

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

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Abstract

There is an extensive debate about banks' dividend policy in the financial crisis of 2007-2009. We provide a systematic study of the payout policy of U.S. banks around the financial crisis. First, we analyze whether banks' dividend policy in the crisis was abnormal, compared to fundamentals, using well-established models on dividend policy. Second, we investigate the relation between banks' payout policy and crisis performance, using different measures of payout policy and crisis performance. Third, we test whether banks that paid out dividends despite negative net income have different insider trading patterns to gain insights on how insiders' expectations relate to the dividend policy. Based on standard models of payout policy, we cannot detect any "unusual" pattern in the crisis for the average bank in the sample. We find that both large upward and downward adjustments in payout policy are associated with worse stock price performance. At the same time, there is a positive association between changes in payout and net income. Insider trading measures do not provide a clear indication on whether insiders in loss-making banks that paid out dividend did so because of positive information, overconfidence, or rent extraction.

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

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

1. Introduction

The issue of how much capital banks distribute to their shareholders became central during the financial crisis of 2007-09. As the crisis eroded the capital of many banks, the question of by how much banks scaled back their payouts naturally arises. From the investors' perspective, banks have long been known for their high dividend yields (Kim (2011)), accordingly, their payout decisions during and after the crisis received considerable coverage in the press (Lobb (2008), Kim (2011), Sidel (2014)). Bank dividends have also caught the attention of regulators, as cutting back on payouts helps preserve capital if banks incur losses (Rosengren (2010)). Reflecting this view, the Troubled Asset Relief Program (TARP) placed restrictions on the payout policies of participating banks (US Treasury (2010)).

A small and nascent strand of academic literature has considered the question of banks' payout policy in the crisis. In an early contribution, Acharya et al. (2012) report that many of the largest bank holding companies kept dividends constant, and in some cases even increased them, despite mounting losses. They argue that this type of behaviour can stem from both, a fear of banks that a cut of dividends could trigger refinancing problems and a bank run, as well as banks transferring funds from debt holders to shareholders, in anticipation of high losses. Their analysis focuses on the largest banks in the US and a handful of European banks.

In a theoretical contribution, Acharya et al. (2013) provide a potential justification for the observed increases in dividends. Their model shows that the interconnectedness of banks can lead to dividend externalities in the following sense. A change in charter value in one bank might lead to the adoption of a riskier strategy, which in turn, reduces the value of the claim of the connected bank which might trigger more risk-taking and higher dividend payout even in the other bank.

The primary contribution of our paper is to provide large-scale evidence on banks' payout policy during the recent financial crisis. Our aim is to understand to what extent bank fundamentals in crisis time can explain cross-sectional heterogeneity in payout decisions and whether and to what extent the payout decision in the crisis differs from the payout policy during normal times. To achieve this, we rely on insights and empirical techniques from the literature on payout policy (of non-financial firms), and apply them in the context of the recent literature on the financial crisis. Our second aim is to examine the relationship between bank payout on the onset and during the crisis and performance in the crisis. Given the number of banks in our sample, and the considerable heterogeneity in bank performance during the crisis (Beltratti and Stulz (2010)), we can test whether the relation between dividend policy and performance is linear.

We find that adjustments in payout occurred largely via share-repurchases until 2008. While dividends did not seem to drop until 2009, share-repurchases were significantly reduced between 2007 and 2008. The percentage of banks that increased dividends is still 46.7% in 2007; this fraction declines to 42.7% in 2008 and drops to 18.8% in 2009. At the same time, the fraction of banks that reduce dividends increases from 4.9% in 2007 to 14.75% and 32.253% 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 again increases to 48.6% in 2009.

The most important empirical challenge is to understand what constitutes a normal or an excessive level or change in dividend policy. To overcome this issue, we adapt the approach of Fama and French (2001) and DeAngelo et al. (2006) to model the probability with which a bank pays dividends. We use data from 1995-2006 to estimate the propensity to pay as a function of a

number of factors. Both models of payout policy seem to predict quite well the average propensity to pay dividends and they hold fairly well even during the crisis.

We also use dividend per share as a measure of payout policy. We run an OLS panel regression with fixed effects for the period of 1995-2006 and use the estimated coefficients to obtain abnormal dividends (difference between actual and estimated dividends) for the crisis period. Again, we find no significant change in the explanatory power of the model in and out-of-sample. Based on these models, it is not possible to conclude that banks' decision in the crisis to pay out a dividend was unusual.

We then examine the relationship between payer status and performance. We use two measures of crisis performance: (i) the buy-and-hold return on a bank's stock between July 2007 and December 2008 (cumulative return); (ii) the sum of the bank's earnings between July 2007 and December 2009 scaled by total assets (cumulative net income). We use both a market and an accounting measure of performance in the crisis to ensure that our results are not driven by our choice of performance measure. The market might overreact to news and, in particular, changes in dividends. That is, investors might interpret a reduction in dividends as negative signal so that the share price decreases. An accounting measure of crisis performance avoids this problem, but managers might delay reporting negative news. We thus extend the period for the accounting measure of performance to include 2009. We use the controls of Fahlenbrach et al. (2012) and those from our dividend regressions to ensure that any correlation we measure between payout behavior and crisis performance is not driven by variables that influence both.

We find that banks that increased or decreased dividends by a large amount performed worse than banks that made moderate upward or downward adjustments when we measure

performance by cumulative stock return during the crisis. This relationship seems to be more pronounced for banks that reduced dividends.

Looking at cumulative net income, banks changed dividends in accordance with their performance: banks with good performance increased more (decreased less), and banks with bad performance increased less (decreased more). Using the year-on-year percentage growth in total payout as an independent variable, the results indicate that banks that had a higher total payout growth in 2006 had lower performance during the crisis, similarly to our findings on dividend growth. We also find that banks with higher growth of total payout in 2007 had lower cumulative returns in the crisis and banks that reduced their total payout in 2008 had higher cumulative returns.

As a last exercise, we look at the time-evolution of banks with negative earnings and calculate the fraction of banks that pays out dividend. (See also Acharya et al. (2012).) While the percentage of banks with negative income is around 2% prior to the crisis, this number increases by ten-fold between 2006 and 2009. The percentage of banks paid out dividends conditional on having negative income reaches 70 % in 2008. This pattern confirms that banks did not refrain from paying dividends early in the crisis. The question is whether banks did so to transfer funds to shareholders, anticipating large losses, or if they believed the losses are temporary.

To address this question, we analyze the relation between insider trading and the level of dividends. We separate banks into three groups based on their dividend policy, and show insider trading measures for these three groups. The first group consists of banks that have a negative net income and do not pay dividends. The second group consists of banks pursuing a dividend policy that we defined as aggressive, that is, banks that have a negative net income but pay dividends. The third group consists of banks with positive net income. For most of the measures,

insiders of banks that have positive income seem to engage in more insiders selling than insiders of banks that have negative income. The one to this general tendency is the sell volume and net volume of in banks with negative income and payout in 2008, which indicate more insiders selling at these banks. When only focusing on banks with negative net income, the evidence suggests that banks that paid dividends engaged in more insider sales and bought less than banks that did not pay a dividend. To the extent that insiders trades reflect optimism of insiders about the outlook of their banks, this latter finding casts doubt on the argument that the bank paid a dividend to signal strength despite making a loss.

Hence, our results provide mixed evidence on whether banks that paid out dividends despite negative earning did so because of positive information about the future of their banks.

2. Data

Our data set include listed bank holding companies (BHC) in the U.S. between 1995 and 2012. Balance sheet data and pricing data are obtained by merging different sub-databases within SNL Financial. We collect data on insider trading from Thomson Reuters, and data on stock returns 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 228 banks in 1995 to 606 banks 2007. Unsurprisingly, we see attrition from the sample during 2008-2011.

Panel B of Table 1 shows descriptive statistics of all the variables we use in the empirical analysis of the paper. The average (median) bank in our sample has \$ 5,740 million (\$ 556 million) in total assets, indicating that our sample banks are considerably smaller than in other empirical

studies of the crisis such as Fahlenbrach and Stulz (2011), or Cziraki (2011). The average return on average assets (ROAA) in our sample is 0.9 %, which is comparable to the ROAA value reported by the Federal Reserve Bank of St. Louis for the same period.¹

3. Bank payout policy for the period of 1995-2012

Although the fraction of banks in the sample that pay dividends continuously decreased from above 90 % in 1995 to 76 % in 2012, paying dividends seem to be “important” for banks (Figure 1). Indeed, even in 2008, more than 80 % of all banks in our sample pay dividends. Thus, despite huge losses that banks made and restrictions on dividends for banks that received TARP funding, few banks actually stopped paying dividends. Figure 1 also shows the fraction of banks that repurchase shares in a given year. The fraction fluctuated around 60 % until 2008 and then decreased to just above 30 % in 2009.

- Insert Figure 1 here -

Figure 2 provides evidence on the weight of dividends in the total payout to shareholders in our sample. It shows that while the weight of dividends between 2001 and 2007 oscillated between 40% and 60%, this ratio dramatically increases between 2007 and 2008.

- Insert Figure 2 here -

Looking at a balanced panel of 240 banks, we find that banks continuously increased the total amount of dividends until 2009. When only looking at the increase in dividends, one could hardly identify that there was a crisis unfolding in 2007. While these banks did not reduce dividends, they did reduce repurchases from more than \$ 5.24 bn in 2007 to \$ 1.02 bn in 2008. From 2000 to 2007, total payouts through repurchases were of a similar magnitude as total payouts through dividends. The fact that banks made adjustment via share repurchases and not

¹ <http://research.stlouisfed.org/fred2/series/USROA>

via dividends is consistent with the argument that dividends are “sticky” and it is easier to adjust share repurchases.

- Insert Figure 3 here -

Of course, the panel contains only banks that did not go out of business, which might give rise to the concern that it only contains banks that did well. However, the panel includes banks that were bailed out through guarantees and TARP. Indeed, 99 banks in the panel received TARP funding. Interestingly, banks that did not receive any TARP did not reduce total dividends until 2011. Moreover, non-TARP banks were much slower to reduce share repurchases than banks that received TARP funding. The reluctance of non-TARP banks to cut dividend could be consistent with the idea that these banks tried to signal their strength by maintaining of a steady flow of dividends.

The fact that banks did not reduce their dividends at the beginning of the crisis has triggered a debate about the possible reasons. (See, in particular, Acharya et al. (2012, 2013).) One possibility is a transfer of wealth from debt holders (and in the case of a bailout, the government) to shareholders, anticipating future losses. Thereby, banks increased the severity of the financial crisis and contributed to the financial problems. 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. Consistent with this argument is the hypothesis that the huge turbulence after the Lehman bankruptcy was an unforeseen shock.

It is difficult to pinpoint which argument is correct given the missing counterfactual (banks did not reduce dividends very much), large uncertainty in the market, and government intervention. However, we want to take a first step to understand whether banks have reacted in

an usual way in the face of the unfolding crisis. In particular, we would like to examine whether the same factors (fundamentals) that might drive banks' payout decision in normal times could equally well explain payout decisions during the crisis. Furthermore, whether banks' responded to the crisis in different ways and whether this heterogeneity leads to differences in performance during the crisis.

4. Dividend policy before and in the crisis

4.1. The Decision to Pay Dividends

A first step to analyze the question of whether banks' dividend policy in the crisis was unusual is to ask whether a model that predicts whether a bank pays a dividend does worse during the crisis than before or after it. We adapt the approach of Fama and French (2001) and DeAngelo et al. (2006) to model the probability with which a bank pays dividend. We use data from 1995-2006 to estimate the propensity to pay dividends as a function of a number of factors such as profitability, leverage, B/M ratio, size and variables capturing the bank's business model and the extent of capitalization. Applying the method of Fama and French (2001), we then use the estimated coefficients from these regressions to obtain out-of-sample predictions of dividend payment behavior during and after the crisis from 2007 to 2012. We then compare the predictions with the actual dividend payer status.

