

Bank Payout Policy, Performance, and Insider Trading in the Financial Crisis of 2007-2009

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Abstract

We provide an extensive analysis of the payout policy of U.S. banks around the financial crisis. We find no evidence that banks systematically used their payout policy to transfer wealth to shareholders in anticipation of future problems. Banks hardly reduced dividends until 2009, but significantly reduced share repurchases in 2008. Using established models that relate dividends to fundamentals, dividends in 2008 do not appear excessive. Banks that reduce dividends in 2008 do worse in 2009 than other banks. Insiders of banks that do not reduce dividends in 2008 do not sell more shares than before the crisis.

Keywords: dividends, total payout, financial crisis, insider trading

JEL codes: G21, G24, G28, G32, G35

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1. Introduction

Banks have long been known for paying high dividends (Kim (2011)), and their payout decisions in the financial crisis of 2007-2009 received considerable coverage in the press (Lobb (2008), Kim (2011), Sidel (2014)). The payout policy at the beginning of the financial crisis is particularly controversial as the crisis eroded the capital of many banks, which then relied on government funding (Rosengren (2010), US Treasury (2010)). Acharya et al. (2012) document that many of the largest bank holding companies kept dividends constant and in some cases even increased them until the end of 2008, despite mounting losses. They note that it is difficult to identify the underlying reason for these banks' dividend policy. Banks may have engaged in wealth transfer from their creditors (or the government) to shareholders, possibly anticipating future losses. Alternatively, banks may have been reluctant to cut dividends fearing that dividend reductions would lead to uncertainty about their fundamentals, and cause subsequent refinancing problems.

We provide a first extensive study to shed some light on the implications and possible motives of banks' payout policy at the beginning of the financial crisis, 2007-2008. We explore the extent to which banks' dividend (total payout) patterns in the crisis differ from normal times; and relate dividends (total payout) to past, contemporaneous, and future profitability, as well as insider trading patterns.

We find that while banks did not seriously reduce dividends paid to shareholders until 2009,¹ they reduced share repurchases significantly from 2007 to 2008, similarly to the results of

¹ While TARP recipients were required to consult on payout plans with the Federal Reserve' supervisory staff and had to get treasury approval for common stock dividends and share repurchases, they were not unconditionally barred from paying dividends (<http://www.treas.gov/initiatives/eesa/>). In early 2009, the FED increased the pressure on all bank holding companies (BHCs). BHCs were strongly advised to defer or eliminate dividends if (i) the BHC's net income in the previous four quarters, net of dividends previously paid during that period, was not sufficient to fully fund the dividends, or (ii) if the retention rate of earnings was not consistent with the BHC's capital needs.

Floyd et al. (2015). The percentage of dividend-increasing banks is 46.7% in 2007, 42.7% in 2008, and drops to 18.8% only in 2009. At the same time, the percentage of banks that reduce dividends increases from 4.9% in 2007 to 14.8% in 2008 and 32.3% in 2009.

To identify whether patterns in banks' payout policy at the beginning of the crisis differ from normal times, we need a reference that takes into account changes in banks' fundamentals. To obtain such a reference point, we estimate a model of payout policy for the period of 1995-2006. We then use this model to predict banks' payout policy in 2007-08 and compare it to the actual payout policy. The payout policy that the model predicts provides a reference point for what banks and investors could consider normal. A payment in excess of this amount is more difficult to reconcile with the argument that banks feared negative market reactions and would be more consistent with the hypothesis that banks engaged in wealth transfer.

We first adopt the approach of Fama and French (2001) and DeAngelo et al. (2006) to model a bank's propensity to pay a dividend. We also adapt their approach by augmenting their list of explanatory variables with measures that reflect the different nature of the banking business from non-financials. The model estimated during the period prior to the crisis predicts the average propensity to pay dividends quite closely.

Next, we consider dividend per share and dividend yield as measures of dividend policy, using a method similar to the one we employ for the propensity to pay. We run an OLS panel regression with fixed effects for the period of 1995-2006 and use the estimated coefficients to calculate the difference between actual and estimated dividends for the crisis period. We refer to this difference as the "abnormal dividend". We repeat the same analysis for total payouts, i.e. the sum of dividends and share repurchases.

We find that, compared to the dividend payout pattern in previous periods, the average bank pays out excessively in 2007. This is true for dividends as well as for total payout. On the contrary, in 2008, controlling for fundamentals, dividends per share for the average bank do not look significantly different from normal times, and total payout per share even decreases below normal times. However, this does not imply that banks should not have reduced their payout by more, given the economic situation at that time. Indeed, the average dividend yield and the total payout yield in 2008 are excessive compared to normal times. Nevertheless, banks did reduce repurchases instead of using them to transfer wealth to shareholders in 2008. In addition, the fact that they reduced repurchases, but not dividends, is consistent with banks fearing an adverse price reaction to dividend cuts.²

In our second set of tests, we analyze how dividend changes relate to future performance in the crisis. We use two measures of performance, stock returns and return on assets (ROA). We find no relation between dividend changes and future performance in 2007. However, we find a significant positive relation between dividend changes in 2008 and performance in 2009, which is driven by banks that reduced their dividend in 2008. The evidence suggests that banks cut dividends as a response to looming problems or that banks that cut dividends indeed run into problems (e.g., have to sell assets at fire sale prices because of refinancing problems).

Finally, we use insider-trading data to see whether insiders behave differently in banks that increased dividends vis-à-vis other banks. To do so, we split the sample into three categories: banks increasing, reducing, and not changing their dividend. We find no difference in insider trading behavior across the three groups of banks in 2006. However, we find significant differences for the years 2007 to 2009. Compared to the pre-crisis period,² insiders of banks that

² This result resembles the finding of Brav et al. (2005) for non-financial firms that maintaining dividends has the same priority as investment, while repurchases are more flexible.

held dividends constant and insiders of banks that decreased dividends bought significantly more stock. Insiders of banks that increased dividends did not significantly change their insider trading behavior. These patterns do not support the wealth transfer hypothesis. They are, however, consistent with a number of alternatives such as contrarian trading (see Jenter (2005), Piotroski and Roulstone (2006)), or regulatory and public scrutiny (Cziraki (2011)).

Our analysis contributes to the literature on the role of bank payout policies on the financial crisis. Acharya et al. (2012) and Acharya et al. (2013) note that banks may have continued paying dividends to transfer wealth to shareholders, or because they feared that cutting dividends could cause refinancing problems or a bank run. Overall, our evidence suggests that while banks may have decreased their payouts too little, and too late, it is unlikely that banks used their payout policy to engage in a deliberate wealth transfer as a response to the crisis, anticipating bankruptcy, or betting on bailouts. First, while payouts in 2007 look clearly excessive, insiders of banks that increased dividends did not sell more shares than before, and insiders of banks that kept dividends constant sold significantly less stock. Second, banks considerably reduced their share repurchases from 2007 to 2008. We would not expect such a drop if banks' main motive was to transfer funds to shareholders. Third, the link between future performance and dividend policy became stronger in 2008, not weaker, in particular for banks with worse future performance. Banks that held dividends constant or increased them had better future performance than banks that reduced dividends. Thus, banks' dividend policy was not detached from future performance. We would not expect the link between future performance and dividend policy to become stronger in the crisis if wealth transfer considerations are a main motive of dividend policy.

Floyd et al. (2015) compare the payout policy of banks and non-financial firms from 1980 to 2012. They document that dividends play a more important role for banks than for non-financial firms and that, at the beginning of the crisis, banks reduced share repurchases but not dividends. Floyd et al. (2015) argue that their findings are consistent with the idea that signaling with dividends is more important for banks than for firms since banks are more opaque. We contribute to the discussion about the possible implications and motives underlying banks' dividend policy. In particular, we examine whether banks' payout policy was abnormal during the crisis, whether their payout policy predicted future performance, how the market reacted to the announcement of dividend changes, and whether insiders traded differently across banks with different dividend policies.

2. Data

Our data set includes listed bank holding companies (BHC) in the U.S. between 1995 and 2012. We obtain data on bank balance sheets and other regulatory financial data by merging different sub-databases within SNL Financial. We collect data on insider trading from Thomson Reuters, and data on stock returns, adjusted for dividends and stock splits, are from CRSP. Overall, there are 8,195 bank-year observations with non-missing dividend data in our sample. Panel A of Table 1 shows the coverage of our panel during the sample period of 1995-2012.

– Insert Table 1 here –

The number of banks in the sample continuously increases from 236 banks in 1995 to 662 banks in 2006. The coverage of the share repurchase data in SNL improves substantially by 2000. Therefore, we start our analysis of repurchases and total payout in 2000.

Panel B shows descriptive statistics of all the variables we use in the empirical analysis of the paper. The average dividend to book equity is 3.19%, and the dividend yield is 2%, higher than the 1.3% reported for S&P1500 firms by Fenn and Liang (2001). To select our control variables, we first rely on prior literature on corporate payout policies (see Farre-Mensa et al. (2014) for a survey). Then, we add variables that capture the essence of the banking business.

We use the natural logarithm of total assets to measure size. The average (median) bank in our sample has \$12,300 million (\$505 million) in total assets, indicating that our sample banks are considerably smaller than the ones in other empirical studies of the crisis such as Fahlenbrach and Stulz (2011), or Cziraki (2011). The proxies for investment opportunities are the rate of growth of total assets and the market to book ratio of equity. We measure profitability as the ratio of the bank's earnings (net income) to total assets (ROA). The average (median) return on assets (ROA) in our sample is 0.74% (0.9%), which is comparable to the ROA value reported by the Federal Reserve Bank of St. Louis for the same period.³ We approximate banks' leverage using the definition of Acharya et al. (2010), as $(\text{book assets} - \text{book equity} + \text{market equity}) / (\text{market equity})$. Liquidity is measured as the sum of cash and cash equivalents, securities held for trading, and securities available for sale, divided by total assets. We use the share of institutional ownership to control for clientele effects (Chetty and Saez (2003)). The ratio of retained earnings to total equity measures the mix between earned and contributed capital (DeAngelo et al. (2006)).

Banks have to satisfy regulatory capital requirements, and banks that are close to the regulatory requirement may need to conserve cash instead of paying it out to shareholders. In our set of bank-specific variables, we capture the effect of regulation with the ratio of regulatory Tier 1+Tier 2 capital over risk-weighted assets. Some banks have more trading business, and others

³ <http://research.stlouisfed.org/fred2/series/USROA>

might focus more on the traditional lending businesses. This may influence the volatility of earnings and the payout decision of the bank. We control for the business model of a bank using the ratio of interest to non-interest (fee) income. Banks have access to the Fed funds and repo market through which they can exchange liquidity with other banks. This might affect their propensity to pay and the ability to increase dividends. We capture this effect through the lagged Fed funds rate and banks' net interest income paid on Fed funds and repos, as a fraction of total assets. As Fed funds and repos have an extremely short maturity, the net interest income captures the use of this market throughout the year better than the outstanding funds at the end of the year. As a further control for funding, we also include the ratio of deposits to total assets and the ratio of short-term liabilities to total liabilities.

3. Evidence on banks' payout policy from 1995 to 2012

The percentage of banks that pay dividends is high from the beginning of our sample: more than 80% of the banks return money to shareholders in the form of dividends. Figure 1 shows that this number does not significantly drop until 2010. Even in 2008, 84% of all banks in our sample pay dividends. Figure 1 also shows the fraction of banks that repurchase shares in a given year. The fraction fluctuates around 60% until 2008 and then decreases to just above 30% in 2009.

– Insert Figure 1 here –

Figure 2, Panel A provides evidence on the equally as well as value-weighted average ratio of dividends relative to the total payout to shareholders of banks. Due to data availability on share repurchases, we look at the period after 2000. The average share of dividends to total payout (equally weighted) fluctuates around 75% and increases to about 90% in 2009. The value weighted dividend ratio is between 40% and 60% until 2007 and then increases sharply to about

90% in 2008. The difference in payout ratios suggests that there is a difference in payout policy between large and small banks. Share repurchases were more important for large banks and these banks considerably cut back share repurchases in 2008 (Hirtle (2014)).

Panel B plots the value-weighted ratio of dividends to the banks' book value of equity as well as the banks' market value of equity. Both ratios increase steadily until 2005. Of particular interest is the period 2007 to 2009. While dividends to book equity remain relatively stable in 2007, the ratio of dividends to market capitalization increases, as banks' stock prices start to deteriorate. In 2008, the ratio of dividends to book equity decreases, while the ratio of dividends to market increases significantly. The large drop in share prices in 2008 can explain the large increase in dividends to market equity, while the drop in dividends to book equity suggests that some banks reduced dividends or increased book equity.

– Insert Figure 2 here –

Looking at a balanced panel of 240 banks from 2000 onwards, we find that banks continuously increased the total amount of dividends until 2007 and slightly decreased them in 2008 (Figure 3). When only looking at dividends, one could hardly suspect that there was a crisis unfolding in 2007. However, banks reduced repurchases from more than \$ 21.52 bn in 2007 to \$ 3.51 bn in 2008. From 2000 to 2007, repurchases were of a similar magnitude as dividends. Banks significantly reduced dividends only in 2009 and 2010. The fact that banks started to adjust share repurchases in contrast to dividends is consistent with the argument that dividends are “sticky” and it is easier to adjust share repurchases. The decrease in repurchases shows that banks started to react to the mounting problems in the financial crisis by reducing their payout to shareholders.

– Insert Figure 3 here –

By definition, the balanced panel contains only banks that did not go out of business, which may give rise to the concern that it only contains banks that did well. However, only two banks drop from our total sample because of failure during the crisis. The panel includes banks that were bailed out through guarantees and TARP. Indeed, 99 banks in the balanced panel received TARP funding. Although the TARP program did not ban dividend payments, recipients were required to consult on the proposed dividend and share repurchase plans with the Federal Reserve supervisory staff. The TARP requirements also included mandatory treasury approval of common stock dividends and share repurchases.⁴ Regulatory pressure also increased for banks that did not receive TARP funding (non-TARP banks). They were strongly advised to defer or eliminate dividends if (i) the BHC's net income in the previous four quarters, net of dividends previously paid during that period, was not sufficient to fully fund the dividends, or (ii) if the retention rate of earnings was not consistent with the BHC's capital needs.

Splitting the panel into banks that received TARP and banks that did not receive TARP reveals an interesting difference. The payout policy of TARP banks resembles the payout policy of the total panel, and taking out the eight largest banks that were forced to take TARP money early on does not significantly alter the picture.⁵ In contrast, non-TARP banks hardly reduced dividends during the crisis and were much slower to reduce share repurchases than banks that received TARP funding. The difference in payout policy is consistent with both non-TARP banks signaling their strength by maintaining a steady flow of dividends in the crisis as well as regulatory pressure put on TARP banks to reduce dividends after they received TARP funds.

Comparing Panels B and C shows that TARP banks were larger than non-TARP banks and paid out more as a fraction of their equity (both book and market value) prior to the crisis.

⁴ <http://www.treas.gov/initiatives/eesa>

⁵ The eight banks are Bank of America, Bank of New York Mellon, City Group, Goldman Sachs, JP Morgan, Merrill Lynch, Morgan Stanley, Sate Street, and Wells Fargo.

Panel D shows repurchases by 21 banks that never paid dividends in the balanced panel. Repurchases in these banks increased dramatically from 2007 to 2008, matching the total payout of dividend paying non-TARP banks, but fell to nearly zero in 2009.

– *Insert Figure 4* –

In Figure 4, we plot dividend changes over time. The fraction of banks that increase dividends is 46.7% in 2007, which is slightly lower than the average of the preceding four years (50%). In 2008, still 42.7% of the banks increase dividends. We only observe a significant drop to 18.8% in 2009. At the same time, the fraction of banks that reduce dividends increases from 4.9% in 2007 to 14.8% and 32.3% in 2008 and 2009, respectively. The fraction of banks that keep dividends constant decreases from 48.3% in 2007 to 42.5% in 2008, but then increases to 48.6% in 2009.

