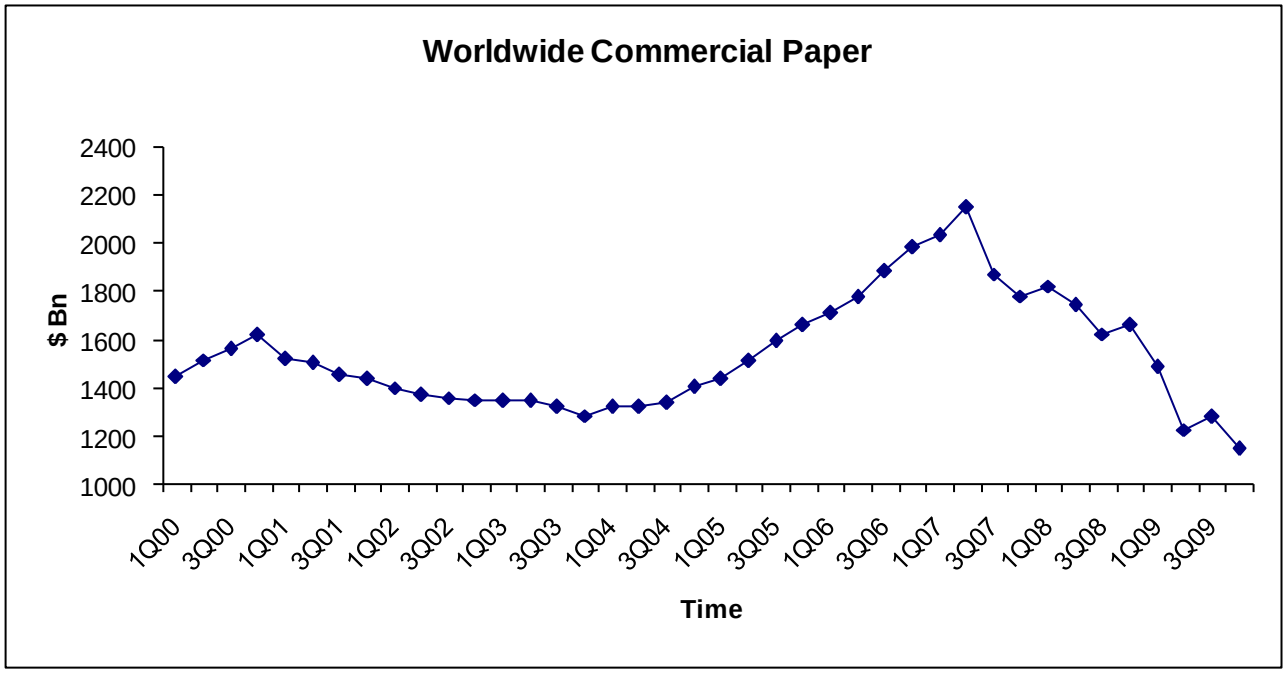
Table 8 Commercial Paper Worldwide

Quarterly Data for Commercial Paper ($Bn)

Year	CP	Year	CP	Year	CP	Year	CP
1Q00	1449.1	**3Q02**	1360.8	**1Q05**	1436.9	**3Q07**	1871.8
2Q00	1517.2	**4Q02**	1352.3	**2Q05**	1514.7	**4Q07**	1780.6
3Q00	1560.2	**1Q03**	1349.9	**3Q05**	1597.2	**1Q08**	1821.5
4Q00	1619.3	**2Q03**	1349.8	**4Q05**	1662.0	**2Q08**	1741.1
1Q01	1523.0	**3Q03**	1321.4	**1Q06**	1709.9	**3Q08**	1624.3
2Q01	1504.4	**4Q03**	1284.2	**2Q06**	1776.4	**4Q08**	1658.8
3Q01	1457.0	**1Q04**	1323.5	**3Q06**	1886.0	**1Q09**	1488.8
4Q01	1437.4	**2Q04**	1323.0	**4Q06**	1982.9	**2Q09**	1229.1
1Q02	1400.2	**3Q04**	1341.2	**1Q07**	2034.7	**3Q09**	1279.5
2Q02	1372.6	**4Q04**	1403.8	**2Q07**	2149.7	**4Q09**	1147.7

Source: FCPOTOTS index – Bloomberg
(Commercial Paper Outstanding Seasonally Adjusted)

Figure 5 Quarterly Data for Commercial Paper Worldwide ($Bn)



Source: FCPOTOTS index – Bloomberg

Table 9 Commercial Paper issued by each bank as reported in Cash Flow Statement of Financial Statements