Table 2 shows the results of our panel estimation 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. The specification of the multivariate logit regression in column (1) is adapted from Fama and French (2001). We run separate logit regressions for each of the 12 years in our sample to obtain a time series of fitted coefficients.

- Insert Table 2 here -

Table 2 shows the average (across years) of the intercepts and coefficients and the t-statistics for the means. Profitability is measured as the ratio of the bank's earnings before interests to total assets (ROA). The proxies for investment opportunities are the rate of growth of total assets and the market to book ratio of equity. We use the natural logarithm of total assets to measure size.

We add two variables to this basic specification that intend to capture the nature of the banking business. First, different banks might follow different business models, for example some banks have more trading business, and others might focus more on traditional businesses. This may influence the volatility of earnings and the payout decision of the bank. We control for the business line composition of the bank by using the ratio of interest to non-interest (fee) income of the bank. Second, banks are subject to regulation in that they have to satisfy capital requirements. Banks that are close to the regulatory requirement might need to conserve cash instead of paying it out to equity holders. We capture the effect of regulation with the ratio of Tier 1 capital over risk-weighted assets.

The average coefficients confirm our expectations with regard to the role of size, profitability and investment opportunities in the decision to pay dividends. Larger and more profitable banks are more likely to pay out dividends. Banks with more investment opportunities measured by the growth rate of total assets and the market to book ratio are less likely to pay dividends. Regarding the specific explanatory variables for banks, banks with a higher fraction of interest to fee income are less likely to pay out dividends. As expected, banks that are more capitalized, measured by the ratio of regulatory capital to risk-weighted asset, are more likely to pay out dividends.

The regression in column (2) builds on a slightly adjusted version of DeAngelo et al. (2006). DeAngelo et al. (2006) include the ratio of retained earnings (earned equity) to total common equity as a proxy for the extent to which a firm is self-financed (relies on capital markets) affects the probability of paying a dividend. In addition, we also control for the ratio of common equity to total assets. In contrast to De Angelo et al. (2006), we do not use lagged dividend status as an explanatory variable. As Fama and French (2001) and De Angelo et al. (2006) discuss, using lagged dividend status as an explanatory variable can be problematic, because the model would then explain dividend behavior on the basis of past dividend behavior. Given the aim of the work of De Angelo et al. (2006), including lagged dividend status as a control is not an issue for their analysis, but it can become problematic in our setting. The reason is that the model might do well in predicting payer status in the crisis just because banks did not change their payer status in the crisis. Since the dividend payer status is sticky, the past dividend payer status is important in explaining a bank's dividend payer status. To focus on the role of bank fundamentals in explaining dividend payer status, we do not include lagged dividend status as an explanatory variable.²

Similarly to DeAngelo et. al (2006), we find that both retained earnings to total equity and total equity to total assets significantly affect the propensity to pay dividends. The probability of paying dividends is higher if the bank has a high ratio of total equity to total assets and if the ratio of retained earnings to total equity is higher.

Panel A of Figure 4 shows the difference between the estimated and the actual average propensity to pay based on Fama and French (2001) and DeAngelo et al. (2006), respectively.

² Consider a bank that has been a dividend payer, but then does not pay for two years in a row. Assume that there is little change in its fundamentals. In this case, the model cannot explain why the bank did not pay dividends in the first of these years. However, including lagged dividend status would help predict that it goes on not to pay dividends in the second year, after not paying in one year, although its fundamentals are unchanged.

The difference based on the DeAngelo et.al. (2006) specification is positive for the entire period. Thus, the estimated average propensity to pay is higher than the actual one. The difference based on Fama and French (2001) fluctuates around 0 until 2009, indicating that their model augmented with our bank-specific variables is successful in predicting the propensity of the average bank to pay dividends. The estimated average payout probability under both models seems to match closely the actual payout probability, not only in-sample, but also out-of-sample, i.e., after 2006.

- Insert Figure 4 here -

Thus, based on the fundamentals that these models use to predict dividend payer status, the predicted average propensity to pay that was not very different from bank's actual propensity to pay. Using these models, it is therefore not possible to conclude that banks' decision in the crisis to pay out a dividend 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) 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 the 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 of Figure 4, discarding bank-years in which a bank has TARP funds outstanding. By definition, this may only affect our estimates from 2008 onwards. Panel B of Figure 4 shows the actual and estimated average payout probabilities for banks that have no TARP money outstanding. Our results are quite similar to those for all banks in in Panel A of Figure 4, which seems to suggest that our previous conclusions are not driven by the presence of TARP banks.

4.2. The level of dividends

An alternative way of characterizing banks' dividend policy is to look at the level of dividends. Our methodology here is similar to the one we employed for the propensity to pay. We use a panel regression from the years prior to the crisis to estimate how much dividends banks distribute as a function of bank specific variables. To capture time-invariant unobserved heterogeneity at the bank level, we estimate regressions with bank fixed effects (FE).

Table 3 reports the results. Banks pay higher dividends per share if they are larger, more profitable, and have an equity cushion with a higher retained earnings component. These findings are in line with prior literature. We also find that banks tend to pay higher dividends when their risk-weighted capital ratio is lower. Taken together, these results suggest that past profitability and retained earnings are more important in determining the level of dividends than the regulatory capital ratio.

Figure 5 shows the average level of abnormal dividends for the entire period (including in sample and out of sample), based on the estimated average coefficients of Table 3.

- Insert Figure 5 here -

As dividends in TARP banks follow a different dynamics than those in non-TARP banks, we plot abnormal dividends for non-TARP and TARP banks, separately. The average level of abnormal dividends per share is low and oscillates around zero for most of the in-sample period. For non-TARP banks, it decreases slightly at the onset of the crisis and, while it shows a slight increase during the crisis, it remains negative until the end of our sample period. The abnormal dividend is negative and decreasing for TARP banks throughout our sample period. The standard deviation of abnormal dividends for non-TARP banks is almost constant during the entire in-sample period, while it slightly increases during the crisis years. Standard deviation starts out at much higher level for TARP banks, but shows a constant decline, subsequently.

5. Payout policy and crisis performance

In this section, we explore the relationship between a bank's payout policy, in particular, its dividend policy, and the bank's performance in the crisis. We use two measures of crisis performance. First, following, Fahlenbrach et al. (2012), we use the buy-and-hold return on a bank's stock between July 2007 and December 2008 (cumulative return). Second, we use the sum of the bank's earnings between July 2007 and December 2009 scaled by total assets (cumulative net income). We use both a market and an accounting measure of performance in the crisis to ensure that our results are not driven by our choice of performance measure. The market might overreact to news and, in particular, changes in dividends. That is, investors might interpret a reduction in dividends as negative signal so that the share price decreases. An accounting measure of crisis performance avoids this problem, but managers might delay reporting negative news. We thus extend the period for the accounting measure of performance to include 2009.

The main coefficient of interest is the relation between a bank's payout policy and crisis performance. We use the dividend payer status, change in dividend, and change in total payout to measure bank's payout policy.³ For all payout measures, we look at 2006, 2007, and 2008. While 2007 and 2008 coincide with the beginning of the crisis, we also include 2006 to see whether there is a relation between banks' performance in the crisis and banks' dividend policy just before the crisis.

³ We do not use dividend yield (dividends per share divided by share price) or dividend payout ratio (total dividends divided by net income). First, the issue with the dividend yield is that the change in the dividend yield is by definition related to the stock price performance, one of our performance measures. Second, a large fraction of banks had negative net income in the crisis, making it difficult to interpret the dividend payout ratio

We use the controls of Fahlenbrach et al. (2012) as well as the controls from Table 2 to ensure that any correlation we measure between payout behavior and crisis performance is not driven by variables that influence both.

Dividend payer status and crisis performance

We first look at the correlation between dividend payer status and bank performance in the crisis. We do not find a statistically significant relation between dividend payer status in 2006, 2007, or 2008 with any of our measures of crisis performance (Table 4).

- Insert Table 4 here -

Thus, it seems that it did not matter for crisis performance whether a bank paid a dividend or not. However, an important aspect of dividend behavior is whether it is justified by the bank's fundamentals. In particular, we attempt to distinguish between banks that paid dividends and had weak fundamentals and those that had strong fundamentals. To this end, we interact the bank's propensity to pay dividends with the bank's dividend payer status. The propensity to pay dividends is estimated using the model adapted from De Angelo et al. (2006) shown in Table 2, column 1. Table 5 displays the results.

- Insert Table 5 here -

We find a positive and significant relation between the interaction term (dividend payer) \times (propensity to pay) in all years and for all measures of crisis performance. The only exception is the coefficient for 2007 and cumulative income, which is not significant, but also positive. Thus, for two banks with similar propensities to pay, the bank that did pay dividends did better during the crisis.

Dividend levels, total payout and crisis performance

Table 6 shows the correlation between crisis performance and the year-on-year percentage change in dividends per share. We measure changes in dividends as All other independent variables are the same as in Table 4 to ensure comparability of our results across specifications.

- Insert Table 6 here -

We find that banks with higher dividend growth in 2006 did worse in the crisis. This is true both when we measure crisis performance by cumulative returns and by cumulative net income. It is unlikely that banks increased their 2006 dividend to transfer wealth to shareholders in anticipation of their high losses in the crisis. An alternative interpretation is that banks that raised their dividends considerably in 2006 had a smaller buffer to operate during the crisis and thus did worse.

Column (2) (3) and (5) and (6) include a simultaneous measure of dividend change and performance. We find that banks that increased or decreased dividends by a large amount performed worse than banks that made moderate upward or downward adjustments when we measure performance by cumulative stock return during the crisis. This relationship seems to be more pronounced for banks that reduced dividends.

We detect a significant correlation between dividend growths and performance measured in cumulative net income: banks with lower (higher) dividend growth in 2007 and 2008 had lower (higher) net income. Thus, banks seemed to change dividends in accordance with their performance: banks with good performance increased more (decreased less), and banks with bad performance increased less (decreased more). We obtain similar results using the growth in dividend to book equity instead of the dividend per share.

The empirical setup of Table 6 implicitly assumes a linear relation between dividend growth and bank performance. However, it is possible that minor adjustments to the level of

dividends are not correlated with future performance, while large adjustments (large cuts or large increases) are. To investigate this possibility, Table 7 repeats the analysis of Table 6 using dummies for quintiles of dividend growth instead of the actual value of the change in dividends. The omitted category is the quintile with the highest dividend growth, quintile 5.

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The findings in Table 7 suggest that the negative relation between dividend growth in 2006 and crisis performance mainly stems from banks that had a very large dividend growth. Column 1 shows that banks with low to moderate dividend growth (2nd and 3rd quintile) did significantly better during the crisis than banks with the highest dividend growth in 2006. We do not find that banks that reduced their dividends in 2006 did better during the crisis relative to those that moderately increased their dividends. We also find little evidence that different quintiles of dividend growth during the crisis (column (2), (3), (5)) are significantly correlated with crisis performance.

- Insert Table 8 here -

Having shown in Figure 3 that banks reduced repurchases before they reduced dividends, we also examine the relation between growth in total payout and crisis performance. Table 8 repeats the analysis of Table 6, using the year-on-year percentage growth in total payout as an independent variable. The results indicate that banks that had a higher total payout growth in 2006 had lower performance during the crisis, similarly to our findings on dividend growth. We also find that banks with higher growth of total payout in 2007 had lower cumulative returns in the crisis and banks that reduced their total payout in 2008 had higher cumulative returns. Examining these two findings further, we verify that the relation in 2007 is driven primarily by banks with increases in total payout, which did poorly during the crisis.

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Finally, to analyze whether the relation between total payout growth and crisis performance is monotonic, Table 9 repeats the analysis of Table 7 using quintiles of total payout growth instead of quintiles of dividend growth. First, in line with the results of Table 8, we find that banks that had low to moderate growth in total payout in 2006 performed better during the crisis. During 2008, we find that banks with the lowest growth in total payout did worse than those with the highest total payout growth, consistent with the idea that banks reduced payout in response to poor performance.