Acharya et al. (2012) point out that several banks kept paying dividends despite making losses. In Figure 5, we look at the prevalence of such a dividend policy. While the percentage of banks with negative income is less than 1% prior to the crisis, this number increases to 3% in 2007, to 12.9% in 2008, and to 23.41% in 2009. We split the sample of banks with negative earnings into three subsamples: (1) banks with positive dividend growth; (2) banks with unchanged dividends; (3) banks with negative dividend growth including those that stop paying dividends. The graph shows that while in 2007 the overall percentage of banks with negative earnings was very small, 80% of these banks did not reduce dividends. In 2008 and in 2009, 57% and 91% of the loss-making banks decreased dividends, respectively.

We also plot the contemporaneous relation between performance and dividend changes for banks that perform worse than the sample median. We use two measures of performance: the yearly return on the bank's stock and net income normalized by total assets. Panel A and B of

Figure 6 show that for both performance measures, worse performing banks have generally lower dividend growth over our sample period. Consistent with this pattern, banks with worse performance reduced dividends by more in 2008 than banks with better performance. On average, banks in the bottom 50% of the performance distribution cut dividends in 2008.

– Insert Figure 6 here –

Our evidence that banks reduced share repurchases, but not dividends at the beginning of the crisis is in line with the findings of Floyd et al. (2015) and confirms that the findings of Acharya et al. (2012) and Acharya et al. (2013) for large banks carry forward to a broader set of banks. The reluctance of banks to cut their dividends at the beginning of the crisis has triggered a debate about the possible reasons (Acharya et al. (2012), Acharya et al. (2013)). One possibility is a deliberate transfer of wealth from debt holders (and in the case of a bailout, the government) to shareholders, gambling on a quick recovery or bailout. Another possibility is that reducing dividends could have caused large uncertainty about the soundness of individual banks. Given the huge volume of short-term debt that banks have and continuously need to refinance, such a concern might have been a bigger problem than the payout of the dividends. A third possibility is that banks did not change their dividend policy, as they did not foresee the extent and the depth of the crisis that evolved after the Lehman bankruptcy.

It is difficult to pinpoint which argument is correct, given the missing counterfactual: banks did not reduce dividends by a large amount early in the crisis, and those banks that did reduce dividends in 2009 and 2010, received TARP. We look, as a first step, to understand the extent to which fundamentals can explain banks' dividend policy in 2007 and 2008. In particular, we look at whether the same factors (fundamentals), which drive banks' payout decisions in normal times, can equally explain payout decisions at the beginning of the crisis. Further, we

analyze whether banks responded to the crisis in different ways and whether this heterogeneity leads to differences in performance during the crisis.

4. Identifying unusual patterns of dividend policy in the crisis

4.1. The propensity to pay dividends

In the previous section, we characterize banks' payout policy over time. While the pattern is interesting, it is not possible to identify unusual behavior in 2007-2008 by looking at this pattern alone, since banks' fundamentals also changed. That is, we are missing a reference that we could use in order to identify whether banks' dividend policy at the beginning of the crisis differs from normal times, taking into account changes in banks' fundamentals. To obtain such a reference point, we estimate a model of payout policy for the period 1995-2006. We then use this model to predict banks' payout policy in 2007-08 and compare it to their actual payout policy. The payout policy that the model predicts provides a reference point for what banks and investors could consider normal. A payment in excess of this amount is more difficult to reconcile with the argument that banks feared negative market reactions and would be more consistent with the hypothesis that banks engaged in wealth transfer.

As a first step, we analyze banks' propensity to pay dividends. We adapt the approach of Fama and French (2001) and DeAngelo et al. (2006) to model the probability with which a bank pays a dividend. Table 2 reports the coefficients obtained from the panel regression using yearly data for the period of 1995-2006. Our outcome variable is a dummy that takes a value of 1 if a bank pays dividends in a given year, and 0 otherwise.

– Insert Table 2 here –

Larger, more profitable banks and those with a higher fraction of retained earnings are more likely to pay dividends. Leverage is also positively associated with the propensity to pay a dividend. Banks with a higher market to book ratio are less likely to pay dividends. The propensity to pay dividends is higher for banks with a lower fraction of interest to fee income as well as if they have a higher risk-weighted regulatory capital ratio and a higher net exposure to the Fed funds and repos market.

Panel A of Figure 7 shows the estimated and the actual average propensity to pay based on the regression in Table 2. The difference is positive for the entire period: the estimated average propensity to pay is higher than the actual one. The estimated average propensity to pay seems to match closely the actual propensity to pay, not only in sample, but also out of sample, after 2006.

– Insert Figure 7 here –

Based on the fundamentals that our model uses to predict dividend payer status, the predicted average propensity to pay is not very different from banks' actual propensity to pay. Hence, the model does not suggest that banks' decision to pay out a dividend in the crisis was unusual. One reason for this might be that the explanatory variables based on accounting numbers were slow to adjust and do not reflect the problems of the crisis. As Acharya et al. ((2012), p.4) argue, "the inertia in bank accounting makes even a distressed bank appear healthy..." Another reason might be that banks received money from the TARP, which made banks' fundamentals look stronger, increasing their predicted propensity to pay and reducing the distance between the average actual and predicted propensity to pay. To address these concerns, we repeat the analysis of Panel A, discarding bank-years in which a bank has TARP funds outstanding. By definition, this only affects our estimates from 2008 onwards. Panel B shows the

actual and estimated average payout probabilities for banks that have no TARP money outstanding. The results are quite similar to those for all banks in Panel A, which suggest that the presence of TARP banks does not drive our results.

4.2. The level of dividends

An alternative way to characterize banks' dividend policy is to look at the level of dividends. Again, our objective is to identify patterns in dividend policy during 2007-08 that differ from the time before the crisis. We use dividend per share and the dividend yield to measure a bank's level of dividend payment. We also perform the same analysis, replacing dividends by total payout (the sum of dividends and share repurchases).

As in the previous section, we estimate our model for the period 1995-2006. We then use it to predict dividend payments in 2007 and 2008. We define the difference between the actual dividend and the dividend that the model predicts as the abnormal dividend. Of course, a model estimated in the crisis would better predict the dividend policy in the crisis. However, our objective is not to correctly predict dividends, but to identify differences in the dividend policy before and during the crisis.

Table 3 reports the estimation results for the period of 1995-2006. In column 1, our outcome variable is dividend per share; in column 3, it is the dividend yield. In column 2 and 4, we present the estimation results using total payout per share and total payout yield as our outcome variables. To capture time-invariant unobserved heterogeneity at the bank level, including differences in the number of shares outstanding, we estimate all regressions with bank fixed effects (FE).

– Insert Table 3 here –

Our fixed-effects regressions show that in normal times, banks' dividends per share increases if bank size, past profitability, or leverage increase (column 1). The dividend yield in normal times (column 3) also increases with bank size and past profitability. Further, the dividend yield increases if the bank's liquidity ratio or the Fed funds rate increase. Holding past profitability constant, the dividend yield decreases if contemporaneous profitability (ROA) increases. Finally, the dividend yield decreases if net interest expense in the Fed and repo market, or the share of deposit financing increase. We note that the negative (positive) effect of an increasing Fed funds rate (contemporaneous profitability) on a bank's share price is likely driving the positive (negative) coefficients in the dividend yield regression.

In Panel A of Figure 8 we plot the average level of abnormal dividends from 1996 to 2012. We define the abnormal dividend as the difference between actual and predicted dividend, using the estimated coefficients from Table 3, column 1 for the entire period (both in sample and out of sample).

– Insert Figure 8 here –

As dividends of TARP banks follow different dynamics than those of non-TARP banks, we separately plot the average abnormal dividends for non-TARP and TARP banks from 2008 onwards. The average level of abnormal dividends per share is low and oscillates around zero for most of the in-sample period. It increases at the onset of the crisis and decreases almost to zero in 2008, and then becomes negative in 2009. For TARP banks, the average abnormal dividend is negative with a large negative spike in 2009. Thus, TARP banks reduced dividends considerably compared to normal times. One reason might be that regulatory pressure on TARP banks is underlying the reduction of dividends.

In Panel B, we plot the average abnormal dividend yield for all banks in the sample, splitting again non-TARP and TARP banks from 2008. The average abnormal dividend yield is very close to zero between 2003 and 2006 and then increases dramatically, in particular, in 2008. It is significantly larger for TARP banks in 2008 than for non-TARP banks, but rapidly decreases for TARP banks afterwards, reaching negative values after 2009. A comparison of Panel A and Panel B suggests that the discrepancy in 2008 is due to decreasing stock prices, not increasing dividends.

In Panels C and D, we plot the average abnormal total payout per share and the total payout yield, respectively. The abnormal payout values are based on the regressions in column 2 and column 4 of Table 3. The average abnormal payout per share, as well as average abnormal total payout yield, oscillates around zero between 2001 and 2006. In 2007, both increase dramatically. While the average abnormal payout per share goes below zero in 2008, the average abnormal payout yield remains high. Splitting the sample into TARP and non-TARP banks, we find that the average TARP bank reduced the abnormal total payout below zero in 2008, independently of the normalization (per share or share price) we take.

In Panel A of Table 4 we show the average residuals estimated out of sample, and test whether these are significantly different from zero.⁶ Our out-of-sample residuals are based on the coefficients of the models presented in Table 4. These are the values shown in Figure 8. The average out-of-sample estimate of the abnormal dividend per share is significantly positive for 2007, but not for 2008. Thus, even when using a model estimated during normal times, dividends for the average bank in 2007 look excessive based on 2006 fundamentals. For 2008, we find that the average bank behaves as predicted by the model. Looking at the average abnormal total

⁶ The average in-sample residual for for the period 1995-2006 is zero, by definition.

payout per share (Table 4, Panel B), it is significantly positive out of sample for 2007, but significantly negative out of sample for 2008.

– *Insert Table 4 here* –

The higher abnormal payout relative to normal times in 2007 may suggest that banks were transferring wealth from creditors (or the government) to shareholders. From 2006 onwards the housing market was slowing down which should have acted as a warning sign for banks involved in subprime lending. In the second half of 2007, rates for lending at one-month maturity in the interbank market dramatically increased. Thus, banks were aware that problems were unfolding. However, it is probably fair to say that they did not anticipate the severity of the crisis that erupted after the Lehman bankruptcy. Moreover, if one believes in the signaling role of dividends, this exactly the time where one would expect it to be important.

Looking at 2008, the average bank paid dividends consistent with our model, but reduced total payouts below the expected level via share repurchases. However, we relate dividends and total payout to 2007 fundamentals, not 2008. In addition, accounting numbers are slow to adjust. Thus, the fact that we do not find an excessively high abnormal payout policy per share does not imply that banks should not have reduced their payout by more, given the economic environment. Indeed, the average dividend yield and the total payout yield in 2008 are excessive compared to normal times. Nevertheless, banks did reduce repurchases and did not use them to transfer wealth to shareholders. In addition, the fact that they reduced repurchases, but not dividends is consistent with banks fearing an adverse price reaction to dividend cuts.

5. Payout policy and crisis performance

In this section, we relate changes in bank payout policy to future performance to explore the potential motives for the presence of high (abnormal) dividends during the crisis. The payout

literature on non-financials examines the information content of dividends (Benartzi et al. (1997), Grullon et al. (2002)), in particular, whether dividend changes reflect past or future performance. Looking at the relation between dividend changes and future performance, we address two related questions. First, was the relation between dividend changes and future performance different during the crisis compared to normal times? Second, did banks that made larger dividend changes perform better or worse during the crisis compared to other banks?

We use two measures of performance: yearly stock returns and earnings (net income) normalized by total assets. We use both a market and an accounting measure of performance to ensure that our choice of performance measure does not drive the results. The market may overreact to news and, in particular, dividend changes: investors may interpret a reduction in dividends as a negative signal so that the share price decreases. An accounting measure of performance avoids this problem, but managers may delay reporting negative news.

To assess the changes in bank dividend policies over time, we run regressions of performance in year $t+1$ on dividend changes in year t , and control variables.⁷ We employ two dummy variables, one dummy for the crisis period of 2007-08 and a second dummy for the post-crisis period 2009-12.⁸ The coefficient of the interaction term between the dividend change and the time dummies reflects the difference between normal times (i.e., 1996-2006) and the crisis and post-crisis periods with regard to the relation between dividend changes in year t and performance in year $t+1$. Columns 1 and 3 of Table 5 display the relation between dividend change and future performance without controls, while columns 2 and 4 include lagged controls.

⁷ Dividend data are available for 1995-2012, so 1996 is the first year in which we calculate dividend changes.

⁸ In this section, we do not use the dividend yield. First, we are interested in dividend changes that stem from managerial decisions, not stock price movements. Second, a large fraction of banks had negative net income in the crisis, making it difficult to interpret the dividend yield. Whenever we analyze changes in dividends, we exclude banks that never paid a dividend. For banks that stopped paying a dividend, we set the dividend change equal to zero in years where this bank does not pay a dividend in two consecutive years. Our results do not change if we leave the banks in the sample that never pay a dividend and set the dividend change equal to zero in all years.

The relation between future performance and dividend changes is not significantly different between normal times and the crisis when we use stock returns as a measure of performance. In contrast, this association becomes significantly stronger during the crisis when we use accounting returns: *ceteris paribus*, larger dividend increases (decreases) are associated with higher (lower) future accounting performance.

– *Insert Table 5 here* –

In Table 6, we focus on the crisis years to see where the significant relation between dividend changes and future performance comes from. In particular, we examine dividend changes in 2007 and 2008 and subsequent performance in 2008 and 2009, respectively.⁹ We find a positive and strongly significant relation for both measures of performance for 2008, but not for 2007. To understand whether the relation between dividend changes and crisis performance differs for reductions and increases of dividends, we replace the change in dividends by dummies for positive and negative dividend growth in Panel B of Table 6.

We find that banks that reduced dividends in 2008 performed significantly worse in accounting terms in 2009 than other banks. At the same time, splitting the sample does not modify our conclusion for the relation between dividend changes 2007 and performance in 2008.

– *Insert Table 6 here* –

As a robustness check, similar to Fahlenbrach et al. (2012), we define the crisis period from the third quarter of 2007 to the last quarter of 2008, and look for the correlation between crisis performance and dividend changes in 2007 and 2008. As managers might delay reporting negative news, we extend the measurement of ROA until the last quarter of 2009. The estimation results (displayed in Table A.1 of the Internet Appendix) are consistent with our previous

⁹ In these yearly regressions, we cannot include the Fed funds rate, as it varies across years, but not across banks.

findings. We find a strong positive correlation between dividend changes and crisis performance only for 2008, but not for 2007.

The overall evidence suggests a significant association between future performance and dividend changes in 2008. In particular, banks that made larger downward adjustments in dividends in 2008 performed worse in 2009.

Until now, we only looked at the relation between dividend changes and performance. In Table 7 we display results from a regression where we relate future returns and changes in total payout, which includes dividends and share repurchases. We find a significant relation between total payout changes in 2008 and future performance measured by the ROA. We do not find a significant relation between total payout changes in 2007 and performance in 2008.

– Insert Table 7 here –

The previous evidence is not consistent with the hypothesis that banks increased payouts in 2007 in anticipation of better performance, whether measured as stock returns or accounting performance. However, it is also not consistent with banks systematically using their payout policy to transfer wealth to shareholders in anticipation of worse performance. At the same time, we document that dividend changes in 2008 are associated with worse (accounting) performance in the following year. One reason is that bank managers who foresaw bigger problems in the future reduced dividends. Another reason is that the dividend change exacerbated banks' problems by triggering refinancing issues and potentially even asset fire sales, reducing these banks' ROA in 2009. In the next section, we assess the degree to which investors reacted to dividend changes during the crisis.