(USD 'Billions)	Name	Type of bank	FY00	FY01	FY02	FY03	FY04	FY05	FY06	FY07	FY08	FY09
U.S	JP Morgan	Commercial	24.9	18.5	16.6	14.0	12.6	13.9	18.8	49.6	37.8	41.8
U.S	Wells Fargo	Commercial	15.8	14.0	11.1	6.7	6.2	4.0	1.1	30.4	45.9	13.0
U.S	Lehman Brothers	Investment	4.2	1.9	1.6	1.6	1.7	1.8	1.7	3.1	0.0	0.0
U.S	Wachovia Corp.	Commercial	2.9	2.9	3.1	7.2	12.0	3.9	4.7	6.7	0.0	0.0
U.S	Citigroup	Commercial	18.7	13.9	18.3	17.6	25.6	34.2	43.7	37.3	28.7	10.2
U.S	Washington Mutual	Commercial	1.0	0.4	0.7	1.1	4.0	7.1	4.8	2.0	0.0	0.0
U.S	Merrill Lynch	Investment	13.0	1.9	3.4	3.4	4.0	3.9	6.4	12.9	20.1	0.0
U.S	Morgan Stanley	Investment	27.8	32.8	50.8	28.4	28.5	23.2	22.4	22.6	6.7	0.8
U.S	Bank of America	Commercial	7.0	1.6	25.2	42.5	78.6	116.3	141.3	191.1	158.1	0.0
U.S	Goldman Sachs	Investment	10.7	8.4	9.5	4.8	4.4	5.2	1.5	4.3	1.1	62.5
US	Fannie Mae	GSE	0.0	0.0	0.2	1.3	0.0	5.1	10.0	0.0	0.0	0.0
US	Freddie Mac	GSE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18.5	0.0	0.0
US	Bear Stearns	Investment	0.0	0.0	0.0	0.0	0.0	0.0	20.7	3.9	0.0	0.0
U.K	Royal Bank of Scotland	Commercial	1.0	0.4	11.2	6.3	16.1	25.1	24.8	155.9	71.0	41.4
U.K	HSBC	Commercial	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
U.K	Barclays Plc.	Commercial	0.0	4.8	8.4	7.9	40.1	50.4	51.9	46.5	40.4	31.2
U.K	HBOS	Commercial	2.0	11.2	15.0	23.0	0.0	0.0	33.9	33.5	129.9	0.0
U.K	Lloyds TSB	Commercial	0.0	0.0	0.0	0.0	15.4	18.6	25.6	34.5	42.2	56.6
Europe	IKB	Commercial	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Europe	UBS	Investment	0.0	0.0	0.0	0.0	69.7	77.8	98.0	133.6	104.1	49.9
Europe	Credit Suisse	Commercial	0.0	0.0	0.0	0.0	0.0	7.9	12.3	13.0	4.5	4.8
Europe	Deutsche Bank	Commercial	0.0	0.0	0.0	16.5	13.5	15.9	43.0	42.7	36.5	31.5
Europe	Fortis Bank	Commercial	0.0	0.0	0.0	0.0	60.4	78.5	100.4	109.2	0.0	0.0
Europe	BNP Paribas	Commercial	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Europe	ABN AMRO	Commercial	26.0	20.3	25.1	20.3	20.9	61.5	74.4	63.3	41.9	30.3
Total			**154.8**	**132.8**	**200.1**	**202.5**	**413.8**	**553.9**	**741.4**	**1014.6**	**768.9**	**374.0**

Source: Bloomberg, SEC filings, Annual reports; Note: Commercial paper information could not be found for HSBC, BNP, 2004 and 2005 numbers for HBOS, 2000 numbers for Barclays, 2000-2003 for Lloyds PLV, UBS, Credit Suisse, Deutsche Bank and Fortis and IKB in financial statements available on Bloomberg or SEC filings.; Data unavailable for this year*

Table 10 CDS Spreads and Stock Prices

Panel A: Stock Prices

Bank type	Dividend Rises/Neutral	Dividend Cuts	Obs
Commercial	0.005	-0.003	74
Investment	0.006	-0.031	29

Panel B: CDS Spreads

Bank type	Dividend Rises/Neutral	Dividend Cuts	Obs
Commercial	-1.186	-4.104	39
Investment	5.854	2.962	22

Source: Bloomberg, Datastream
Note: The table above reports the average stock return (Panel A) and CDS spread (Panel B) relative to the market return on the day of the dividend announcement. This is measured separately for dividend cuts/neutral and dividend cuts separately for investment and commercial banks. In Panel A the abnormal returns are the fraction and in Panel B the spreads are in basis points. We look at the return 1 day after the dividend announcement for the period from September 2007 to December 2009. Stock price data for all banks are from Bloomberg. CDS spreads data is from Datastream. We separately analyze for dividend increases and dividend decreases. P-value of the difference in the abnormal return for these two cases is shown above.

APPENDIX A

Variable Definitions

Main Variables	Definitions	Source
Credit Losses & Write downs	Write downs include those that directly reduce income, as well as value reductions that only decrease equity and are excluded by the banks from their earnings figures. The values are net of financial hedges the companies use to mitigate losses.	Bloomberg , WDCI function
Capital Raised (WDCI)	Capital infused by all banks, brokers, insurance companies and GSEs by different means.	Bloomberg , WDCI function
Capital Raised	Includes net capital raised by long term borrowings, net common equity issuance and net preferred shares issued	Bloomberg, SEC, annual reports, Datastream,
Net Capital	Includes net capital raised by long term borrowings, net common equity issuance and net preferred shares issued, less dividends	Bloomberg, SEC, annual reports, Datastream
Dividend	Dividends paid in cash by Banks	Bloomberg, SEC, annual reports, Datastream, Compustat
Common Equity	Common Equity was calculated by subtracting Preferred Equity from Total Shareholders Equity. Both Preferred and Shareholders Equity numbers were taken from the Balance Sheet	Bloomberg, SEC, annual reports, Datastream
Profit & Loss	Profit & Loss of the bank as reported on the Income Statement	Bloomberg, SEC, annual reports, Datastream
Assets	Total Assets of the bank as reported on the Balance Sheet	Bloomberg, SEC, annual reports, Datastream
Liabilities	Total Liabilities of the bank as reported on the Balance Sheet	Bloomberg, SEC, annual reports, Datastream
Total Debt (Leverage ratios)	Short Term Borrowings + Long Term borrowings as reported on the Balance Sheet. This does not include deposits held by banks	Bloomberg, SEC, annual reports, Datastream
Loans	Loans + Mortgages as reported on the Balance Sheet	Bloomberg, SEC, annual reports, Datastream

Appendix B
Frequency of data

Banks	Frequency	No. of Years
US Banks	Quarterly and Annual information	2000 onwards
European Banks	Quarterly/Semi Annual and Annual information	2000 onwards
UK Banks	Semi Annual and Annual information	2000 onwards