4. Aggressive dividend policy and insider trading

A simple measure of an aggressive dividend policy is whether a bank pays dividends despite making losses (negative net income). (See also Acharya et al. (2012).) To understand whether such behavior is prevalent among banks, Figure 6 shows the percentage of banks (out of total banks in our sample) that pay dividends despite having negative net income during 2000-2012. While the percentage of such banks in our sample is fairly low until 2006, it increases in 2007 and then rises sharply in 2008-2009.

- Insert Figure 6 here -

Due to the sticky nature of dividends, banks may not stop paying despite making a loss, if they expect the negative net income to be temporary. Figure 6 also plots the percentage of banks (out of total banks in our sample) that have negative income and the percentage of banks that pay dividends out of banks that have negative net income (measured on the right vertical axis). While the percentage of banks with negative income is around 2% prior to the crisis, this number increases by ten-fold between 2006 and 2009.

Figure 6 also shows that typically 10 % to 40 % of banks that make a loss pay dividends prior to the crisis, which given the low number of loss making banks prior to the crisis corresponds to a handful of banks. In 2006, this figure increases to 60 %, and reaches 70 % in 2008. These patterns confirm that banks did not refrain from paying dividends early in the crisis. The question is whether banks did so to transfer funds to shareholders, anticipating large losses, or if they believed the losses are temporary.

We address this question by examining the views that managers of banks with aggressive dividend policies held about their bank's prospects using data on insider trading. An analysis of the relationship between insider trading and the level of dividends may shed light on the extent to which bank managers might have anticipated future bad performance and hence deliberately erode the value of creditors' claim

Table 10 provides evidence on the extent of insider trading for banks during 2006-2012. To examine the relation between aggressive dividend policy and insider trading, we separate banks into three groups based on their dividend policy, and show insider trading measures for these three groups. The first group consists of banks that have a negative net income and do not pay dividends. The second group consists of banks pursuing a dividend policy that we defined as aggressive, that is, banks that have a negative net income but pay dividends. The third group consists of banks with positive net income.

We rely on prior literature to select a number of 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 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)). We also examine the percentage of net buyers, defined as insiders who buy more stock than they sell (Jenter (2005), Cziraki (2011)). Conversely, we also look at the percentage of net sellers, that is, insiders who sell more stock than they buy.⁴ The dummy variable indicating no insider trading is based on the work of Marin and Olivier (2007) and Gao and Ma (2013). It equals 1 for a given firm-year if insiders of the firm made no trades in that year. *Net volume* is the average number of shares bought by insiders less the number of shares purchased by insiders divided by the number of shares outstanding. We also report volume bought and volume sold individually, which are the average total number of shares purchased divided by the total number of shares and the average total number of shares sold divided by the total number of shares (Babenko, Tserlukevich and Vedrashko (2012)). We multiply net volume and volume bought (sold) by 10,000 to facilitate the interpretation.

- Insert Table 10 here -

For most of the measures, insiders of banks that have positive income seem to engage in more insiders selling than insiders of banks that have negative income. The one to this general tendency is the sell volume and net volume of in banks with negative income and payout in 2008, which indicate more insiders selling at these banks. Given that insider trades have to be reported, insiders of banks that made losses might have feared a negative signal and reaction of investors. Also, CEOs of banks that made losses were under scrutiny of their boards and the public, which might also have constrained insider sales.

Hence, our findings cannot necessarily be interpreted as insiders of banks were optimistic about the future and therefore they did not sell. In fact, when comparing banks that had negative

⁴ The fraction of net sellers and net buyers need not sum to one if there are insiders who make offsetting trades, or do not place any open market transactions in a given year – but do have other insider transactions in the data, such as obtaining stock options, forfeiting shares, or transferring them to another beneficial owner, e.g. a family member.

net income, the evidence suggests that banks that paid dividends engaged in more insider sales and bought less than banks that did not pay a dividend. To the extent that insiders trades reflect optimism of insiders about the outlook of their banks, this latter finding casts doubt on the argument that the bank paid a dividend to signal strength despite making a loss.

5. Conclusion

We provide a systematic study of the payout behavior of banks around the recent financial crisis for a large sample of U.S. banks. We find that banks show considerable heterogeneity in their payout policy and in their reaction at the beginning of the financial crisis of 2007-2009. We employ standard models of dividend policy and the prediction by these models is used as reference to determine whether banks altered their payout behavior in crisis time in an unusual way. We find no significant change in the explanatory power of the model in and out-of-sample. Based on these models, it is not possible to conclude that banks' decision in the crisis to pay out a dividend was unusual.

We find that large downward and upward adjustments in dividends are associated with lower crisis performance measured in terms of cumulative stock return during the crisis. At the same time, the correlation between net income and performance is positive during the crisis: banks with good performance increased more (decreased less), and banks with bad performance increased less (decreased more).

Looking at insider trading does not provide clear-cut evidence on whether banks that paid out dividends despite negative earnings did so because of positive information about the future of their 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 repurchase if the sum of quarterly repurchases is nonzero in a given year. The data span 1995-2012 for dividends and 1999-2012 for repurchases

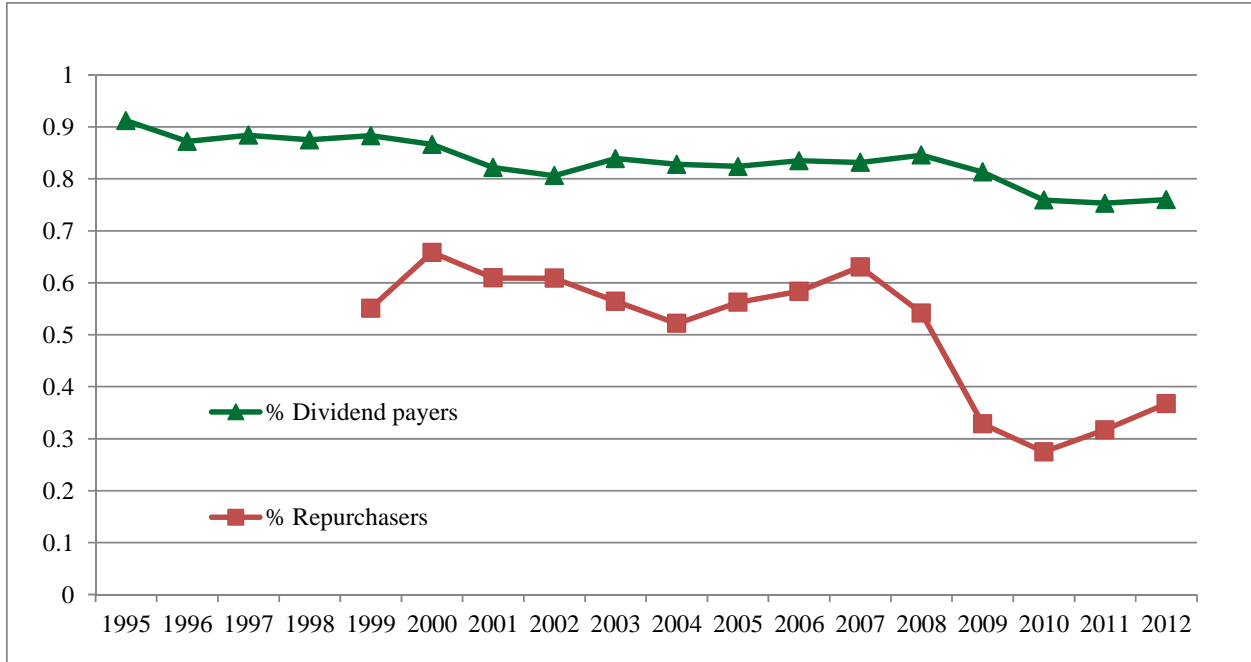


Figure 2: The level of bank dividends over time

Data from bank dividend payments are from SNL. The solid line shows the level of dividend per share for all banks. The dashed lines shows the level of dividends per share non-TARP bank-years only: it is obtained by discarding bank-year observations in which a bank has TARP funds outstanding. The data span 1995-2012.

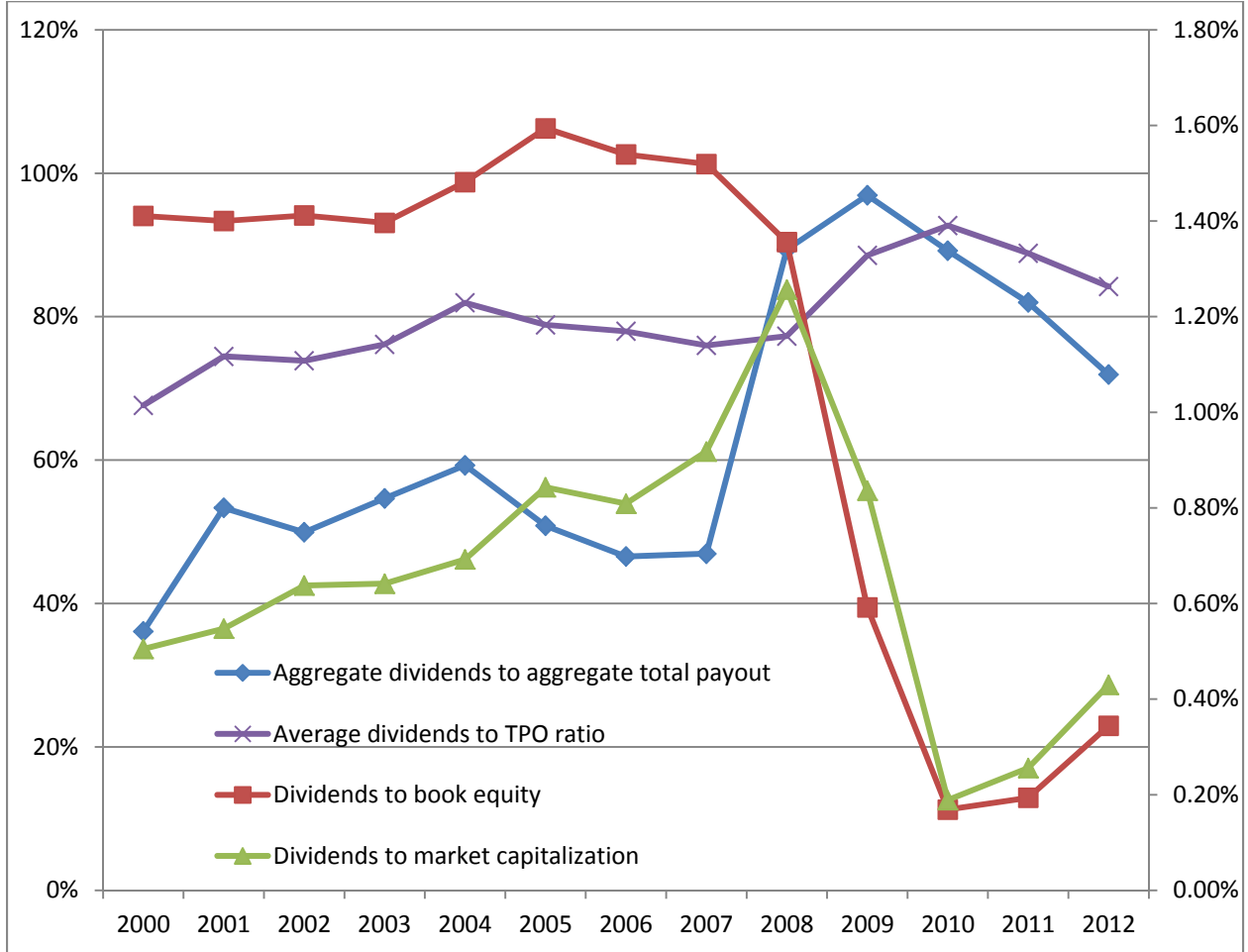
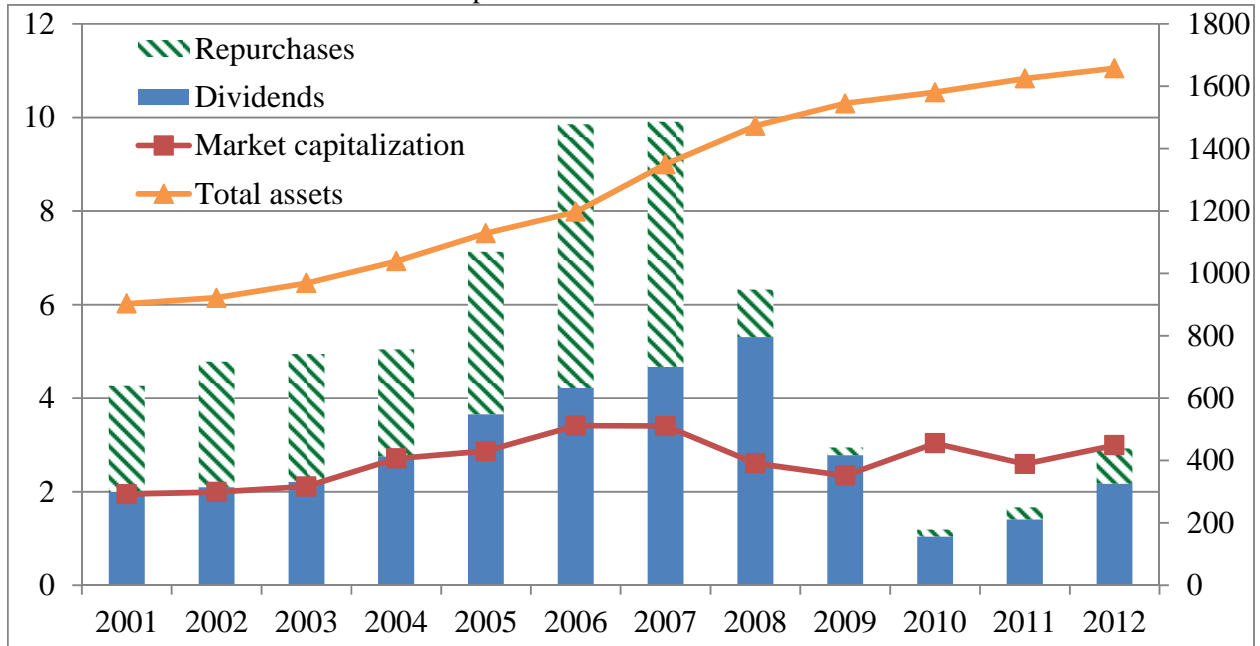