6. The market reaction to bank dividend changes

To assess whether the stock market indeed punishes (rewards) dividend cuts (increases), we now examine whether markets react adversely (positively) to dividend cuts (increases) of banks. Benartzi, Michaely, and Thaler (1997) show that dividend changes have some, albeit weak, association with future long-term returns, and also that dividend decreases (increases) are greeted with a negative (positive) market reaction upon announcement. We examine the short-term market reaction to dividend increases and dividend decreases for our sample banks over time.

To do so, we calculate $CAR(0,3)$, the cumulative abnormal return from the day of the announcement to the 3rd day after the announcement, for dividend increases and decreases in our sample. To compute CARs, we use a Carhart (1997) four-factor model as the benchmark, estimating model parameters for the period starting 260 days before, and ending 20 days before the announcement date. We test whether the CARs are significantly different from zero using the test statistic of the standardized cross-sectional Z-test of Boehmer, Musumeci, and Poulsen (1991), which is robust to event-induced variance.

There may be announcements of dividends and earnings made jointly. To ensure that such events do not contaminate our event study, we drop announcements of dividend changes that are made together with earnings.

– *Insert Table 8 here* –

Table 8 summarizes our results from the event study. We find that the market reacts negatively to dividend decreases. The abnormal return after such events is -0.28%, significantly different from zero at the 1% level. Similarly, we find that the market reacts positively to dividend increases, with a statistically significant CAR of 0.44% following such announcements.

This confirms that the results of Benartzi et al. (1997) hold also for our sample of large US bank holding companies.

Importantly, we find that abnormal returns after dividend increases were slightly more positive in 2007 (at 0.52%), and decreases were considerably more negative in 2009 (at -1.46%), than the average reaction over the entire sample period. We find no significant abnormal returns after dividend cuts in 2008, once we eliminate observations where earnings announcements were made at the same time. The price reaction to dividend decreases in 2009 might reflect investors' updated beliefs about the future prospect of the bank, but it is also consistent with investors updating their beliefs about the extent of wealth transfer that the bank engages in.

7. Dividend policy and insider trading

In this section, we analyze the relation between insider trading and the change in dividend policy. The objective is again to identify whether bank managers adjusted the payouts of their bank anticipating poor future performance. To do so, we split banks into three groups and show insider-trading measures for these groups. The first group consists of banks that decrease their dividends, the second group consists of banks that increase their dividends, and the third group consists of banks that do not change their dividends.

We rely on prior literature to select variables to measure insider trading and, in particular, whether insiders are purchasing or selling. The variable *NPR count* is the average net purchase ratio calculated as the ratio of net purchases to total insider transactions, $\frac{\text{number of purchases} - \text{number of sales}}{\text{number of purchases} + \text{number of sales}}$ (Lakonishok and Lee (2001)). This measure equals 1 if all insider trades in a given year are purchases and -1 if all insider trades are sales. *NPR volume* uses the number of shares bought and sold as opposed to the number of purchases and sales

(Lakonishok and Lee (2001)). Finally, we also examine the percentage of net buyers, defined as insiders who buy more stock than they sell (Jenter (2005)). All three measures increase with more insider buying and decrease with more insider selling. To control for bank-specific, time-invariant heterogeneity in the insider-trading behavior of bank managers, which might stem from differences in firm-level insider trading policies (Roulstone (2003)) or governance arrangements (Ravina and Sapienza (2010), Cziraki et al. (2014)), we de-mean the insider-trading measures. We calculate the de-meaned values by taking the time-series average of the variable for each bank during the pre-crisis period 1995-2006, and then subtract this average from each of the observations.

– Insert Table 9 here –

Table 9, Panel A shows the averages of the (de-meaned) insider-trading measures for each of the three groups of banks around the crisis. There is no significant difference between the three groups in 2006, 2010, and 2012. In contrast, for 2007 to 2009, we find significant differences in the three insider-trading measures between the three groups. In particular, the net purchase ratios as well as the percentage of net buyers for insiders of banks that decrease (increase) dividends are significantly higher (lower) than for other banks. Panel B shows the dynamics of the three insider-trading measures around dividend changes for the entire sample from 1995 to 2012. The insider-trading measures are shown in event time, in the 7 years around the dividend decision. Year 0 is the year in which the dividend is paid. These results show that the significant difference in insider trading patterns for banks with different payout policies are specific to the crisis of 2007-2009. We do not find the same insider-trading patterns for banks outside the crisis.

– Insert Figure 9 here –

In Figure 9, we plot the results of Table 9, Panel A, and then disaggregate these results by TARP status. The top figure shows that the insider-trading measures for banks that reduce dividends are very different from the insider trading-measures in previous years, while insider-trading measures for banks that increase dividends are comparable to previous years. The pattern suggests that insiders of banks that reduced dividends drive the difference in insider-trading measures for the different banks in the crisis. Net purchase volume in these banks rose significantly between 2007 and 2008, and increased further in 2009. However, insider-trading measures also changed in banks which did not change dividends at the onset of the crisis. Taking these measures as a reference (to account for the differences between the crisis and normal times), banks that increase dividends and banks that decrease dividends both deviate from this reference point in different directions.

One explanation for the differences between groups in 2007 and 2008 is contrarian trading. Banks that reduced dividends probably experienced a stronger decline in share price than banks that increased dividends. Insiders of banks that experienced a relatively larger decline in share price may buy more and sell less expecting the price to recover (see Jenter (2005) and Piotroski and Roulstone (2006)). However, we do not find a significant announcement effect for banks that reduce dividends in 2008.

An alternative explanation is that insiders of banks that received TARP were under greater public and regulatory scrutiny than banks that did not receive TARP. Insiders of banks that received TARP and reduced dividends are therefore less likely to sell shares (Cziraki (2011)). Splitting the sample into TARP and non-TARP bank shows that those banks that decreased dividends and at the same time also received TARP had a more substantial increase in

NPR volume than non-TARP banks. Thus, regulatory pressure seems to partially explain the increase in NPR volume in dividend-decreasing banks.

8. Conclusion

We provide a systematic study of the payout behavior of U.S. banks around the recent financial crisis to understand the possible motives and drivers of banks' payout policy, which regulators criticized (Rosengren (2010), US Treasury (2010)). Overall, our evidence suggests that while banks may have decreased their payouts too little, and too late, it is unlikely that banks used their payout policy to engage in a deliberate wealth transfer as a response to the crisis, betting on bailouts.

Banks show considerable heterogeneity in their payout policy and in their reaction at the beginning of the financial crisis, 2007-2008. We employ standard models of dividend policy and use the prediction of these models as a reference to determine whether banks altered their payout behavior in crisis time in an unusual way.

In 2007 the average bank paid out high dividends relative to normal times, controlling for fundamentals. Including share repurchases does not alter this conclusion. Looking at the relation between dividend (total payout) changes in 2007 and future performance we do not find any significant relation. At the same time, banks that increased dividends experienced an abnormal return of 0.52% in a three-day event window. One possible interpretation of this pattern is that banks engaged in wealth transfer from creditors to shareholders at the beginning of the financial crisis. However, in 2007, insider-trading patterns of the banks that increased dividends were similar to those that reduced them.

In 2008 dividend policy for the average bank did not look significantly different from normal times, controlling for fundamentals. However, the average bank reduced share repurchases significantly, which decreased total payout below the amount expected based on our model. We would not expect such a drop if banks' main motive was to transfer funds to shareholders. We also find that the relation between dividend changes and future performance became significant in 2008, with the correlation coefficient being higher than in normal times. Additional analysis shows that this correlation is mainly driven by banks reducing dividends, as they have poor subsequent performance. Net insider purchases in these banks increased considerably compared to other banks.

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Figure 1: Percentage of banks by payout status

Data from bank dividend payments are from SNL. Each year we sum the quarterly dividend payments of each bank, and categorize a bank as a payer if the total amount is positive. Similarly, we categorize a bank as a repurchaser if the sum of quarterly repurchases is positive in a given year. The data span 1995-2012 for dividends and 2000-2012 for repurchases.

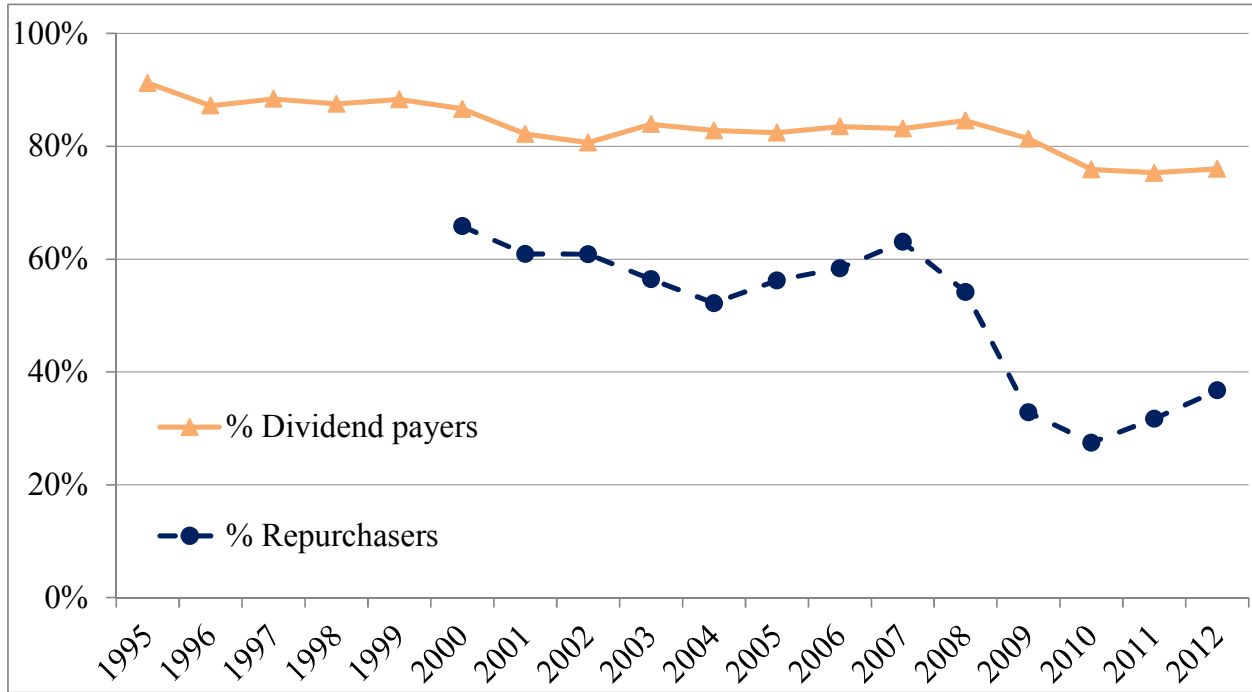
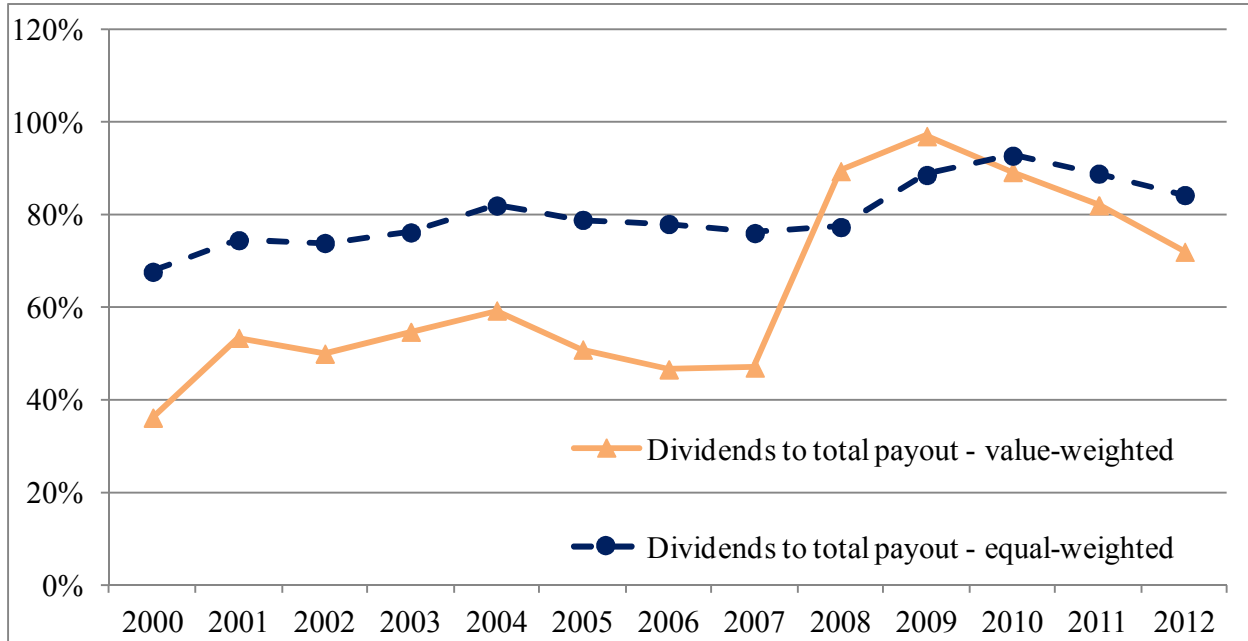


Figure 2: The level of bank dividends over time

Dividend measures for our sample banks over time. Panel A shows the ratio of dividends to total payout across our sample banks, both on an equal-weighted basis and on a value-weighted basis. In Panel B the dotted line shows the ratio of aggregate dividends to aggregate book equity, and the dash-dotted line shows the ratio of aggregate dividends to aggregate market capitalization. Data from bank dividend payments are from SNL. The data span 2000-2012.

Panel A: Dividends to total payout



Panel B: Dividends to book equity and market capitalization

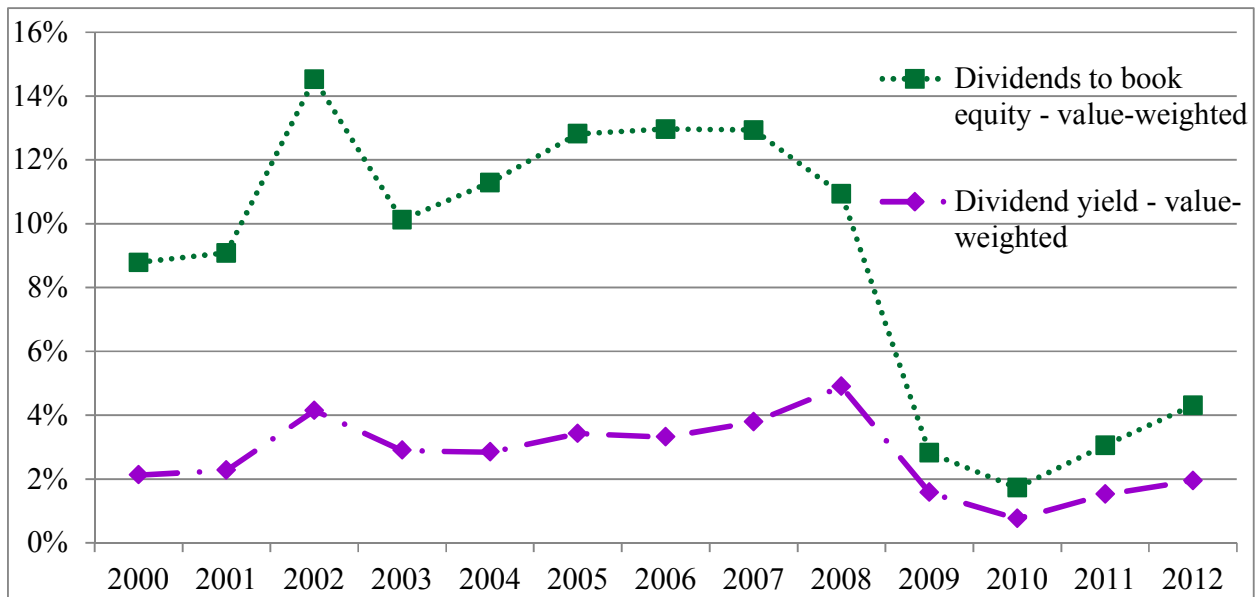
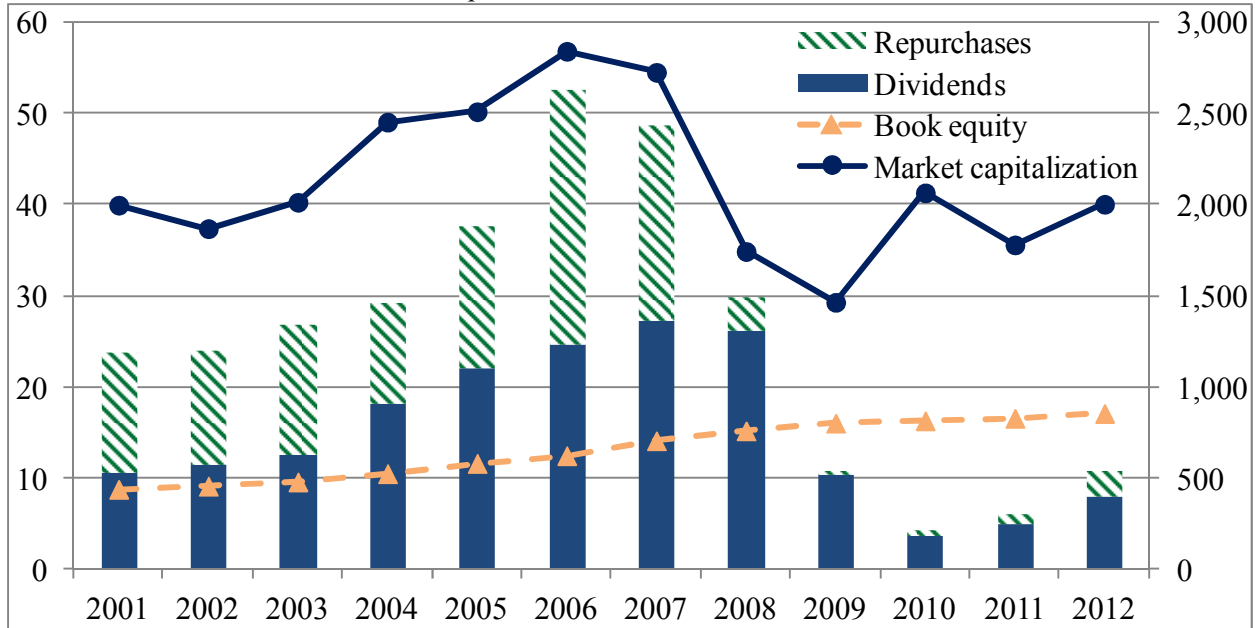


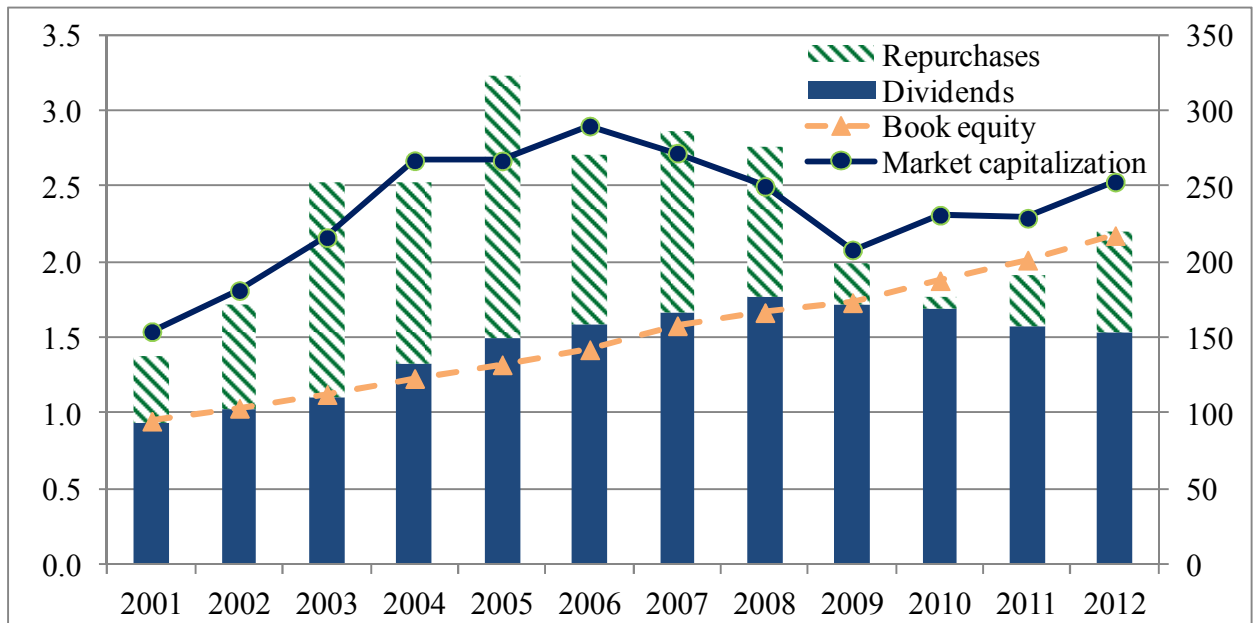
Figure 3: The dynamics of bank payout over time in a balanced panel

Data on bank dividends and repurchases are from SNL. The figures show a balanced panel of 240 banks with information on payout available through 2001-2012. Each year we sum the total amount of dividends and the total amount of repurchases of these banks. The dollar value of dividends and repurchase is measured in billions on the left vertical axis. The lines show how the total assets and market capitalization of these banks evolve over time. The dollar amount is measured in billions on the right vertical axis. Panel A shows all banks in the balanced panel. Panel B shows only banks that never received TARP funding, Panel C shows only banks that received TARP funding, and Panel D shows banks that never paid dividends.

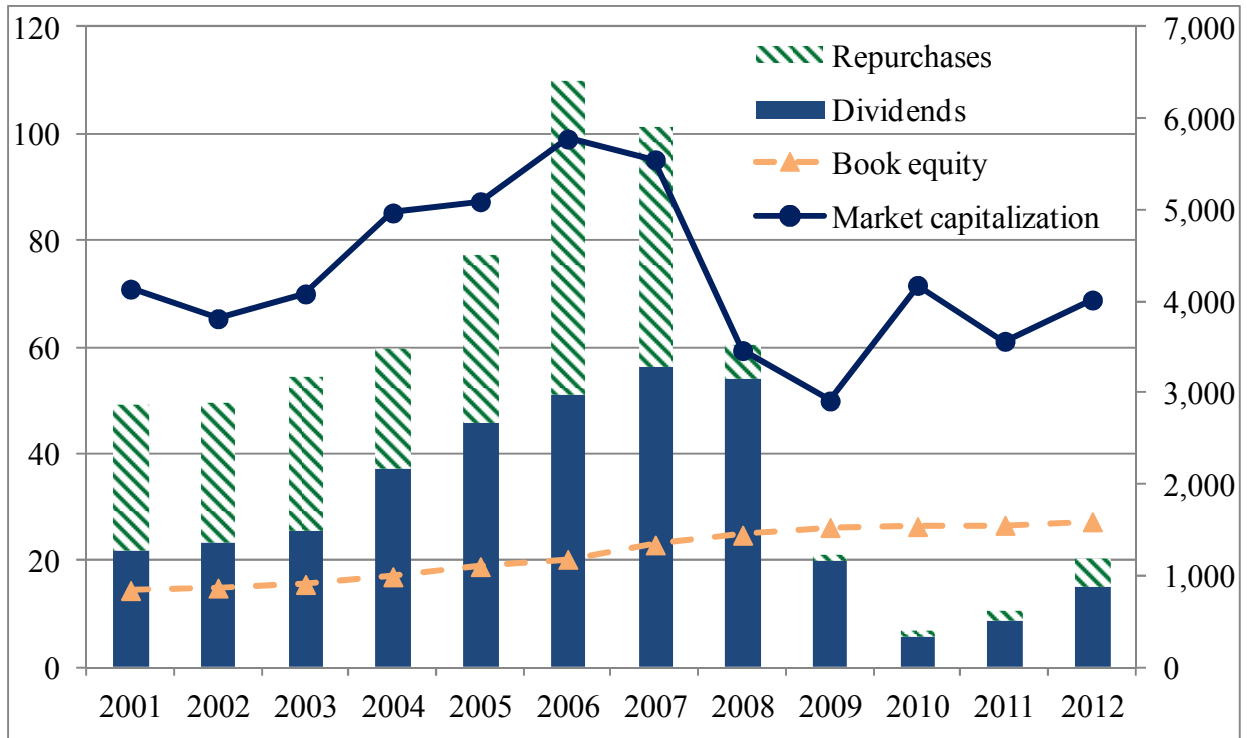
Panel A: All 240 banks in the balanced panel



Panel B: Banks that did not receive TARP funding (N = 141)



Panel C: Banks that received TARP funding (N = 99)



Panel D: Banks that never paid dividends

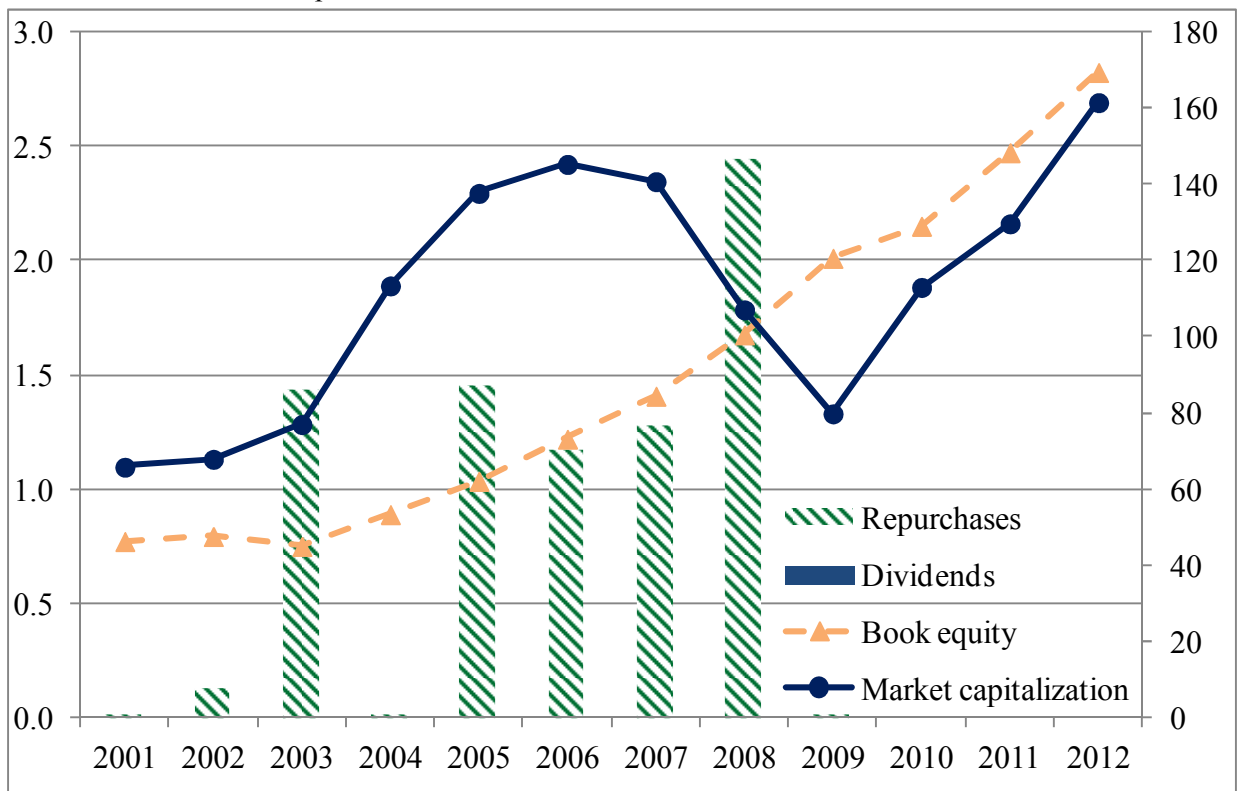


Figure 4: Changes in dividends over time

Data on bank dividends and repurchases are from SNL. The figure shows the percentage of banks that increase, decrease, and do not change their dividends each year. Dividend increases, decreases, and constant dividends are measured based on yearly dividends per share. A bank is classified as having TARP funding if it holds TARP funds in a given year. Dividend data are available for 1995-2012, so 1996 is the first year in which we calculate dividend changes.

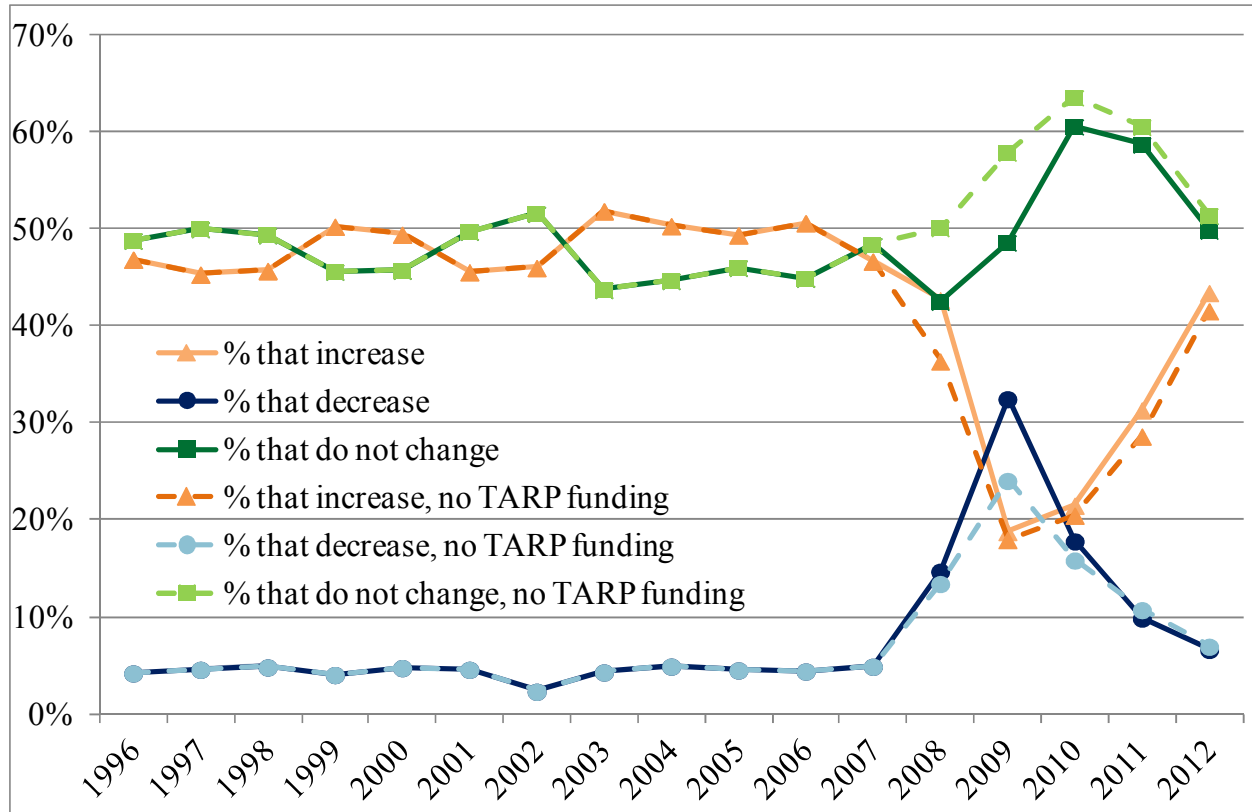


Figure 5: Fraction of banks that pay dividends and have negative earnings

The graphs show the dividend adjustments of banks with negative net income. It shows the percentage of banks with negative net income that increased, decreased, or kept their dividends constant. We further classify banks that decrease dividends into those that decrease but not to zero, and into those that stop paying dividends, i.e., reduce dividends to zero.