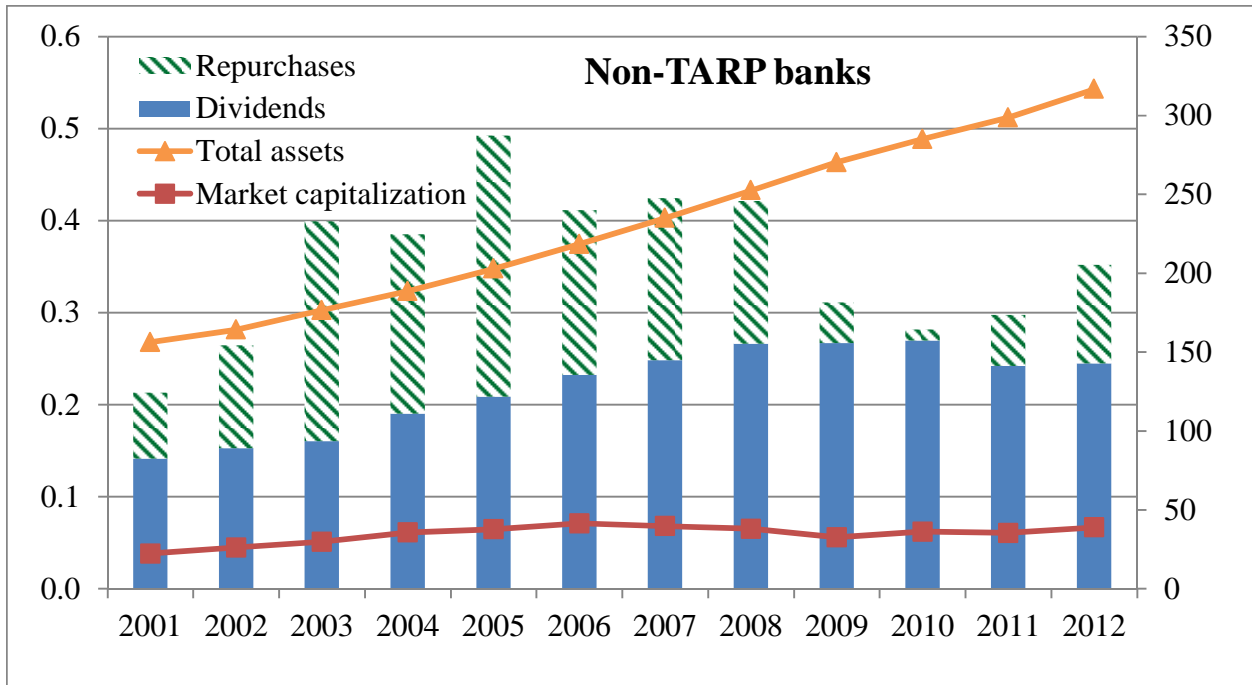
Figure 3: The dynamics of bank payout over time

Data from bank 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 evolves 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, and Panel C shows only banks that received TARP funding.

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)

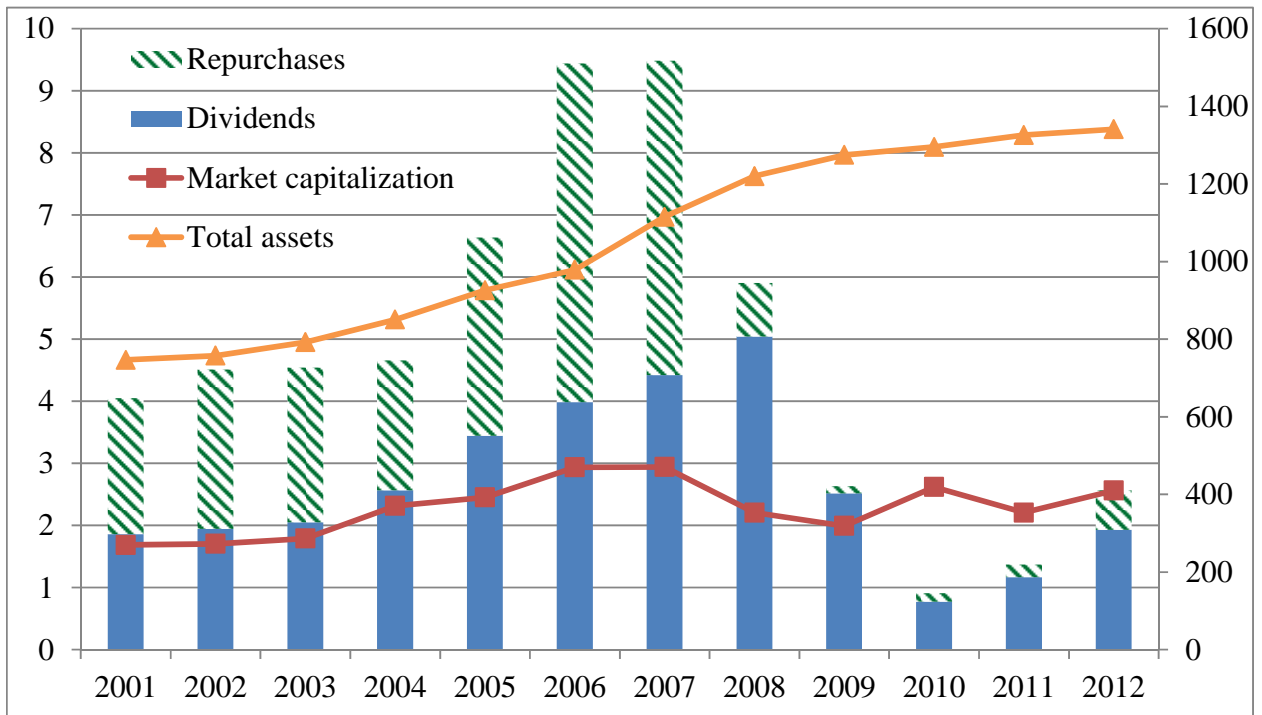
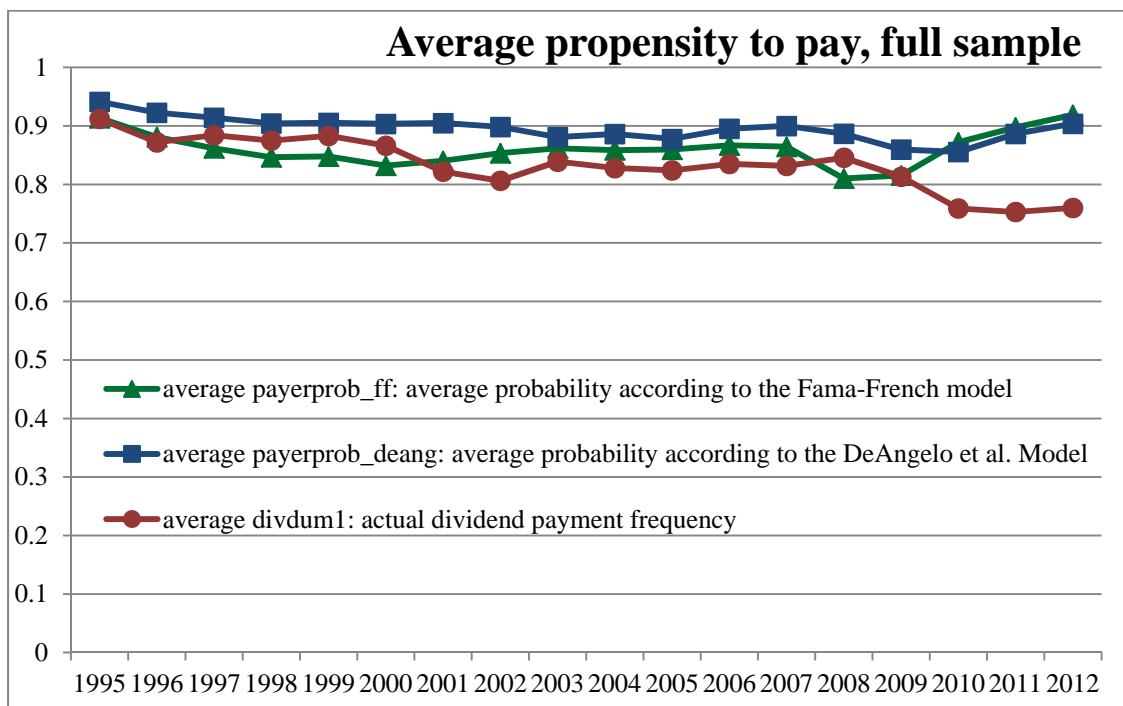


Figure 4: Predicted and actual propensity to pay

The graphs show actual dividend payment frequency and predicted propensity to pay based on the models estimated in columns 1 and 2 of Table 2. Panel A shows the actual and estimated probabilities (top) and the difference between them (bottom) for the whole sample. Panel B shows graphs discarding bank-years in which a bank had TARP funds outstanding.