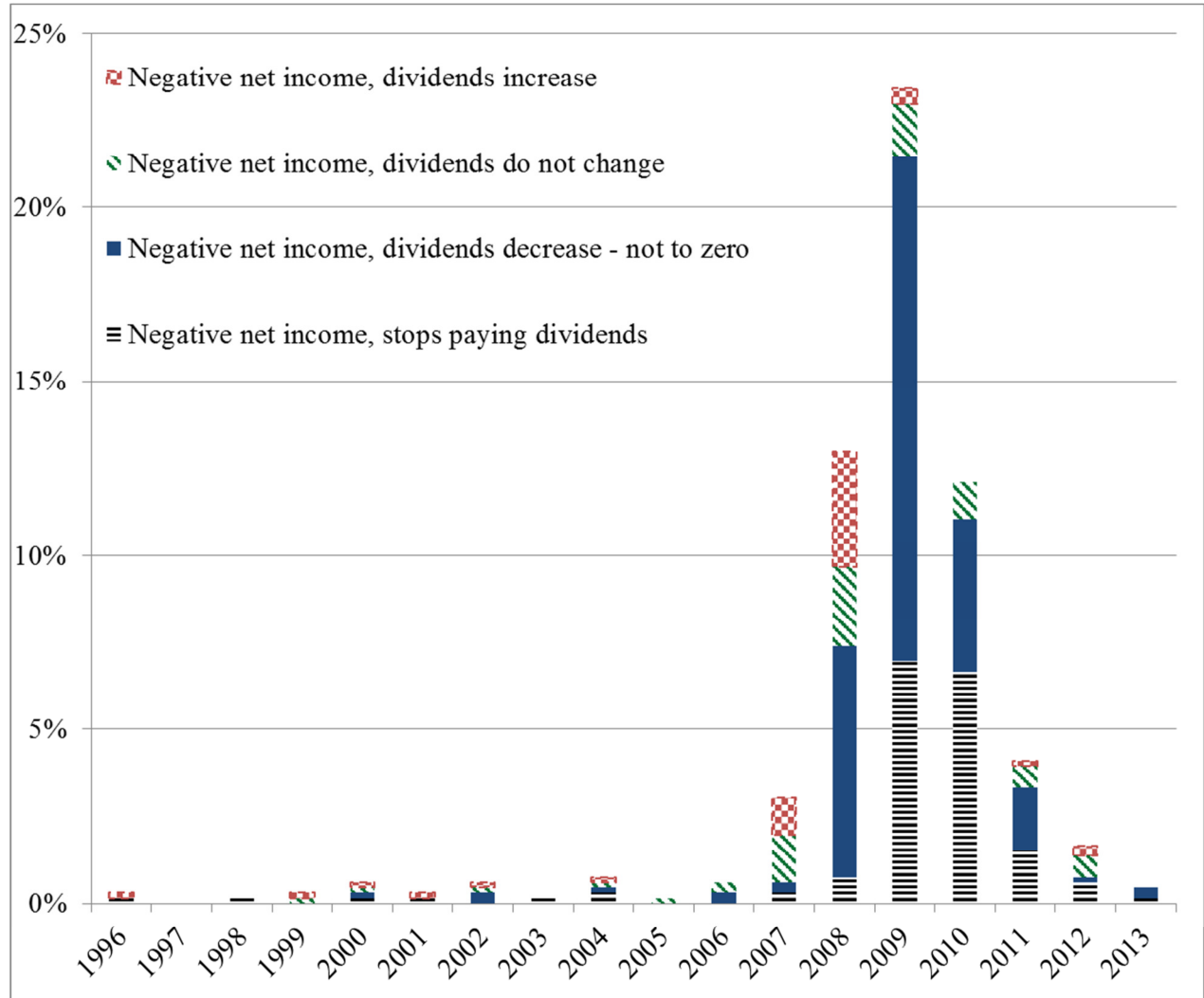
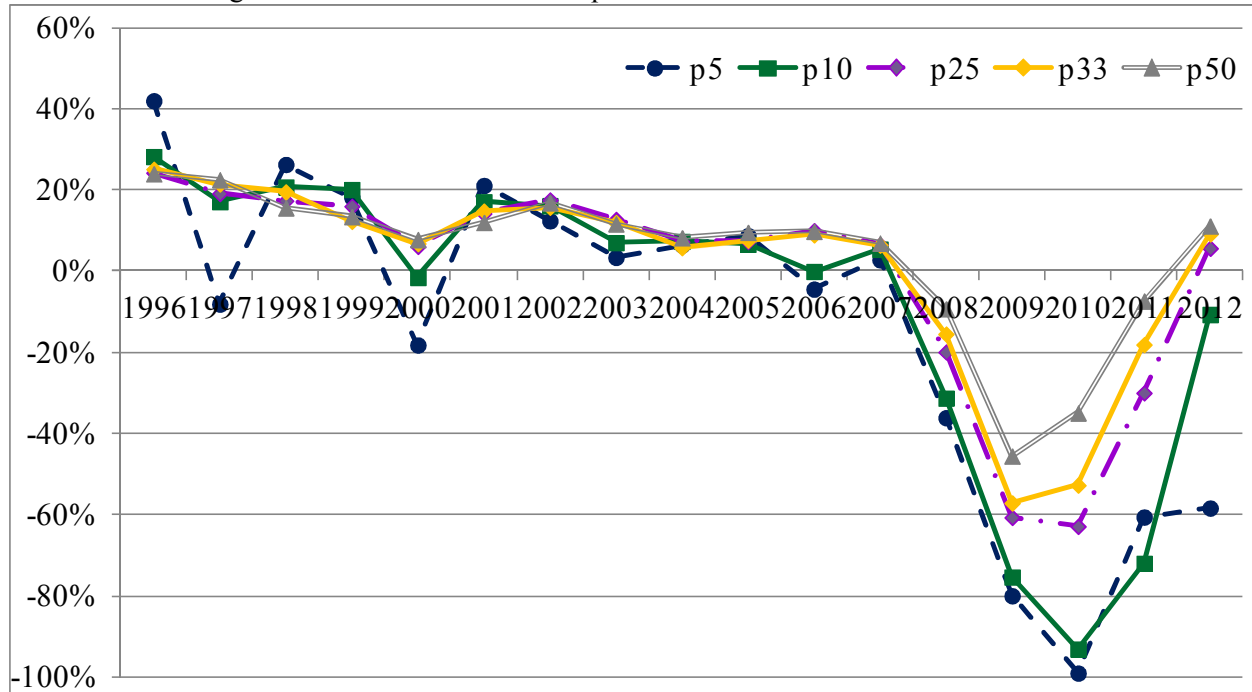


Figure 6: Dividend growth of poorly performing banks over time

The graphs show the year-on-year percentage growth in dividends per share of banks in the lowest, 5%, 10%, 25%, 33%, and 50% of the performance distribution. In Panel A bank performance is measured in stock returns. In Panel B bank performance is measured by net income over total assets (ROA). Dividend data are available for 1995-2012, so 1996 is the first year in which we calculate dividend changes.

Panel A: Dividend growth in banks in the lowest quantiles of stock returns



Panel B: Dividend growth in banks in the lowest quantiles of net income over total assets (ROA)

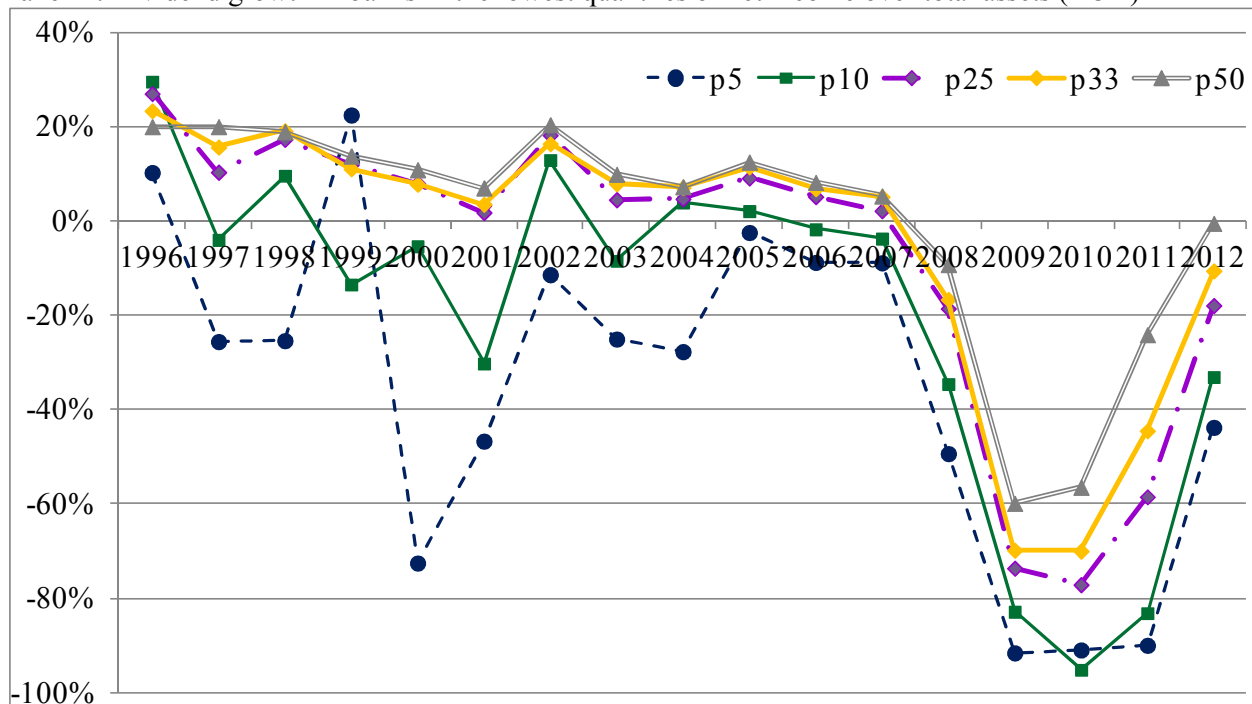
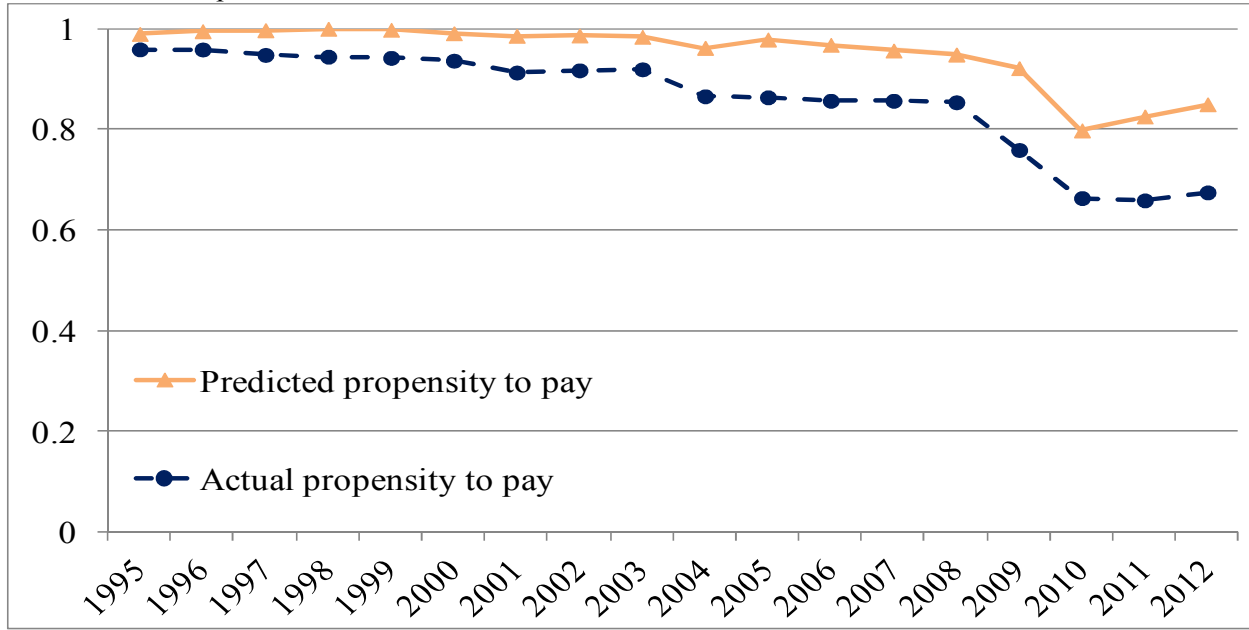


Figure 7: Predicted and actual propensity to pay

The graphs show actual dividend payment frequency and predicted propensity to pay based on the model estimated in Column 1 of Table 2, during the period 1995-2006. Panel A shows the actual and predicted probabilities for the whole sample. Panel B shows graphs discarding bank-years in which a bank had TARP funds outstanding.

Panel A: Full sample



Panel B: Non-TARP bank-years only

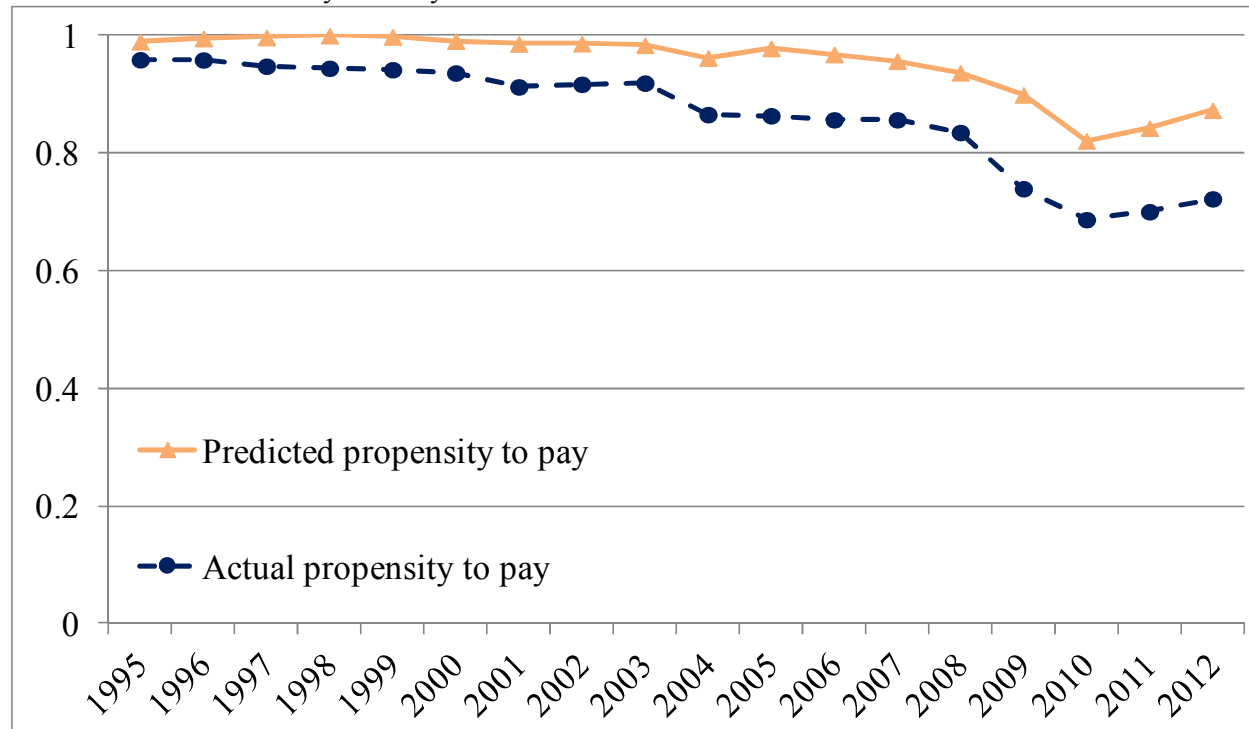
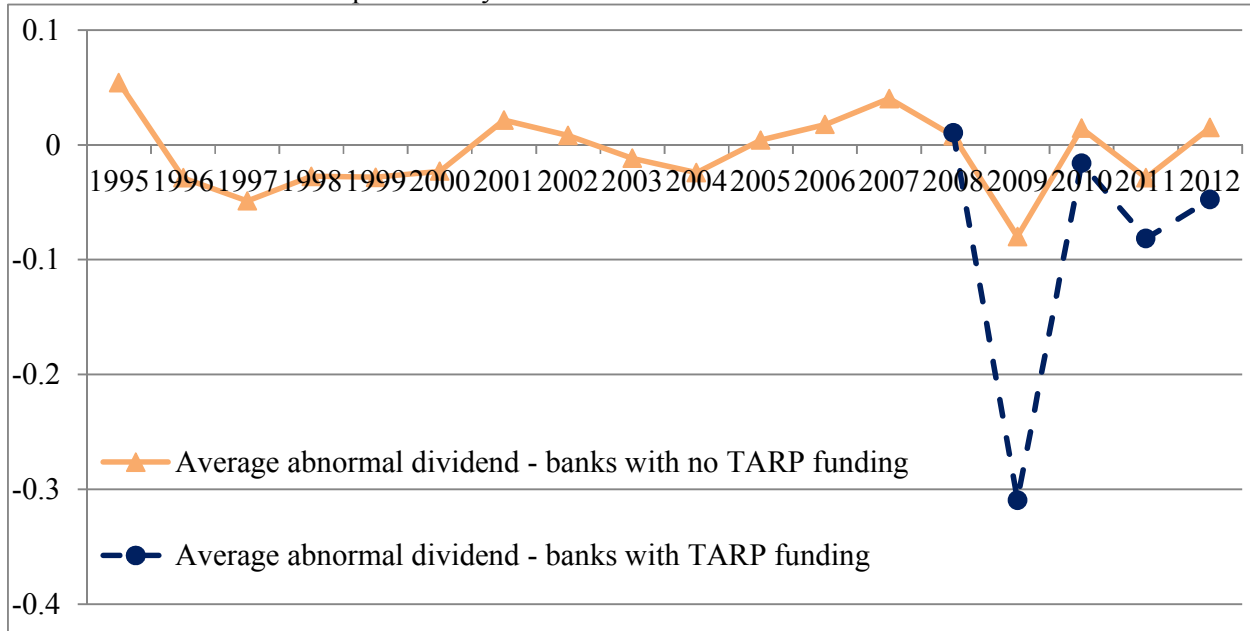


Figure 8: Abnormal dividends over time

The graphs show the error term from the panel regressions of Table 3. Panel A shows residuals from column 1, Panel B shows residuals from column 3; Panel C shows residuals from column 2, and Panel D shows residuals from column 4 of Table 3. The panel regressions are estimated during 1995-2006 (2000-2006) for dividends (total payout), hence the residuals in and after 2007 are based on out-of-sample model predictions. The graphs marked with triangles are based on non-TARP bank-years, and the graphs marked with circles are based only on bank-years in which banks had TARP funds outstanding.

Panel A: Abnormal dividend per share by TARP status



Panel B: Abnormal dividend yield by TARP status

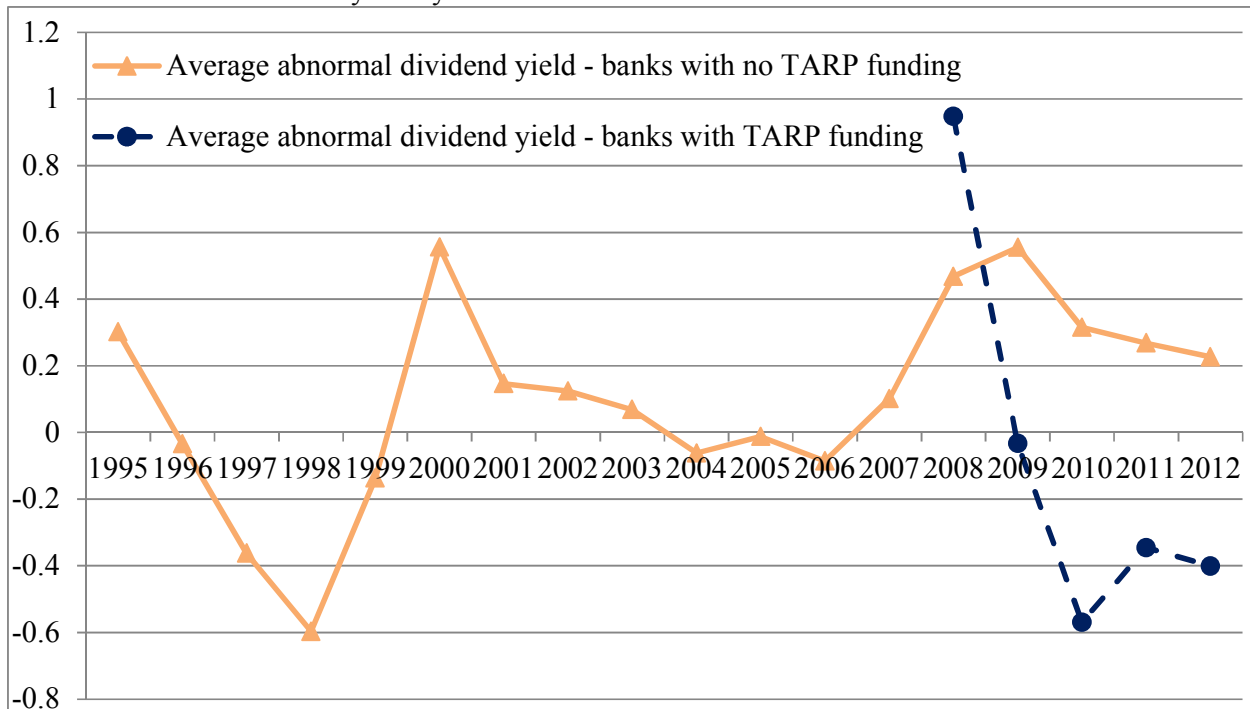
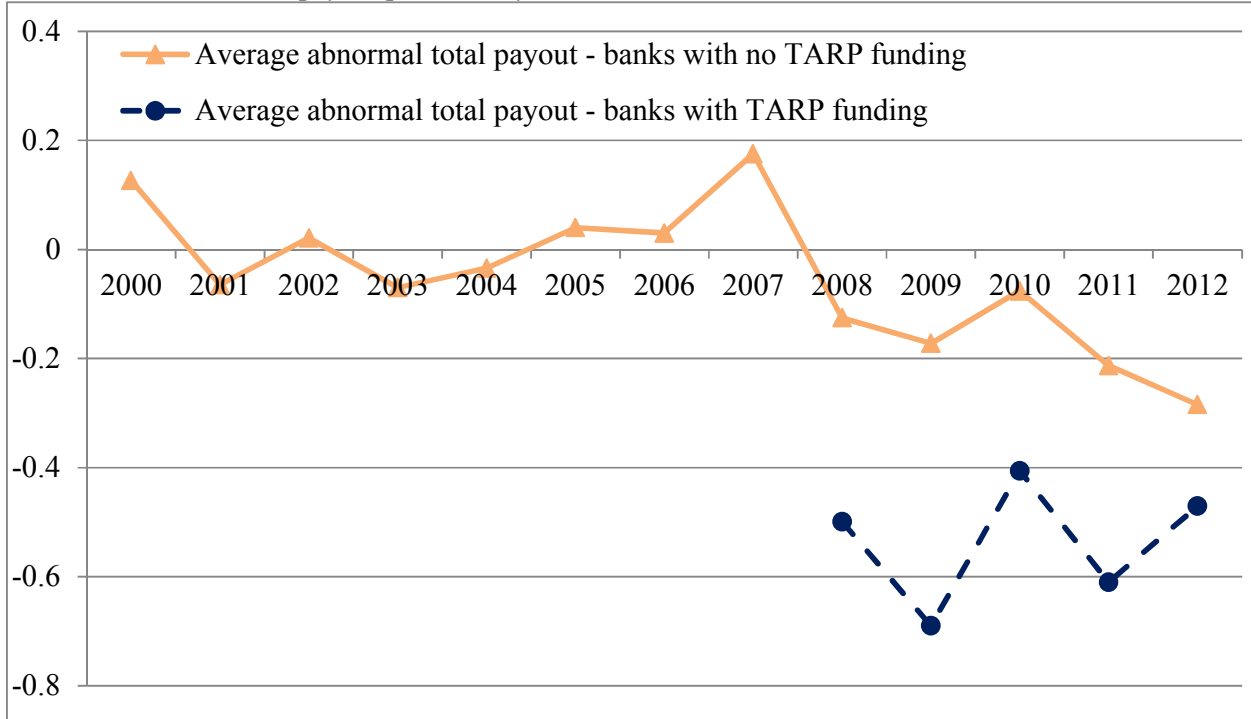


Figure 8 – continued

Panel C: Abnormal total payout per share by TARP status



Panel D: Abnormal total payout yield by TARP status

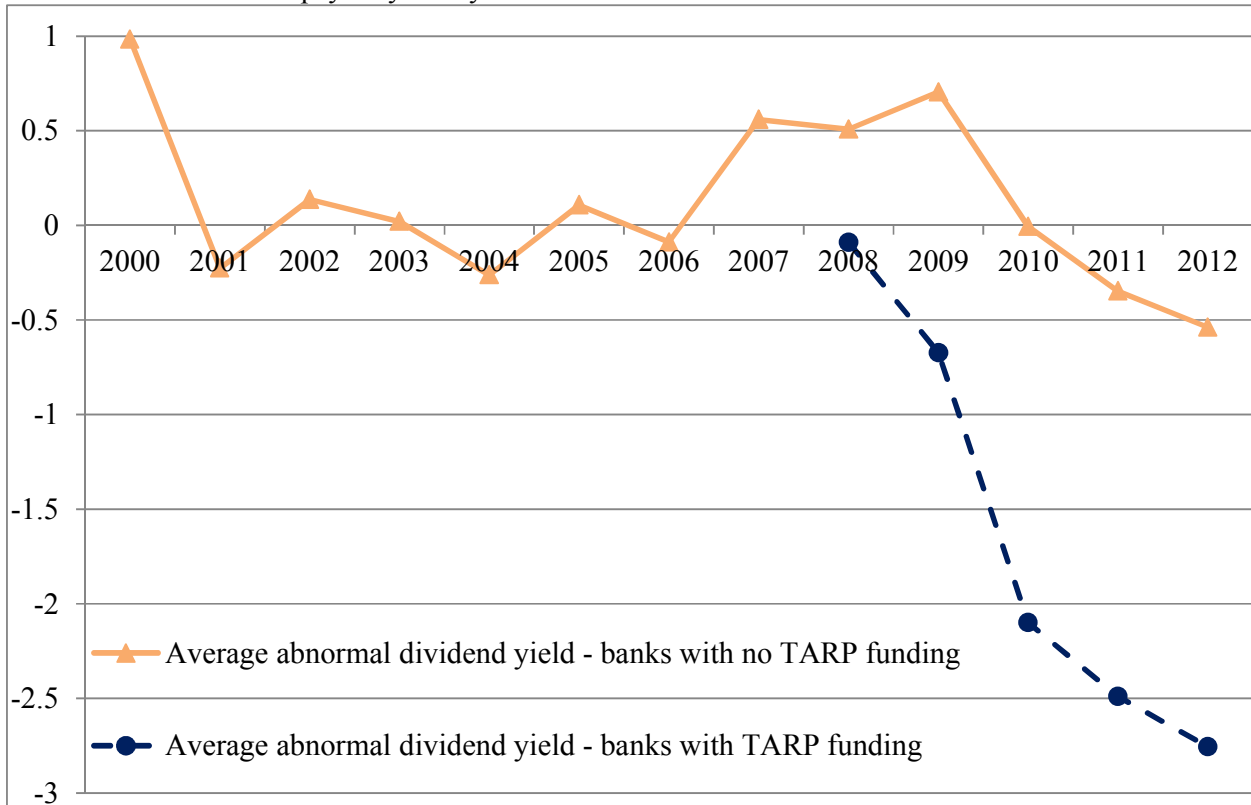


Figure 9: Insider trading and changes in bank dividends

The graphs shows *NPR volume* averaged across banks grouped according to their dividend behavior in each of the years 2000-2012. There are three groups of banks: those with dividend decreases, increases, and no changes in dividends. *NPR volume* is defined as the net purchase ratio calculated based on the number of shares bought and sold. The top panel shows results for all banks, the middle panel for non-TARP bank-years, and the bottom panel only for TARP bank-years.