Panel A. Full sample



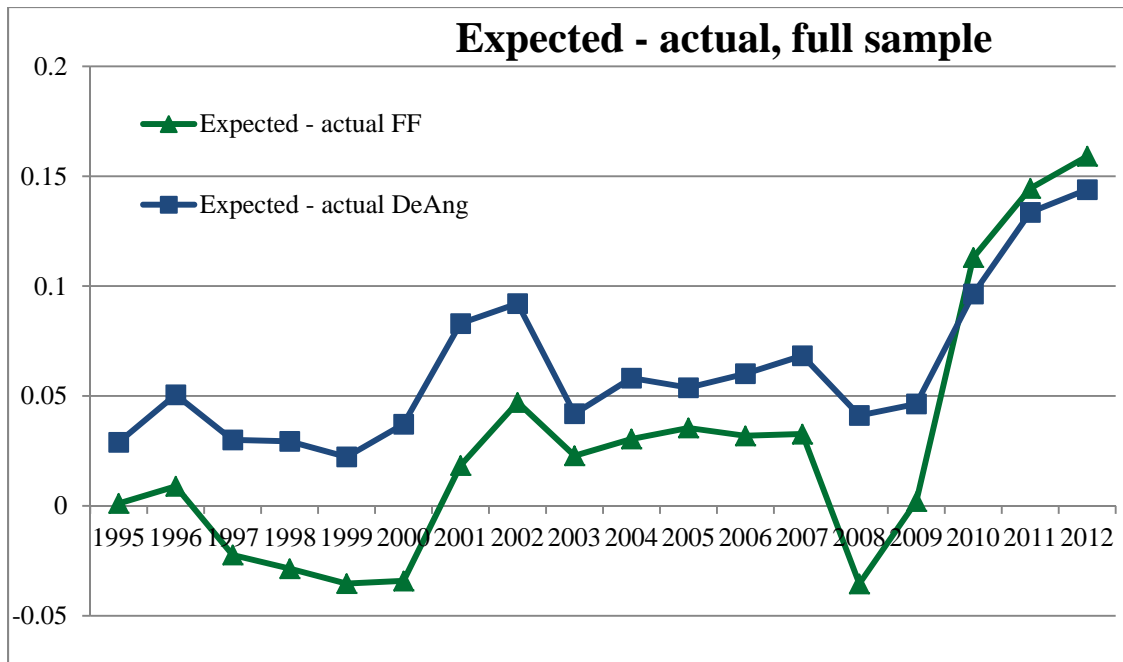


Figure 4 – continued

Panel B: Non-TARP bank-years only

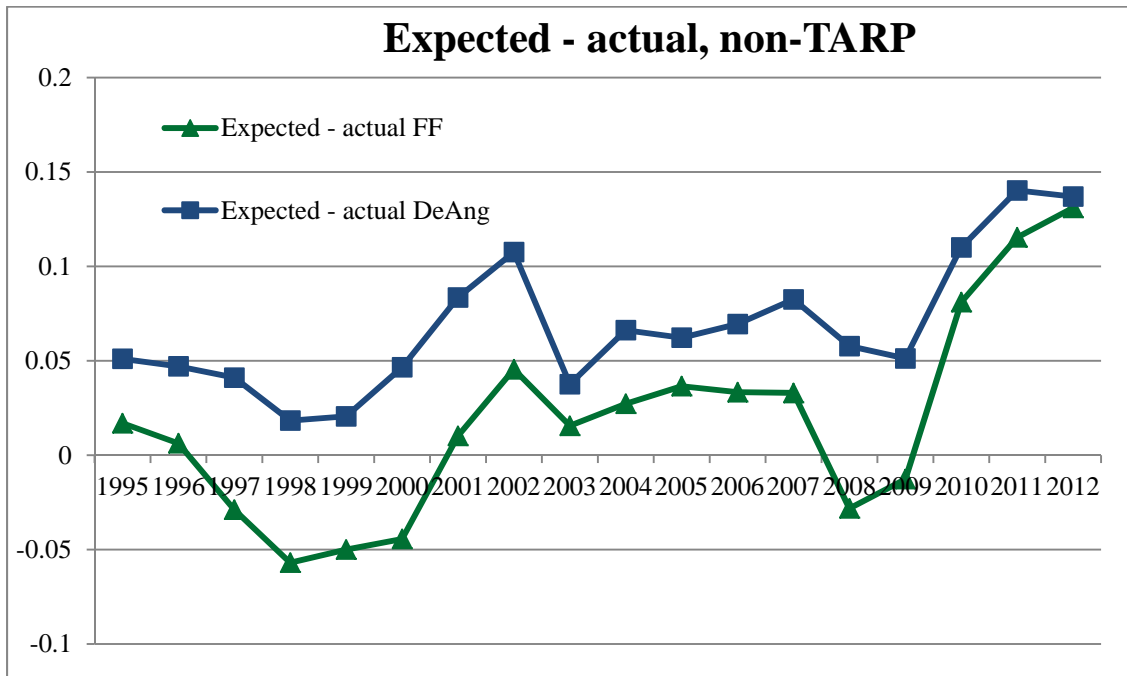
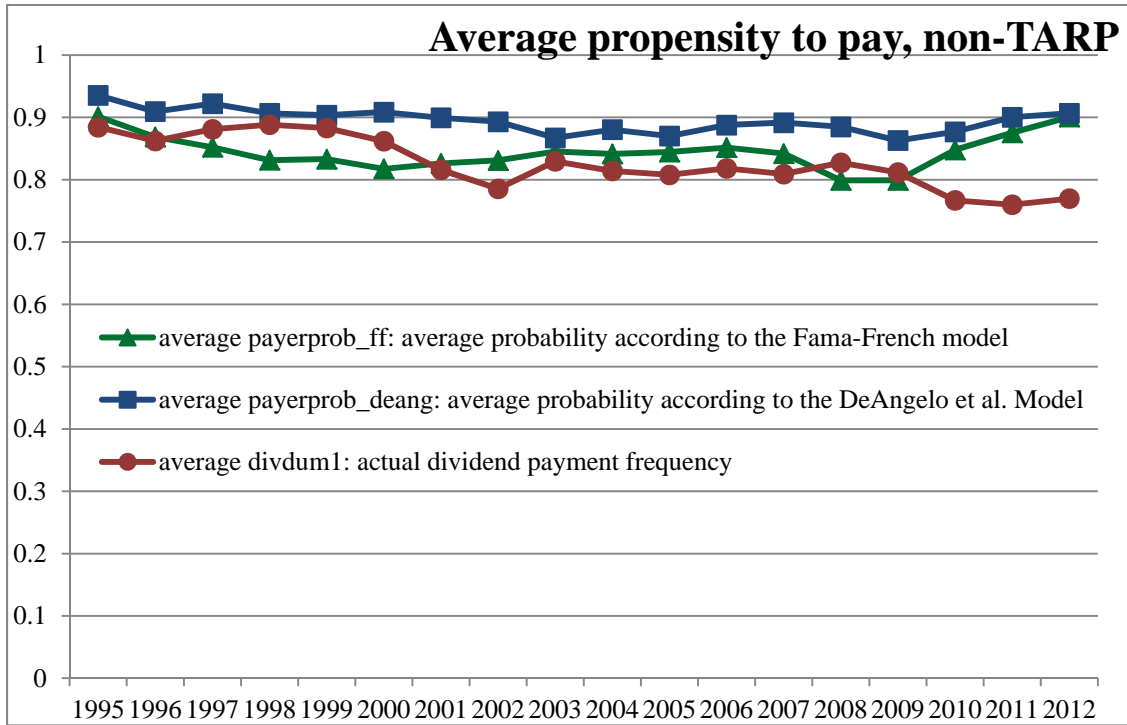


Figure 5: Abnormal dividends and the accuracy of dividend models over time

The graphs show the error term (Panel A) and the squared residual (Panel B) from the panel regression of dividends per share shown in Table 3. The panel regressions are estimated during 1995-2006, 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 squares are based only on bank-years in which banks had TARP funds outstanding.

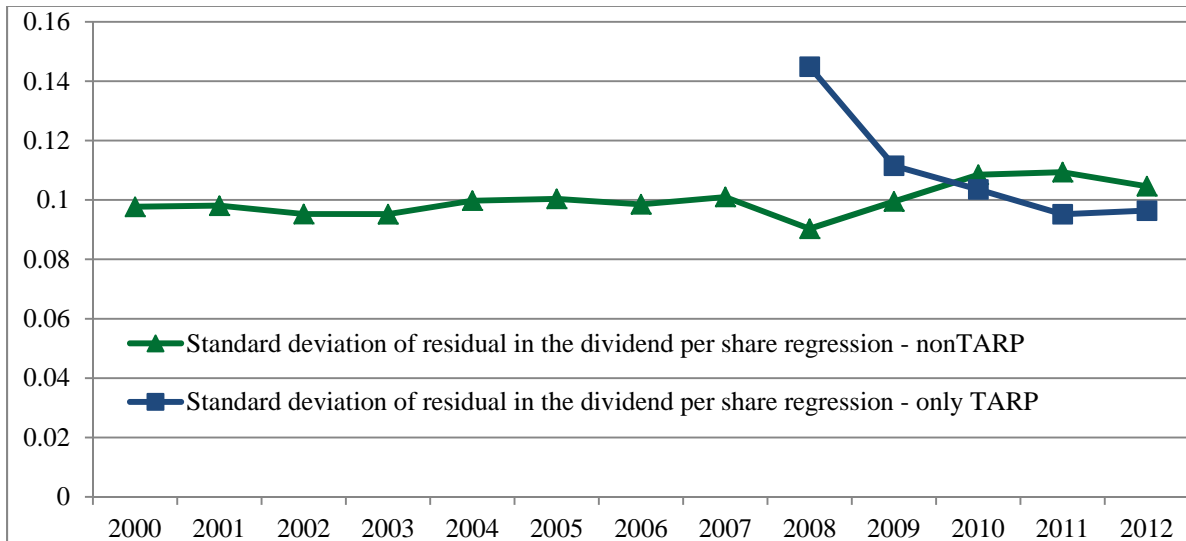
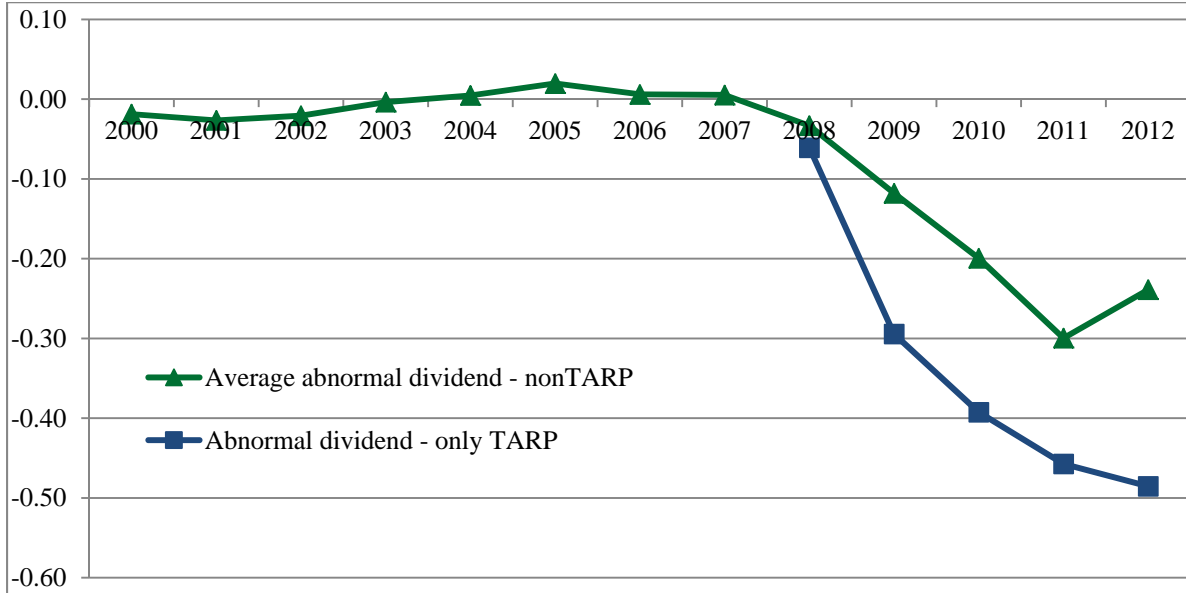


Figure 6: Fraction of banks with aggressive dividend policies over time

The graph with triangles shows the percentage of banks (out of all banks in the sample) that have negative net income in a given year and pay dividends. The graph with the circles shows the percentage of banks (out of all banks in the sample) that have negative net income in a given year. Both these series are measured on the left vertical axis. The graph with squares shows the ratio of the first two quantities: the percentage of banks with negative earnings that pay dividends. This series is measured on the right vertical axis