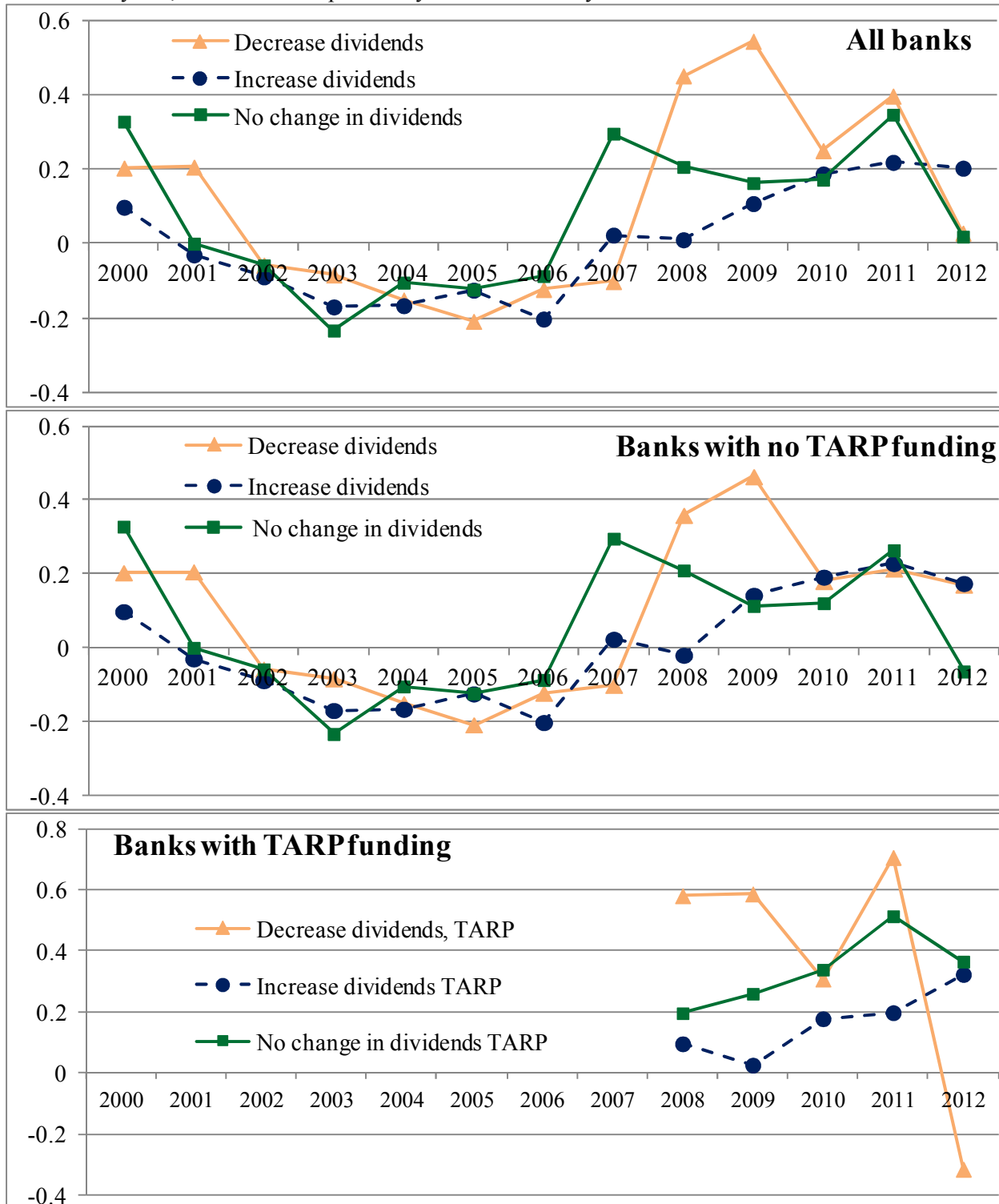


Table 1: Sample Descriptives

Information on bank dividends and fundamentals are from SNL Financial. Stock return data are from CRSP and are adjusted for dividends and stock splits. Panel A shows the number of banks with non-missing dividend and repurchase data for each year in our sample. Panel B shows descriptive statistics of the variables used in the empirical analysis. The data span 1995-2012 for dividends, and 1994-2012 for the explanatory variables, as some regressions use lagged explanatory variables. *Market-to-book ratio* is calculated as (market equity + total liabilities)/(total assets), as in Fama and French (2001). *ROA* is calculated as net income over total assets. *Leverage* is approximated using the definition of Acharya et al. (2010), as (book assets – book equity + market equity)/(market equity). *Total asset growth* measures the year-on-year growth in book assets. *Liquidity ratio* is the sum of cash and cash equivalents, securities held for trading, available for sale securities, and held to maturity securities divided by total assets. *Institutional ownership* is the total ownership stake of all institutions. *Retained earnings to total equity* is the ratio of retained earnings to book equity. *Risk-weighted capital ratio* is the ratio of regulatory Tier 1+Tier 2 capital divided by risk-weighted assets. *Deposits to total assets* is measured as total deposits divided by book assets. *Short-term to total liabilities* is calculated as (short term borrowings + repurchase agreements)/(total liabilities). *Interest to noninterest income* is the ratio of interest income to noninterest income. *Fed funds rate* is the yearly average of the Federal funds rate, based on quarterly values, from the website of the Federal Reserve Bank of New York. *Net interest paid on Fed funds and repos* is calculated as $1,000 \times (\text{interest expense on fed funds and repos} - \text{interest revenue on fed funds and repos}) / (\text{book assets})$. *Stock return* is the yearly return from CRSP.

Panel A: Yearly break-down of the number of observations with non-missing payout data

	All banks		Banks with no TARP funds outstanding	
	Data on dividends	Data on repurchases	Data on dividends	Data on repurchases
1995	236	2	236	2
1996	272	3	272	3
1997	312	4	312	4
1998	336	10	336	10
1999	364	60	364	60
2000	398	379	398	379
2001	469	407	469	407
2002	572	462	572	462
2003	613	489	613	489
2004	645	520	645	520
2005	656	527	656	527
2006	662	526	662	526
2007	662	532	662	532
2008	662	519	549	409
2009	662	521	471	337
2010	661	524	506	372
2011	658	520	530	399
2012	656	502	571	423

Panel B: Summary statistics of variables used in the regressions

	Mean	Median	Standard Deviation	Minimum	Maximum	N
Dividend payer dummy	0.567	1	0.496	0	1	13,240
Dividends to book equity (%)	3.19	3.11	2.75	0.00	31.59	9,583
Dividend yield (%)	2.00	2.05	1.65	0.00	6.90	10,191
Dividend growth (%)	9.27	0	54.11	-100.00	317.39	12,578
Repurchase dummy	0.45	0	0.50	0	1	6,958
Total payout yield	2.94	2.71	2.64	0	12.65	6,678
Total assets (Million \$)	12,300	505	113,000	13	2,390,000	10,193
Log total assets	20.37	20.04	1.64	16.35	28.50	10,193
Market to book ratio	1.40	1.31	0.74	0.04	10.76	9,709
ROA	0.74	0.90	0.88	-5.19	2.33	10,040
Leverage	12.61	8.25	20.56	1.70	524.26	9,168
Total asset growth	0.10	0.07	0.15	-0.51	3.37	9,525
Liquidity ratio	0.27	0.26	0.12	0	0.79	10,193
Institutional ownership	0.22	0.11	0.25	0.00	1.00	6,691
Retained earnings to total equity	0.57	0.55	8.49	-58.97	789.60	8,790
Risk-weighted capital ratio	0.15	0.14	0.05	0.09	0.40	9,711
Deposits to total assets	0.79	0.81	0.10	0.44	0.97	10,188
Short-term to total liabilities	0.04	0.02	0.06	0.00	0.84	10,185
Interest to noninterest income	8.96	6.64	8.10	0.70	58.32	10,044
Fed funds rate (%)	3.09	3.44	2.21	0.25	6.38	13,240
Net interest paid on Fed funds and repos	0.37	0	1.82	-20.24	31.37	9,178
Stock return	0.07	0.02	1.33	-1.00	116.19	8,431

Table 2: Analysis of the decision to pay dividends

The table shows a random-effects panel logit regression of dividend payer status. The dependent variable is a dummy variable equal to 1 if the firm pays dividends. Independent variables are defined in Table 1. Independent variables, with the exception of ROA and total asset growth, are lagged by one year. The model is estimated with a constant, which is not reported in the table. The model is estimated during the pre-crisis period 1995-2006. Underneath each coefficient, we show t-statistics. *, **, and *** indicate that the coefficient is statistically significant at the 10%, 5%, and 1% level.

Dependent variable	Dividend payer
Sample period	1995-2006
	(1)
Log total assets	5.4020*** (3.609)
Market to book ratio	-1.1587* (-1.691)
Lag ROA	5.0281*** (4.712)
ROA	0.9038 (1.295)
Leverage	-0.3983*** (-3.597)
Total asset growth	-1.7469 (-0.985)
Liquidity ratio	-4.9032 (-1.304)
Institutional ownership	-2.0158 (-0.426)
Retained earnings to total equity	7.3846*** (5.965)
Risk-weighted capital ratio	0.2921** (2.398)
Deposits over total assets	8.0262 (1.292)
Short-term to total liabilities	-10.8614 (-1.504)
Interest to noninterest income	-0.1568*** (-2.656)
Fed funds rate	-0.2151 (-1.189)
Net interest paid on Fed funds and repos	0.5299** (2.408)
Observations	3,321
Number of banks	503
Pseudo R ²	54%

Table 3: What determines the level of payouts?

Fixed-effects panel regressions of dividends and total payout on firm fundamentals. Independent variables are defined in Table 1. The dependent variable is dividend per share in column 1, total payout (dividends + repurchases) per share in column 2, dividend yield in column 3, and total payout yield in column 4. Independent variables, with the exception of ROA and total asset growth, are lagged by one year. Underneath each coefficient we show t-statistics that are based on heteroskedasticity-robust standard errors, clustered at the bank level. *, **, and *** indicate that the coefficient is statistically significant at the 10%, 5%, and 1% level.

Dependent variable	Dividend	Total payout	Dividend	Total payout
	per share	per share	yield	yield
Sample period	1995-2006	2000-2006	1995-2006	2000-2006
	(1)	(2)	(3)	(4)
Log total assets	0.3964*** (5.192)	0.4715*** (3.645)	0.2551*** (2.888)	-0.2681 (-0.781)
Market to book ratio	-0.0602 (-1.209)	-0.0988 (-1.439)		
Lag ROA	0.2448** (2.575)	0.4051*** (2.871)	0.2056* (1.673)	0.4957* (1.919)
ROA	0.0048 (0.157)	0.0434 (0.695)	-0.2731*** (-4.425)	-0.3414 (-1.202)
Leverage	-0.0297* (-1.849)	-0.0293** (-2.234)	-0.0221 (-0.836)	0.0044 (0.124)
Total asset growth	0.1149 (1.174)	-0.4157** (-2.490)	-0.2398 (-1.441)	-2.3400*** (-4.059)
Liquidity ratio	0.1319 (0.717)	-0.4455 (-1.003)	0.7690** (2.187)	-1.2104 (-0.807)
Institutional ownership	0.1376 (0.711)	0.2892 (0.768)	0.1300 (0.674)	0.2429 (0.228)
Retained earnings to total equity	0.2017 (1.263)	0.2455 (0.594)	0.2793 (1.430)	-1.7075 (-1.625)
Risk-weighted capital ratio	-0.0092 (-1.430)	0.0224 (1.486)	-0.0173 (-1.446)	0.2702*** (3.852)
Deposits over total assets	-0.3566 (-0.737)	-0.5485 (-0.694)	-2.3076*** (-3.030)	-2.0076 (-0.819)
Short-term to total liabilities	-0.4122 (-1.076)	-0.3212 (-0.574)	0.8712 (1.571)	-0.4350 (-0.249)
Interest to noninterest income	0.0008 (0.196)	-0.0058 (-1.158)	-0.0002 (-0.026)	-0.0210 (-1.130)
Fed funds rate	-0.0146 (-1.587)	0.0075 (0.609)	0.0716*** (4.334)	0.2457*** (5.552)
Net interest on Fed funds and repos	0.0014 (0.119)	-0.0162 (-1.150)	-0.0276** (-2.326)	-0.0450 (-0.922)
Bank FE	Yes	Yes	Yes	Yes
Observations	3,321	2,295	3,321	2,295
Number of banks	503	442	503	442
Adjusted R ²	22%	10%	5%	10%

Table 4: Abnormal payouts predicted out of sample for the crisis

This table shows the average out-of-sample residuals based on the regressions shown in columns 1–4 of Table 3. We obtain out-of-sample estimates by comparing the actual payout of a bank during 2007 and 2008 to the out-of-sample prediction from the models in Table 3, based on the coefficients estimated for 1995-2006 for dividends and 2000-2006 for total payout.

Panel A: Dividends

Variable	Out-of-sample estimates of abnormal dividends			
	Dividend per share		Dividend yield	
	2007	2008	2007	2008
Average residual	0.0726***	0.0249	0.1255***	0.6562***
T-test	(2.745)	(0.873)	(3.057)	(7.701)
Observations	444	432	444	432

Panel B: Total payout

Variable	Out-of-sample estimates of abnormal total payout			
	Total payout per share		Total payout yield	
	2007	2008	2007	2008
Average residual	0.3055***	-0.1165***	0.6384***	0.3893***
T-test	(5.092)	(-3.431)	(4.835)	(3.298)
Observations	377	364	377	364

Table 5: Dividend growth and future performance

OLS regressions of future stock returns and future operating performance on dividend growth. The dependent variable in columns 1 and 2 (columns 3 and 4) is the stock return (ROA) in year $t+1$. The independent variables include dividend growth in year t , period dummies, and control variables. Control variables are defined in Table 1. Control variables are lagged one year with respect to dividend growth, i.e. are measured in year $t-1$. Models are estimated with a constant, which is not reported in the table. The regressions are estimated for the period 1996-2012. *Crisis* is a dummy variable for the period 2007-2008. *Postcrisis* is a dummy variable for the period 2009-2012. Underneath each coefficient we show t-statistics that are based on heteroskedasticity-robust standard errors, clustered at the bank level. *, **, and *** indicate that the coefficient is statistically significant at the 10%, 5%, and 1% level.

Dependent variable	Future returns		Future ROA	
	(1)	(2)	(3)	(4)
Dividend growth	0.0662** (2.559)	0.0475** (1.983)	0.1961*** (5.839)	0.1107*** (3.975)
Dividend growth \times crisis	0.0063 (0.139)	0.0192 (0.418)	0.7608*** (4.941)	0.6065*** (4.478)
Dividend growth \times postcrisis	-0.0294 (-0.752)	-0.0221 (-0.555)	0.5067*** (7.561)	0.1751*** (3.305)
Crisis	-0.2659*** (-19.698)	-0.2880*** (-19.175)	-0.8570*** (-19.760)	-0.7517*** (-18.669)
Postcrisis	-0.0087 (-0.860)	-0.0051 (-0.371)	-0.3811*** (-14.951)	-0.0942*** (-3.150)
Log total assets		0.0030 (0.660)		0.0317*** (2.778)
Market to book ratio		-0.0908*** (-9.851)		0.1056*** (4.915)
ROA		0.0454*** (2.741)		0.4453*** (13.739)
Leverage		0.0027* (1.797)		0.0076** (2.129)
Total asset growth (% year-on-year)		0.0379 (0.828)		-0.2466 (-1.616)
Liquidity ratio		0.1700*** (3.723)		0.2377** (2.325)
Institutional ownership		0.0095 (0.266)		-0.0819 (-0.938)
Retained earnings to total equity		0.0109 (0.667)		0.1042*** (2.784)
Risk-weighted capital ratio		-0.0052*** (-3.583)		0.0165*** (5.659)
Deposits over total assets		0.1177* (1.683)		0.3785* (1.893)
Short-term to total liabilities		0.3213*** (3.398)		0.0419 (0.198)
Interest to noninterest income		-0.0012 (-1.464)		-0.0056*** (-2.590)
Fed funds rate		0.0187*** (7.461)		0.0062 (1.233)
Net interest paid on Fed funds and repos		-0.0053** (-2.275)		-0.0042 (-0.915)
Observations	4,756	4,756	5,162	5,162
Adjusted R ²	10%	13%	30%	43%

Table 6: Dividend growth and future performance – year-by-year analysis during the crisis

OLS regressions of future stock returns and future operating performance on dividend growth. Panel A uses the percentage change in dividends per share to measure dividend growth. Panel B includes two dummy variables, one for an increase in dividends, and one for a decrease in dividends. The dividend changes in columns 1, 3, 5, and 7 are measured in 2007; and those in columns 2, 4, 6, and 8 are measured in 2008. Control variables are defined in Table 1. Control variables are lagged one year with respect to dividend growth, i.e. are measured in year $t-1$. Models are estimated with a constant, which is not reported in the table. Underneath each coefficient we show t-statistics that are based on heteroskedasticity-robust standard errors. *, **, and *** indicate that the coefficient is statistically significant at the 10%, 5% and 1% level.