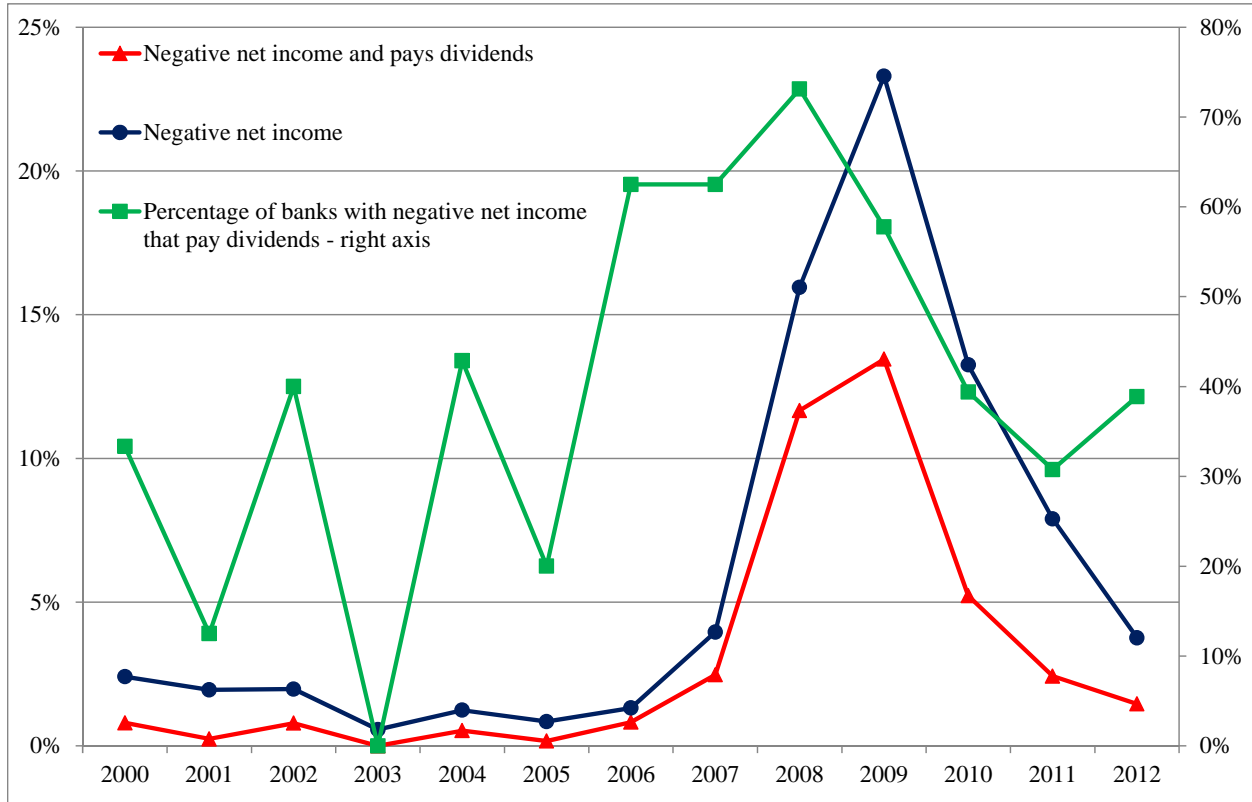


Table 1: Sample descriptives

Information on bank dividends and fundamentals are from SNL Financial. Stock return data are from CRSP. *Panel A* shows the number of banks with non-missing dividend data for each year in our sample. *Panel B* shows descriptive statistics of the variables used in our regressions. The data span 1995-2012 for dividends, and 1994-2012 for the explanatory variables, as some regressions use lagged explanatory variables.

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

	Banks with non-missing dividend data	Banks with non-missing dividend data that have no TARP funds outstanding
1995	228	228
1996	258	258
1997	302	302
1998	328	328
1999	342	342
2000	374	374
2001	410	410
2002	506	506
2003	528	528
2004	564	564
2005	591	591
2006	606	606
2007	606	606
2008	583	475
2009	498	361
2010	498	390
2011	494	408
2012	479	428

Panel B: Summary statistics of variables used in the regressions

	Mean	Median	Std. Dev.	Minimum	Maximum	N
Total assets (\$ millions)	5,740	556	23,300	47	177,000	8,770
Return on average assets (%)	0.90	0.96	0.57	-3.33	2.33	8,729
Return on average assets, 5-year average (%)	0.94	0.96	0.46	-2.57	2.33	5,910
Dividend yield, 5-year average	2.30	2.41	1.39	0.00	9.54	6,007
B/M	0.91	0.74	0.66	0.11	14.49	8,540
Retained earnings to total equity	0.56	0.58	0.29	0.00	2.72	7,570
Tier one ratio	13.56	12.62	4.22	6.57	37.50	8,439
Total ownership by insiders and blockholders (%)	16.57	14.54	1.32	0.22	65.36	6,660
Total ownership stake of the 10 largest shareholders (%)	16.01	14.43	1.36	0.19	65.36	6,660
Public float (\$ millions)	2,300	63	13,600	0	175,000	7,347
Total ownership stake of institutions (%)	30.24	29.70	0.62	0.00	95.94	7,286
Interest to noninterest income	8.41	6.48	7.07	0.70	58.32	8,732
Loan growth	0.11	0.08	0.18	-0.45	5.86	8,274
Debt to equity	1.18	0.91	1.14	0.00	14.86	8,744
Earnings volatility	0.78	0.27	2.08	0.03	16.32	7,046
Bank has TARP money outstanding this year (dummy)	0.06	0.00	0.23	0.00	1.00	8,811
Dividend yield	2.24	2.26	1.66	0.00	24.43	8,769
Risk-weighted capital ratio	14.97	13.99	4.10	8.61	39.60	8,450
Total assets to total equity	0.10	0.09	0.06	0.01	1.39	8,761
Year-on-year asset growth	0.10	0.07	0.14	-0.45	3.37	8,289

Table 2: Analysis of the decision to pay dividends

Logit regressions of dividend payer status on firm fundamentals, estimated for the pre-crisis period 1995-2006. The model specification in column 1 is adapted from Fama and French (2001). The model specification in column 2 is adapted from DeAngelo et al. (2006). 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 payer	
	(1) Fama and French (2001)	(2) DeAngelo et al (2006)
ROA	1.2169*** -10,089	-0.0999 (-0.465)
Total asset growth (% year-on-year)	-4.3641*** (-14.073)	-2.4769*** (-6.908)
Log total assets	0.7581*** -13,581	0.5012*** -7,879
Lag risk-weighted capital ratio	0.0422** -2,550	0.0486* -1,760
Interest to noninterest income	-0.0139** (-2.140)	-0.0201** (-2.226)
MV/BV of equity	-0.0996*** (-4.755)	
Lag ROA		1.3649*** -6,180
Retained earnings to total equity		3.5283*** -12,909
Total equity to total assets		11.8953*** -2,703
Constant	-13.0634*** (-11.673)	-12.0687*** (-8.964)
Observations	4.55	3.774
Pseudo R ²	0.239	0.277

Table 3: What determines the level of dividends?

Fixed-effect panel regressions of dividend per share on firm fundamentals, estimated for the pre-crisis period 1995-2006. 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 per share	
Retained earnings to total equity	0.2237** (2.170)
Total equity to total assets	3.2331** (2.290)
ROA	0.0159 (0.401)
Lag ROA	0.1181* (1.963)
Total asset growth (% year-on-year)	-0.0306 (-0.411)
Log assets	0.4961*** (7.523)
Risk-weighted capital ratio	-0.0144** (-2.119)
Interest to noninterest income	-0.0010 (-0.303)
Constant	-9.8509*** (-6.950)
Bank FE	Yes
Observations	3,774
R ²	0.174

Table 4: Dividend payer status and crisis performance

OLS regressions of crisis performance on dividend payer status and firm characteristics. The dependent variable in columns 1-3 is cumulative returns during July 2007 – December 2008. The dependent variable in columns 4-6 is cumulative net income scaled by total assets during July 2007 – December 2009. The independent variables are measured in 2006, 2007 and 2008 in columns 1 and 4, 2 and 5, and 3 and 6, respectively. *Dividend payer* is a dummy variable equal to 1 if the bank pays dividend in a year and 0 otherwise. *Stock returns* are measured during the year, based on daily data. *Beta* is the market beta from a Fama-French three-factor model estimated on daily data during the year. *Marginal expected shortfall* is the average return of a bank during the 5% worst days for the value-weighted CRSP market return during a given year (Acharya et al (2010)). *Idiosyncratic risk* is the annual standard deviation of residuals from a Fama-French three-factor model estimated on daily data.

Dependent variable	Cumulative returns July 2007 - December 2008			Cumulative net income July 2007 - December 2009		
	2006 (1)	2007 (2)	2008 (3)	2006 (3)	2007 (4)	2008 (5)
Covariates measured in						
Dividend payer	0.0897 (1.170)	0.0404 (0.756)	-0.0013 (-0.165)	-0.0002 (-0.024)	-0.0044 (-0.694)	-0.0021 (-0.359)
Retained earnings to total equity	0.0447 (0.621)	-0.0649 (-1.590)	0.0165** (2.215)	0.0166** (2.223)	0.0120* (1.711)	0.0146*** (2.988)
Total equity to total assets	-0.8838 (-1.201)	-1.1617*** (-5.413)	0.0240 (0.298)	0.0138 (0.174)	0.0401 (0.584)	-0.0609*** (-3.384)
ROA	0.0792 (0.735)	0.0710*** (3.460)	0.0137 (1.498)	0.0168* (1.751)		
Lag ROA	-0.0920 (-0.893)	-0.1127** (-2.384)	-0.0012 (-0.146)	-0.0051 (-0.536)	0.0153* (1.944)	
Total asset growth (% year-on-year)	-0.0142 (-0.080)	0.1015* (1.677)	-0.0385 (-1.507)	-0.0347 (-1.394)	-0.0177 (-0.757)	-0.0134 (-0.715)
Total assets	-0.2323 (-1.180)	-0.4491*** (-5.690)	0.0049 (0.216)	0.0003 (0.015)	0.0124 (0.568)	-0.0272*** (-4.628)
Risk-weighted capital ratio	-0.0766*** (-2.704)	-0.0321* (-1.688)	-0.0051* (-1.722)	-0.0050* (-1.680)	-0.0013 (-0.482)	0.0008 (0.377)
Interest to noninterest income	-0.0094*** (-2.764)	-0.0003 (-0.104)	-0.0007* (-1.968)	-0.0007** (-2.081)	-0.0007** (-2.022)	0.0003 (0.872)
Stock returns	-0.0480 (-0.360)			-0.0133 (-0.909)	0.0274 (1.397)	0.0153** (2.156)
Book-to-market	-0.1079 (-0.498)	-0.1619*** (-3.081)	-0.0761*** (-2.894)	-0.0798*** (-3.033)	-0.0743*** (-3.968)	-0.0125*** (-2.103)
Market capitalization	0.1953 (1.035)	0.4362*** (5.876)	-0.0054 (-0.251)	-0.0011 (-0.050)	-0.0147 (-0.690)	0.0272*** (5.100)
Beta	0.1459* (1.937)	0.0844 (1.490)	-0.0016 (-0.209)	-0.0009 (-0.108)	0.0106 (1.111)	-0.0086 (-1.315)
Leverage	0.0301** (2.109)	0.0325*** (4.585)	0.0036** (2.150)	0.0041** (2.553)	0.0047** (2.533)	0.0024*** (3.896)
Tier one capital ratio	0.0933*** (3.297)	0.0435** (2.250)	0.0071** (2.406)	0.0070** (2.425)	0.0032 (1.214)	0.0005 (0.232)
Marginal expected shortfall	-2.1925 (-0.466)	0.1086 (0.115)	0.0385 (0.088)	0.0666 (0.150)	0.1833 (0.513)	0.0572 (0.537)
Idiosyncratic risk	-0.1092* (-1.824)	-0.0227 (-1.619)	-0.0072 (-1.201)	-0.0071 (-1.154)	-0.0077* (-1.662)	-0.0024* (-1.700)
Constant	0.6130 (0.937)	0.9181** (2.054)	0.0007 (0.009)	0.0116 (0.150)	0.0189 (0.312)	0.0619* (1.690)
Observations	226	228	226	226	231	228
R ²	0.298	0.717	0.252	0.255	0.324	0.465

Table 5: Dividend payer status, propensity to pay, and crisis performance

OLS regressions of crisis performance on dividend payer status and firm characteristics. The dependent variable in columns 1-3 is cumulative returns during July 2007 – December 2008. The dependent variable in columns 4-6 is cumulative net income scaled by total assets during July 2007 – December 2009. The independent variables are measured in 2006, 2007 and 2008 in columns 1 and 4, 2 and 5, and 3 and 6, respectively. *Dividend payer* is a dummy variable equal to 1 if the bank pays dividend in a year and 0 otherwise. *Propensity to pay* is the estimated propensity to pay given the bank's fundamentals, based on the parameters of the model of DeAngelo et al. (2006) estimated during 1995-2006, shown in Table 2, Column 2.