Covariates measured in	Future returns		Future ROA		Future returns		Future ROA	
	2007	2008	2007	2008	2007	2008	2007	2008
Dependent variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dividend growth	-0.0273 (-0.568)	0.2510*** (4.318)	0.2696 (1.563)	1.9264*** (6.172)	-0.0296 (-0.601)	0.1473** (2.460)	0.2564 (1.304)	1.3707*** (4.877)
Log total assets					0.0138 (0.846)	-0.0077 (-0.386)	-0.0009 (-0.007)	-0.0272 (-0.390)
Market to book ratio					0.0097 (0.289)	0.0240 (0.428)	0.2474 (1.034)	0.3692** (2.045)
ROA					0.1034** (2.110)	0.1763*** (3.560)	0.5467** (2.218)	0.8564*** (5.065)
Leverage					0.0049 (0.425)	0.0464 (1.530)	0.0317 (0.715)	0.0751** (2.418)
Total asset growth (% year-on-year)					-0.3654** (-2.321)	-0.2223 (-1.612)	0.8252 (0.904)	-1.6828* (-1.684)
Liquidity ratio					0.3599** (2.235)	0.3458* (1.797)	1.8941*** (2.692)	1.6087** (2.370)
Institutional ownership					-0.0694 (-0.708)	0.0001 (0.001)	-1.9643* (-1.706)	-0.9267 (-1.638)
Retained earnings to total equity					0.0289 (0.551)	0.0236 (0.363)	0.8851*** (3.587)	0.4409** (2.105)
Risk-weighted capital ratio					0.0018 (0.362)	0.0058 (0.903)	-0.0164 (-0.599)	0.0175 (0.668)
Deposits over total assets					0.2314 (1.057)	-0.1086 (-0.327)	0.7516 (0.779)	-0.5280 (-0.688)
Short-term to total liabilities					1.2606*** (2.981)	-0.2660 (-0.392)	2.0927 (1.413)	-1.2615 (-0.817)
Interest to noninterest income					-0.0012 (-0.425)	-0.0047* (-1.667)	-0.0334 (-1.602)	-0.0202*** (-2.664)
Net interest paid on Fed funds and repos					-0.0197*** (-3.436)	0.0001 (0.014)	0.0010 (0.359)	0.0013 (0.632)
Observations	414	409	414	410	414	409	414	410
Adjusted R ²	0%	2%	0%	11%	7%	7%	15%	26%

Table 6 – continued

Panel B: Dividend increases, dividend decreases, and future performance

Dependent variable	Future returns		Future ROA		Future returns		Future ROA	
	2007 (1)	2008 (2)	2007 (3)	2008 (4)	2007 (5)	2008 (6)	2007 (7)	2008 (8)
Covariates measured in								
Dividend decrease	-0.0444 (-0.706)	-0.1869** (-2.176)	0.0467 (0.145)	-1.0868*** (-4.814)	-0.0649 (-0.994)	-0.1123 (-1.595)	-0.3138 (-0.943)	-0.9029*** (-4.387)
Dividend increase	0.0603* (1.664)	-0.0485 (-0.603)	0.2630 (1.512)	0.1901 (1.563)	0.0564 (1.563)	-0.0422 (-0.663)	0.0624 (0.341)	0.0110 (0.093)
Log total assets					0.0102 (0.623)	-0.0019 (-0.093)	-0.0106 (-0.083)	0.0138 (0.210)
Market to book ratio					0.0101 (0.304)	0.0204 (0.369)	0.2441 (1.021)	0.3651** (2.042)
ROA					0.0800 (1.623)	0.1840*** (3.610)	0.5620** (2.400)	0.8352*** (5.112)
Leverage					0.0055 (0.487)	0.0453 (1.574)	0.0340 (0.770)	0.0736** (2.318)
Total asset growth (% year-on-year)					-0.3648** (-2.332)	-0.2079 (-1.448)	0.8353 (0.911)	-1.6423 (-1.566)
Liquidity ratio					0.3674** (2.291)	0.3478* (1.802)	1.9346*** (2.758)	1.4251** (2.167)
Institutional ownership					-0.0562 (-0.576)	-0.0249 (-0.224)	-1.9635* (-1.687)	-1.0344* (-1.943)
Retained earnings to total equity					0.0320 (0.616)	0.0258 (0.395)	0.8688*** (3.560)	0.4390** (2.025)
Risk-weighted capital ratio					0.0030 (0.596)	0.0071 (1.162)	-0.0155 (-0.563)	0.0333 (1.395)
Deposits over total assets					0.2026 (0.922)	-0.1158 (-0.350)	0.7213 (0.736)	-0.5162 (-0.667)
Short-term to total assets					1.2696*** (2.951)	-0.2920 (-0.423)	2.0213 (1.327)	-1.6096 (-1.022)
Interest to noninterest income					-0.0013 (-0.442)	-0.0050* (-1.669)	-0.0332 (-1.576)	-0.0201** (-2.530)
Net interest paid on Fed funds and repos					-0.0203*** (-3.458)	-0.0000 (-0.002)	0.0010 (0.358)	0.0174 (0.833)
Observations	414	409	414	410	414	409	414	410
Adjusted R ²	1%	2%	0%	12%	8%	7%	15%	27%

Table 7: Total payout growth and future performance – year-by-year analysis during the crisis

OLS regressions of future stock returns and future operating performance on the percentage change in total payout per share. The total payout (dividends + share repurchases) changes in columns 1, 3, 5, and 7 are measured in 2007; and those in columns 2, 4, 6 and 8 are measured in 2008. Control variables are defined in Table 1. Control variables are lagged one year with respect to dividend growth, i.e. are measured in year $t-1$. Models are estimated with a constant, which is not reported in the table. Underneath each coefficient we show t -statistics that are based on heteroskedasticity-robust standard errors. *, **, and *** indicate that the coefficient is statistically significant at the 10%, 5% and 1% level.

Dependent variable Covariates measured in	Future returns		Future ROA		Future returns		Future ROA	
	2007 (1)	2008 (2)	2007 (3)	2008 (4)	2007 (5)	2008 (6)	2007 (7)	2008 (8)
Total payout growth	-0.0165 (-0.703)	0.0407 (1.210)	-0.0305 (-0.238)	0.5058*** (3.223)	-0.0221 (-0.939)	0.0052 (0.152)	0.0063 (0.055)	0.2992*** (2.136)
Log total assets					0.0213 (1.211)	-0.0185 (-0.910)	-0.0723 (-0.770)	0.0051 (0.058)
Market to book ratio					0.0023 (0.063)	0.0532 (1.057)	0.2159 (0.819)	0.4143*** (2.054)
ROA					0.1194** (2.289)	0.1163** (2.334)	0.8662*** (3.671)	0.9661*** (4.797)
Leverage					0.0006 (0.049)	0.0190* (1.766)	0.0439 (0.641)	0.0842*** (2.413)
Total asset growth (% year-on-year)					-0.3233** (-2.070)	-0.1406 (-1.018)	1.3581 (1.267)	-1.6319 (-1.583)
Liquidity ratio					0.3884** (2.025)	0.4147** (2.059)	2.3647** (2.427)	1.7456** (2.226)
Institutional ownership					-0.1210 (-1.140)	0.0573 (0.455)	-1.1168* (-1.740)	-0.6517 (-1.030)
Retained earnings to total equity					0.0634 (1.166)	0.0782 (1.306)	0.9057*** (3.252)	0.5820** (2.384)
Risk-weighted capital ratio					-0.0009 (-0.169)	0.0056 (0.852)	-0.0159 (-0.482)	0.0212 (0.767)
Deposits over total assets					0.3744 (1.531)	-0.2487 (-0.991)	1.0012 (0.893)	0.1292 (0.145)
Short-term to total liabilities					1.6065*** (3.494)	0.2724 (0.541)	3.0194** (1.984)	-0.8047 (-0.513)
Interest to noninterest income					-0.0008 (-0.261)	-0.0045* (-1.740)	-0.0270 (-1.256)	-0.0219*** (-2.594)
Net interest paid on Fed funds and repos					-0.0222*** (-3.678)	-0.0004 (-0.428)	-0.0004 (-0.013)	0.0105 (0.566)
Observations	349	354	349	355	349	354	349	355
Adjusted R ²	0%	0%	0%	3%	9%	7%	15%	21%

Table 8: The market reaction to announcements of dividend decreases and dividend increases

Cumulative abnormal returns (CARs) following announcements of dividend decreases and dividend increases. CARs are measured from the day of the announcement (day 0) to the 3rd day after. To compute CARs, we use a Carhart (1997) four-factor model, estimating model parameters for the period (-260,-20) relative to the announcement date. We test whether the CARs are significantly different from zero using the test statistic of the standardized cross-sectional Z-test of Boehmer, Musumeci, and Poulsen (1991). *, **, and *** indicate that the CAR is significantly different from zero at the 10%, 5%, and 1% level.

Year	Dividend decreases		Dividend increases	
	CAR(0,3)	N	CAR(0,3)	N
Full sample	-0.28***	568	0.44***	3,137
1995	0.66	13	0.64***	180
1996	-0.19	10	0.06	182
1997	1.32	17	0.50***	199
1998	-0.27	18	0.88***	198
1999	-0.32	31	0.48**	197
2000	-0.77	21	0.95***	173
2001	0.13	28	0.15	164
2002	0.24	33	0.80***	213
2003	0.69	30	0.25	234
2004	0.01	28	0.61***	202
2005	-0.56	37	0.31	240
2006	0.27	32	0.29	237
2007	0.20	33	0.52***	217
2008	0.43	39	0.12	131
2009	-1.46***	113	0.02	40
2010	-0.74	37	-0.08	57
2011	-0.61	20	0.33	102
2012	0.09	28	0.37	171

Table 9: Dividend policy and insider trading

Panels A and B show measures of insider trading averaged across banks grouped according to their dividend behavior in each of the years 2006-2012. NPR count is the net purchase ratio calculated based on the number of trades placed, and NPR volume is the net purchase ratio calculated based on the number of shares bought and sold. % net buyers is the percentage of insiders that are net buyers of their firm's stock (i.e. buy more shares than they sell). Panel A shows the demeaned insider trading measures, which we obtain by subtracting the bank-level average, calculated during the pre-crisis period of 1995-2006, from each of the measures. Panel B shows these three insider trading measures around dividend decreases, increases, and no changes in dividends for all of our sample period 1995-2012. The numbers are averages for each of the event years shown. Year 0 is the year in which the dividend decision takes place.

Panel A: Demeaned insider trading measures for banks with different dividend policies

Year	Dividend change behavior	NPR count	NPR volume	% net buyers
2006	Decrease dividends	-0.0592	-0.1227	-0.0242
	Increase dividends	-0.1758	-0.2022	-0.0887
	No change in dividends	-0.091	-0.0869	-0.0305
2007	Decrease dividends	0.1505	-0.1018	0.0196
	Increase dividends	0.0128**	0.0231**	0.0321
	No change in dividends	0.2168**	0.2956***	0.1581*
2008	Decrease dividends	0.4236***	0.4507***	0.2514***
	Increase dividends	-0.0675***	0.0106***	0.0213***
	No change in dividends	0.1827*	0.2062	0.128
2009	Decrease dividends	0.4065***	0.5434***	0.3183***
	Increase dividends	0.0466***	0.1078***	0.0912***
	No change in dividends	0.1452	0.163**	0.1153*
2010	Decrease dividends	0.1124	0.2498	0.1588
	Increase dividends	0.1044	0.1873	0.1264
	No change in dividends	0.0323	0.1721	0.046*
2011	Decrease dividends	0.3012	0.3962	0.2438
	Increase dividends	0.1124*	0.2184*	0.1631
	No change in dividends	0.2174	0.3465	0.211
2012	Decrease dividends	-0.1154	0.0285	-0.0348
	Increase dividends	0.0851*	0.2028*	0.0357
	No change in dividends	-0.0494	0.0193	-0.0177

Table 9 – continued

Panel B: Changes in insider trading around dividend changes for the entire sample 1995-2012

Event year	Dividend decreases			Dividend increases			No changes in dividends				
	NPR count	NPR volume	% net buyers	Event year	NPR count	NPR volume	% net buyers	Event year	NPR count	NPR volume	% net buyers
-3	0.292	0.156	0.56	-3	0.262	0.0769	0.525	-3	0.348	0.184	0.591
-2	0.345	0.218	0.605	-2	0.256	0.0746	0.522	-2	0.376	0.233	0.62
-1	0.412	0.278	0.616	-1	0.249	0.073	0.522	-1	0.384	0.252	0.615
0	0.392	0.294	0.51	0	0.256	0.0847	0.518	0	0.411	0.282	0.621
1	0.477	0.37	0.661	1	0.232	0.0573	0.492	1	0.403	0.277	0.568
2	0.455	0.361	0.621	2	0.225	0.0514	0.498	2	0.419	0.296	0.544
3	0.388	0.269	0.47	3	0.232	0.0615	0.509	3	0.379	0.267	0.555

Internet Appendix

Table A.1.: Dividend growth and crisis performance - robustness

OLS regressions of crisis performance on dividend growth and firm characteristics. The dependent variable in columns 1-2 and 5-6 is cumulative returns during July 2007 – December 2008. The dependent variable in columns 3-4 and 7-8 is cumulative net income scaled by total assets during July 2007 – December 2009. The dividend changes in columns 1, 3, 5, and 7 are measured in 2007; and those in columns 2, 4, 6, and 8 are measured in 2008. Control variables are defined in Table 1. Control variables, with the exception of ROA and total asset growth, are lagged by one year with respect to the year of the dividend change. Models are estimated with a constant, which is not reported in the table. Underneath each coefficient we show t-statistics that are based on heteroskedasticity-robust standard errors. *, **, and *** indicate that the coefficient is statistically significant at the 10%, 5% and 1% level.

Dependent variable	Cumulative returns July 2007 -		Cumulative net income July		Cumulative returns July 2007 -		Cumulative net income July	
	December 2008	2008	2007 - December 2009	2008	2007 - December 2009	2007	2008	
Covariates measured in	2007	2008	2007	2008	2007	2008	2007	2008
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dividend growth	0.0242 (0.391)	0.3753*** (5.257)	0.0042 (1.099)	0.0399*** (5.876)	-0.0060 (-0.115)	0.1069* (1.826)	0.0004 (0.109)	0.0258*** (4.832)
Log total assets					-0.0019 (-0.129)	-0.0015 (-0.119)	-0.0001 (-0.064)	-0.0007 (-0.551)
Market to book ratio					0.0009 (0.026)	0.0652 (1.535)	0.0047 (1.521)	0.0132*** (5.247)
ROA					0.3079*** (7.947)	0.1706*** (9.122)		
Leverage					0.0081 (0.770)	0.0194** (2.009)	-0.0001 (-0.142)	0.0006 (1.099)
Total asset growth					-0.1860 (-1.376)	0.0092 (0.086)	-0.0192 (-0.980)	-0.0212 (-1.255)
Liquidity ratio					0.3215** (2.180)	0.0960 (0.660)	0.0285** (2.272)	0.0107 (0.983)
Institutional ownership					-0.1399 (-1.633)	0.0072 (0.098)	-0.0211* (-1.797)	-0.0194* (-1.949)
Retained earnings to total equity					0.0278 (0.575)	-0.0448 (-1.078)	0.0151*** (3.586)	0.0120*** (3.636)
Risk-weighted capital ratio					0.0038 (0.778)	0.0127** (2.408)	-0.0000 (-0.096)	0.0001 (0.305)
Deposits over total assets					0.1349 (0.745)	0.2331 (1.334)	0.0071 (0.442)	0.0099 (0.773)
Short-term to total liabilities					0.6573* (1.720)	0.2024 (0.603)	0.0342 (1.305)	0.0009 (0.035)
Interest to noninterest income					-0.0034 (-1.445)	-0.0031 (-1.621)	-0.0004 (-1.609)	-0.0005** (-2.339)
Net interest paid on Fed funds and repos					-0.0118** (-2.339)	-0.0032 (-0.878)	-0.0001 (-0.327)	0.0005 (1.176)
Stock return							0.0285*** (7.947)	0.0320*** (8.504)
Observations	414	409	414	410	414	409	414	410
Adjusted R ²	0%	10%	0%	15%	21%	35%	20%	43%