Covariates measured in	Cumulative returns July 2007 - December 2008			Cumulative net income July 2007 - December 2009		
	2006 (1)	2007 (2)	2008 (3)	2006 (3)	2007 (4)	2008 (5)
Dividend payer	-0.4542 (-1.585)	-0.4012 (-1.503)	-0.6724** (-2.096)	-0.0348* (-1.877)	-0.0129 (-0.675)	-0.0466*** (-3.155)
Propensity to pay	-0.1139 (-0.390)	0.0474 (0.174)	-0.3915 (-1.064)	0.0124 (0.744)	0.0243 (1.260)	0.0111 (0.809)
Dividend payer × propensity to pay	0.7255** (2.133)	0.6331** (2.058)	0.9558** (2.452)	0.0538** (2.352)	0.0288 (1.234)	0.0650*** (3.601)
Constant	-0.4810** (-2.029)	-0.5998** (-2.568)	-0.1987 (-0.664)	-0.0202* (-1.775)	-0.0299** (-2.040)	-0.0145 (-1.467)
Observations	228	227	224	505	511	496
R ²	0.065	0.074	0.072	0.094	0.089	0.162

Table 6: Dividend growth and crisis performance

OLS regressions of crisis performance on dividend growth status and firm characteristics. The dependent variable in columns 1-3 is cumulative returns during July 2007 – December 2008. The dependent variable in columns 4-6 is cumulative net income scaled by total assets during July 2007 – December 2009. The independent variables are measured in 2006, 2007 and 2008 in columns 1 and 4, 2 and 5, and 3 and 6, respectively. *Dividend growth* is the year-on-year percentage growth in dividend per share. Independent variables are defined in Table 4.

Covariates measured in	Cumulative returns July 2007 - December 2008			Cumulative net income July 2007 - December 2009		
	2006 (1)	2007 (2)	2008 (3)	2006 (4)	2007 (5)	2008 (6)
Dividend growth	-0.0022*** (-7.052)	-0.0040 (-0.058)	-0.0125*** (-2.892)	-0.0001*** (-4.590)	0.0130*** (3.471)	0.0013*** (2.995)
Dividend growth × growth is negative	-0.1045 (-0.511)	1.1631** (2.410)	0.2882*** (3.272)	-0.0166 (-0.479)	0.1886 (0.850)	0.0358* (1.829)
Retained earnings to total equity	0.0423 (0.563)	-0.0460 (-0.643)	-0.0529 (-1.246)	0.0157** (2.032)	0.0118* (1.787)	0.0131*** (3.014)
Total equity to total assets	-0.8614 (-1.185)	-0.1089 (-0.191)	-1.2362*** (-5.940)	0.0117 (0.146)	0.0315 (0.463)	-0.0719*** (-3.570)
ROA	0.0882 (0.812)	0.2183*** (3.383)	0.0628*** (3.078)	0.0174* (1.803)		
Lag ROA	-0.0787 (-0.754)	-0.0849 (-1.073)	-0.1251*** (-2.653)	-0.0056 (-0.591)	0.0128 (1.621)	
Total asset growth (% year-on-year)	-0.0651 (-0.380)	-0.1711 (-1.147)	0.0887 (1.542)	-0.0359 (-1.419)	-0.0140 (-0.603)	-0.0152 (-0.825)
Total assets	-0.2243 (-1.171)	-0.0344 (-0.195)	-0.4579*** (-5.929)	-0.0006 (-0.028)	0.0076 (0.359)	-0.0290*** (-5.194)
Risk-weighted capital ratio	-0.0816*** (-2.987)	-0.0640*** (-2.629)	-0.0278 (-1.522)	-0.0049* (-1.678)	-0.0007 (-0.281)	0.0016 (0.706)
Interest to noninterest income	-0.0107*** (-3.485)	-0.0078*** (-2.782)	-0.0012 (-0.502)	-0.0007** (-2.183)	-0.0006** (-2.070)	0.0002 (0.645)
Stock returns	-0.0293 (-0.220)			-0.0135 (-0.936)	0.0236 (1.228)	0.0125** (1.983)
Book-to-market	-0.1272 (-0.589)	-0.3008* (-1.888)	-0.1368*** (-2.704)	-0.0806*** (-3.060)	-0.0764*** (-4.271)	-0.0106* (-1.847)
Market capitalization	0.1874 (1.019)	0.0058 (0.034)	0.4495*** (6.236)	-0.0002 (-0.011)	-0.0108 (-0.516)	0.0288*** (5.748)
Beta	0.1486* (1.922)	0.2613*** (2.699)	0.0960* (1.764)	-0.0003 (-0.033)	0.0105 (1.082)	-0.0073 (-1.130)
Leverage	0.0324** (2.218)	0.0302 (1.533)	0.0318*** (4.675)	0.0042*** (2.606)	0.0050*** (2.755)	0.0025*** (4.205)
Tier one capital ratio	0.0979*** (3.516)	0.0818*** (3.164)	0.0393** (2.096)	0.0070** (2.433)	0.0027 (1.069)	-0.0004 (-0.187)
Marginal expected shortfall	-2.1327 (-0.438)	3.9205 (1.099)	0.2939 (0.326)	0.0922 (0.207)	0.1573 (0.435)	0.0608 (0.557)
Idiosyncratic risk	-0.1098* (-1.821)	-0.0632 (-1.432)	-0.0164 (-1.088)	-0.0074 (-1.193)	-0.0089** (-2.061)	-0.0014 (-0.924)
Constant	0.6745 (1.028)	0.1157 (0.182)	0.8792* (1.925)	0.0156 (0.201)	0.0394 (0.653)	0.0631* (1.725)
Observations	226	231	228	226	231	228
R ²	0.302	0.376	0.726	0.259	0.348	0.487

Table 7: Quantiles of dividend growth and crisis performance

OLS regressions of crisis performance on quintiles of dividend growth and firm characteristics. The dependent variable in columns 1-3 is cumulative returns during July 2007 – December 2008. The dependent variable in columns 4-6 is cumulative net income scaled by total assets during July 2007 – December 2009. The independent variables are measured in 2006, 2007 and 2008 in columns 1 and 4, 2 and 5, and 3 and 6, respectively. *Dividend growth quintiles* are based on the year-on-year percentage growth in dividend per share. Independent variables are defined in Table 4.

Covariates measured in	Cumulative returns July 2007 - December 2008			Cumulative net income July 2007 - December 2009		
	2006 (1)	2007 (2)	2008 (3)	2006 (4)	2007 (5)	2008 (6)
Dividend growth, 1st quintile	0.0775 (1.220)	0.0101 (0.194)	-0.0310 (-0.752)	0.0043 (0.599)	-0.0041 (-0.555)	-0.0065 (-1.349)
Dividend growth, 2nd quintile	0.1360** (2.277)	0.0995* (1.904)	0.0486 (1.405)	0.0033 (0.516)	0.0008 (0.155)	-0.0030 (-0.919)
Dividend growth, 3rd quintile	0.1161** (2.032)	0.0433 (0.826)	0.0441 (1.316)	0.0078 (1.346)	-0.0072 (-1.159)	-0.0083** (-2.153)
Dividend growth, 4th quintile	0.0859 (1.387)	0.0648 (1.169)	0.0322 (0.934)	-0.0028 (-0.402)	-0.0035 (-0.600)	-0.0026 (-0.993)
Retained earnings to total equity	0.0204 (0.286)	-0.0676 (-0.918)	-0.0619 (-1.481)	0.0147** (2.022)	0.0070 (1.020)	0.0029 (0.779)
Total equity to total assets	-0.9366 (-1.287)	-0.1539 (-0.266)	-1.2224*** (-5.819)	0.0084 (0.109)	0.1164* (1.741)	0.0088 (0.432)
ROA	0.1023 (0.947)	0.2258*** (3.516)	0.0623*** (3.054)	0.0181* (1.856)		
Lag ROA	-0.1079 (-1.037)	-0.0859 (-1.064)	-0.1193** (-2.555)	-0.0057 (-0.611)	0.0015 (0.173)	
Total asset growth (% year-on-year)	0.0127 (0.072)	-0.1668 (-1.055)	0.0928 (1.549)	-0.0344 (-1.336)	-0.0236 (-0.983)	-0.0276 (-1.434)
Total assets	-0.2647 (-1.357)	-0.0411 (-0.232)	-0.4503*** (-5.948)	-0.0027 (-0.121)	0.0313 (1.435)	0.0019 (0.262)
Risk-weighted capital ratio	-0.0763*** (-2.771)	-0.0554** (-2.283)	-0.0293 (-1.560)	-0.0047 (-1.573)	-0.0007 (-0.276)	0.0013 (0.731)
Interest to noninterest income	-0.0094*** (-3.060)	-0.0068** (-2.448)	-0.0006 (-0.240)	-0.0007** (-2.092)	-0.0007** (-2.088)	0.0000 (0.121)
Stock returns	-0.0443 (-0.333)			-0.0134 (-0.928)	0.0041 (0.205)	0.0032 (0.546)
Book-to-market	-0.1366 (-0.646)	-0.2777* (-1.691)	-0.1459*** (-2.817)	-0.0788*** (-3.077)	-0.0742*** (-4.091)	-0.0127** (-2.291)
Market capitalization	0.2273 (1.216)	0.0133 (0.076)	0.4425*** (6.238)	0.0019 (0.088)	-0.0328 (-1.525)	-0.0021 (-0.320)
Beta	0.1220* (1.656)	0.2422** (2.460)	0.0895 (1.566)	-0.0025 (-0.304)	0.0091 (0.964)	-0.0036 (-0.585)
Leverage	0.0328** (2.215)	0.0316 (1.618)	0.0305*** (4.338)	0.0040** (2.515)	0.0038* (1.932)	0.0015*** (2.900)
Tier one capital ratio	0.0931*** (3.349)	0.0738*** (2.838)	0.0414** (2.177)	0.0068** (2.290)	0.0025 (0.986)	-0.0006 (-0.315)
Marginal expected shortfall	-3.4250 (-0.744)	3.3879 (0.939)	0.2550 (0.265)	-0.0057 (-0.013)	0.2092 (0.599)	-0.0105 (-0.103)
Idiosyncratic risk	-0.0917 (-1.583)	-0.0521 (-1.227)	-0.0167 (-1.109)	-0.0060 (-0.949)	-0.0046 (-0.963)	-0.0011 (-0.918)
Constant	0.6692 (1.024)	0.0161 (0.026)	0.8289* (1.886)	0.0165 (0.214)	-0.0528 (-0.903)	-0.0139 (-0.375)
Observations	226	231	228	226	231	228
R ²	0.313	0.383	0.723	0.268	0.404	0.675

Table 8: Total payout growth and crisis performance

OLS regressions of crisis performance on total payout growth status and firm characteristics. The dependent variable in columns 1-3 is cumulative returns during July 2007 – December 2008. The dependent variable in columns 4-6 is cumulative net income scaled by total assets during July 2007 – December 2009. The independent variables are measured in 2006, 2007 and 2008 in columns 1 and 4, 2 and 5, and 3 and 6, respectively. *Growth in total payout* is the year-on-year percentage growth in total payout per share. Independent variables are defined in Table 4.

Covariates measured in	Cumulative returns July 2007 - December 2008			Cumulative net income July 2007 - December 2009		
	2006	2007	2008	2006	2007	2008
	(1)	(2)	(3)	(4)	(5)	(6)
Growth in total payout	-0.0009*** (-2.603)	-0.0002* (-1.726)	0.1490*** (3.853)	-0.0000 (-0.676)	0.0000*** (3.938)	0.0008 (0.113)
Growth in total payout × growth is positive	-0.0643** (-2.172)	-0.0457** (-1.979)	-0.2226*** (-3.202)	-0.0028 (-0.611)	-0.0053 (-1.651)	-0.0007 (-0.059)
Retained earnings to total equity	0.0160 (0.221)	-0.0575 (-0.823)	-0.0348 (-0.908)	0.0151** (1.983)	0.0141** (1.982)	0.0156*** (3.069)
Total equity to total assets	-0.9494 (-1.246)	-0.2074 (-0.349)	-1.1113*** (-5.327)	-0.0067 (-0.079)	0.0562 (0.733)	-0.0659*** (-3.388)
ROA	0.1029 (0.846)	0.2143*** (3.436)	0.0746*** (4.085)	0.0114 (1.081)		
Lag ROA	-0.0869 (-0.686)	-0.0667 (-0.799)	-0.1100** (-2.441)	0.0017 (0.145)	0.0152* (1.783)	
Total asset growth (% year-on-year)	-0.2321 (-1.290)	-0.1637 (-1.066)	0.0363 (0.823)	-0.0545** (-1.993)	-0.0203 (-0.781)	-0.0145 (-0.757)
Total assets	-0.2360 (-1.150)	-0.0630 (-0.339)	-0.4330*** (-5.750)	-0.0044 (-0.191)	0.0175 (0.707)	-0.0295*** (-4.702)
Risk-weighted capital ratio	-0.0763*** (-2.651)	-0.0590** (-2.291)	-0.0218 (-1.221)	-0.0051 (-1.512)	-0.0003 (-0.102)	0.0012 (0.545)
Interest to noninterest income	-0.0112** (-2.393)	-0.0080** (-2.060)	0.0022 (0.983)	-0.0010** (-1.975)	-0.0006 (-1.217)	0.0004 (1.243)
Stock returns	-0.0548 (-0.391)			-0.0115 (-0.761)	0.0249 (1.140)	0.0135* (1.949)
Book-to-market	-0.0666 (-0.297)	-0.2775 (-1.640)	-0.1064** (-2.292)	-0.0703** (-2.523)	-0.0852*** (-4.147)	-0.0122* (-1.827)
Market capitalization	0.1958 (0.992)	0.0313 (0.173)	0.4275*** (5.915)	0.0033 (0.153)	-0.0200 (-0.824)	0.0290*** (5.135)
Beta	0.1561** (2.021)	0.2492** (2.508)	0.1373*** (3.064)	-0.0017 (-0.203)	0.0166 (1.511)	-0.0078 (-1.119)
Leverage	0.0293* (1.836)	0.0329 (1.449)	0.0276*** (4.203)	0.0042** (2.246)	0.0045** (2.247)	0.0026*** (3.972)
Tier one capital ratio	0.0922*** (3.327)	0.0814*** (2.972)	0.0325* (1.834)	0.0067** (2.130)	0.0024 (0.927)	0.0001 (0.042)
Marginal expected shortfall	-0.4503 (-0.093)	2.8062 (0.790)	0.8641 (1.152)	0.0471 (0.103)	0.3400 (0.824)	0.0593 (0.509)
Idiosyncratic risk	-0.0833 (-1.383)	-0.0561 (-1.296)	-0.0282** (-2.470)	-0.0056 (-0.879)	-0.0091* (-1.811)	-0.0035** (-2.060)
Constant	0.7862 (1.121)	0.1368 (0.208)	0.7934** (1.977)	0.0286 (0.340)	0.0102 (0.151)	0.0710* (1.774)
Observations	211	213	216	211	213	216
R ²	0.312	0.404	0.747	0.270	0.356	0.476

Table 9: Quantiles of dividend growth and crisis performance

OLS regressions of crisis performance on quintiles of dividend growth and firm characteristics. The dependent variable in columns 1-3 is cumulative returns during July 2007 – December 2008. The dependent variable in columns 4-6 is cumulative net income scaled by total assets during July 2007 – December 2009. The independent variables are measured in 2006, 2007 and 2008 in columns 1 and 4, 2 and 5, and 3 and 6, respectively. *Total payout growth quintiles* are based on the year-on-year percentage growth in total payout per share. Independent variables are defined in Table 4.

Covariates measured in	Cumulative returns July 2007 - December 2008			Cumulative net income July 2007 - December 2009		
	2006 (1)	2007 (2)	2008 (3)	2006 (4)	2007 (5)	2008 (6)
Total payout growth, 1st quintile	0.1239** (2.239)	0.0557 (1.091)	-0.0683** (-1.975)	0.0060 (1.165)	-0.0013 (-0.220)	-0.0020 (-0.369)
Total payout growth, 2nd quintile	0.0506 (0.983)	0.0633 (1.230)	-0.0229 (-0.663)	-0.0048 (-0.827)	0.0039 (0.655)	0.0001 (0.014)
Total payout growth, 3rd quintile	0.1413** (2.431)	0.0649 (1.157)	-0.0081 (-0.250)	0.0040 (0.663)	-0.0012 (-0.197)	-0.0004 (-0.080)
Total payout growth, 4th quintile	0.0510 (0.930)	0.0833* (1.730)	0.0511 (1.233)	-0.0087 (-1.443)	0.0011 (0.209)	-0.0023 (-0.357)
Retained earnings to total equity	0.0414 (0.573)	-0.0561 (-0.799)	-0.0450 (-1.062)	0.0160** (2.134)	0.0108 (1.582)	0.0141*** (2.961)
Total equity to total assets	-0.9835 (-1.381)	-0.1972 (-0.338)	-1.1716*** (-5.377)	0.0038 (0.048)	0.0386 (0.554)	-0.0611*** (-3.231)
ROA	0.0841 (0.757)	0.2104*** (3.349)	0.0697*** (3.632)	0.0180* (1.818)		
Lag ROA	-0.0875 (-0.894)	-0.0737 (-0.948)	-0.1131** (-2.521)	-0.0050 (-0.550)	0.0148* (1.867)	
Total asset growth (% year-on-year)	-0.0450 (-0.243)	-0.1657 (-1.119)	0.0793 (1.405)	-0.0319 (-1.350)	-0.0149 (-0.623)	-0.0136 (-0.710)
Log total assets	-0.2167 (-1.141)	-0.0514 (-0.278)	-0.4545*** (-5.971)	-0.0008 (-0.036)	0.0105 (0.472)	-0.0277*** (-4.537)
Lag risk-weighted capital ratio	-0.0780*** (-2.755)	-0.0637** (-2.420)	-0.0311* (-1.724)	-0.0050 (-1.635)	-0.0007 (-0.260)	0.0009 (0.390)
Interest to noninterest income	-0.0097*** (-2.959)	-0.0067** (-2.388)	-0.0003 (-0.123)	-0.0007** (-2.301)	-0.0006* (-1.876)	0.0003 (0.915)
Stock returns	-0.0473 (-0.359)			-0.0157 (-1.109)	0.0280 (1.399)	0.0149** (2.167)
Lag book-to-market	-0.0984 (-0.461)	-0.2948* (-1.903)	-0.1380** (-2.534)	-0.0764*** (-2.999)	-0.0743*** (-4.036)	-0.0124* (-1.964)
Market capitalization	0.1846 (1.016)	0.0250 (0.139)	0.4451*** (6.144)	-0.0003 (-0.013)	-0.0133 (-0.605)	0.0275*** (4.990)
Beta	0.1334* (1.802)	0.2521*** (2.680)	0.0844 (1.527)	0.0001 (0.009)	0.0108 (1.119)	-0.0090 (-1.294)
Leverage	0.0281* (1.867)	0.0326 (1.585)	0.0313*** (4.449)	0.0043*** (2.841)	0.0046** (2.395)	0.0024*** (3.828)
Tier one capital ratio	0.0951*** (3.307)	0.0816*** (2.944)	0.0402** (2.178)	0.0070** (2.314)	0.0027 (1.031)	0.0004 (0.196)
Marginal expected shortfall	-2.5039 (-0.550)	3.6060 (1.052)	0.0501 (0.053)	0.0856 (0.194)	0.1854 (0.520)	0.0478 (0.426)
Idiosyncratic risk	-0.0917 (-1.525)	-0.0596 (-1.449)	-0.0222 (-1.555)	-0.0057 (-0.928)	-0.0075 (-1.577)	-0.0025* (-1.689)
Constant	0.5023 (0.731)	0.0312 (0.048)	0.9196** (2.214)	0.0160 (0.207)	0.0235 (0.375)	0.0634* (1.687)
Observations	226	231	228	226	231	228
R ²	0.321	0.383	0.728	0.281	0.325	0.466

Table 10: Dividend policy and insider trading

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). No trading is a dummy equal to 1 if the bank's insiders placed no trades in a given year. Net volume is the number of shares bought by insiders less the number of shares sold by insiders, and this difference divided by the number of shares outstanding. Volume bought is the number of shares bought by insiders divided by the number of shares outstanding and multiplied by 10,000. Volume sold is the number of shares sold by insiders divided by the number of shares outstanding and multiplied by 10,000.

Year	Performance and dividend policy	NPR count	NPR volume	% net buyers	% net sellers	No trading	Net volume	Volume bought	Volume sold
2006	Negative net income and does not pay	1.0000	1.0000	1.0000	0.0000	0.00	45.64	45.64	0.00
	Negative net income and pays	-0.1111	-0.2727	0.3333	0.6667	0.25	-18.98	2.14	21.12
	Positive net income	0.3464	0.2557	0.6383	0.3617	0.10	28.78	75.07	46.29
2007	Negative net income and does not pay	0.8963	0.9773	1.0000	0.0000	0.25	54.85	55.45	0.60
	Negative net income and pays	0.5561	0.5186	0.7273	0.2727	0.00	41.16	49.85	8.68
	Positive net income	0.4274	0.2924	0.6744	0.3256	0.10	19.41	55.33	35.92
2008	Negative net income and does not pay	0.5674	0.5092	0.6364	0.3636	0.00	105.24	123.48	18.23
	Negative net income and pays	0.5745	0.4685	0.6981	0.3019	0.05	-27.72	67.64	95.36
	Positive net income	0.4370	0.3922	0.6667	0.3333	0.03	18.37	39.22	20.85
2009	Negative net income and does not pay	0.7885	0.7693	0.9048	0.0952	0.16	43.84	50.51	6.67
	Negative net income and pays	0.6182	0.5906	0.7959	0.2041	0.04	41.31	54.19	12.88
	Positive net income	0.4547	0.3665	0.7273	0.2727	0.12	24.87	48.31	23.44
2010	Negative net income and does not pay	0.7539	0.6644	0.8500	0.1500	0.13	36.92	42.29	5.37
	Negative net income and pays	0.4591	0.4441	0.7778	0.2222	0.05	1.81	7.87	6.07
	Positive net income	0.4002	0.4255	0.6667	0.3095	0.09	71.68	91.41	19.73
2011	Negative net income and does not pay	0.9729	0.9275	1.0000	0.0000	0.18	56.45	58.27	1.83
	Negative net income and pays	0.7726	0.5935	0.8571	0.1429	0.00	13.52	16.40	2.88
	Positive net income	0.5052	0.4854	0.7500	0.2500	0.03	17.50	29.03	11.53
2012	Negative net income and does not pay	1.0000	1.0000	0.5000	0.0000	0.33	6.12	6.12	0.00
	Negative net income and pays	0.2457	0.2916	0.4286	0.2857	0.00	3.17	4.97	1.80
	Positive net income	0.4766	0.5306	0.6786	0.2500	0.13	18.21	21.64	3.43