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Understanding Bank Payouts during the Crisis of 2007-2009

Finance Working Paper N° 480/2016
December 2017

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ECGI Working Paper Series in Finance

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We are grateful to Pat Akey, Ling Cen, David Denis, Craig Doidge, Itay Goldstein, Arthur Korteweg, Si Li, Robert McMillan, Roni Michaely, George Pennacchi, Philipp Schnabl, Judit Temesvary, and participants at the 2016 American Finance Association Annual Meeting, the 2016 China International Conference in Finance, the Summer Workshop of the Hungarian Academy of Sciences, the 2015 FDIC-JFSR Annual Bank Research Conference, and seminars at ESADE, IE Business School, Manchester Business School, McGill, University of Bristol, University of Bonn, University of Exeter, University of Paderborn, Universitat Pompeu Fabra, University of St. Gallen, University of Toronto, and the Vienna Graduate School of Finance for valuable comments and suggestions. Sara Kollmann, Thomas Rauter, Tommaso Spanò, and Shiny Zhang provided excellent reserarch assistance. Peter Cziraki acknowledges financial support from the Connaught Foundation and a SSHRC Institutional Grant.

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Abstract

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

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

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Understanding Bank Payouts during the Crisis of 2007-2008

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The paper was previously circulated under the title "Bank Payout Policy, Performance, and Insider Trading in the Financial Crisis of 2007-2009". We are grateful to Pat Akey, Ling Cen, David Denis, Craig Doidge, Itay Goldstein, Arthur Korteweg, Si Li, Robert McMillan, Roni Michaely, George Pennacchi, Philipp Schnabl, Judit Temesvary, and participants at the 2016 American Finance Association Annual Meeting, the 2016 China International Conference in Finance, the Summer Workshop of the Hungarian Academy of Sciences, the 2015 FDIC-JFSR Annual Bank Research Conference, and seminars at ESADE, IE Business School, Manchester Business School, McGill, University of Bristol, University of Bonn, University of Exeter, University of Paderborn, Universitat Pompeu Fabra, University of St. Gallen, University of Toronto, and the Vienna Graduate School of Finance for valuable comments and suggestions. Sara Kollmann, Thomas Rauter, Tommaso Spanò, and Shiny Zhang provided excellent reserarch assistance. Peter Cziraki acknowledges financial support from the Connaught Foundation and a SSHRC Institutional Grant.

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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 2007-2008 received considerable coverage in the press (Lobb (2008), Kim (2011), Sidel (2014)). The payout policy at the beginning of the crisis is particularly controversial, as the crisis eroded the capital of many banks, which then relied on government funding (Rosengren (2010), US Treasury (2010)).

In this paper, we shed new light on banks' payout policy at the beginning of the financial crisis, 2007-2008. For a large sample of more than 550 U.S. bank holding companies, we find that banks did not significantly reduce dividends until 2009, while they reduced repurchases significantly already in 2008 (see also Acharya (2012), Hirtle (2014) and Floyd et al. (2016)).[1] The finding that banks reduced repurchases but not dividends is consistent with banks fearing an adverse price reaction to dividend cuts.[2] However, the cut in repurchases alone does not refute the possibility that banks delayed or resisted cutting dividends to engage in risk shifting and transfer wealth to shareholders (Acharya et al. (2012)).

In addition to analyzing aggregate changes in bank payouts, we conduct a number of tests to better understand the potential motives underlying banks' payout policy in 2007 and 2008. As a starting point, we compare banks' payout policy in 2007 and 2008 taking into account bank fundamentals. Using a large set of bank fundamentals, we calibrate a model of bank payouts for the time before 2006. We then compare predicted payouts from this model with the

[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 (https://www.federalreserve.gov/boarddocs/srletters/2009/sr0904.htm, last accessed on March 16, 2017). 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.

[2] See also Hirtle (2014). 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.

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actual payouts in 2007 and 2008. For all our payout measures, we find that the average bank's payouts in 2007 were higher than before 2007, controlling for bank fundamentals.[3] In contrast, the dividend per share in 2008 is in line with levels before 2006. However, one may argue that dividend levels commensurate with normal times may not have been appropriate in 2008 as several bank fundamentals that we use to estimate the payout model are book values that move slowly. Overall, the evidence could be consistent with the argument that banks engaged in high wealth transfer to the benefit of shareholders, increasing the risk of bank failure, in particular in 2007.

However, 2007 and the beginning of 2008 are years characterized by uncertainty about the severity of the crisis and its effect on individual banks. It is possible that investors would have interpreted dividend decreases as a negative signal. Indeed, Floyd et al. (2015) and Hirtle (2014) argue that because of the opaque nature of their business, signaling through dividends is particularly important for banks.

To investigate the signaling argument directly, we measure the stock market reaction to announcements of dividend changes. While announcements of dividend increases before the crisis are associated with positive stock market reactions, announcement effects of dividend decreases are insignificant before the crisis as well as in 2007 and 2008. The asymmetry in the announcement effect of dividends is consistent with dividend increases conveying positive news to the market, while banks wait with dividend decreases until they can no longer avoid them. Thus, the market anticipates dividend decreases and prices them in. However, the evidence does not speak to what happens if banks cut dividends unexpectedly. In this case, the market could

[3] One potential concern with looking only at payouts is that any change in payouts may be offset by simultaneous changes in equity issuance (Boudoukh et al. (2007) and Grullon et al. (2011)). To address this issue, we also look at the incidence of equity issuance and see whether banks that issue equity behave differently from banks that do not do so.

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still react very negatively, and the beginning of the crisis was exactly the time where the market would have interpreted dividend decreases as negative signal given the general uncertainty.

We next examine the relation between dividend changes and future performance. [4] If dividend changes contain private information, dividend increases (decreases) should be positively associated with positive (negative) future performance (ROA), controlling for bank fundamentals. Unlike the desire to signal, wealth transfer may even produce the opposite relation when banks increase dividends in 2007 or 2008, anticipating or thereby contributing to negative future performance. We find no evidence of this type of risk shifting for the average bank in the sample. However, even if the average bank did not engage in risk shifting, certain types of banks may have done so. We therefore conduct several sample splits to investigate the cross sectional heterogeneity of banks' payout policy. For example, banks that are smaller or are not covered by analysts may be subject to greater information asymmetry, while larger banks or those that ended up receiving TARP money may have been more reckless with dividend increases betting on future bailouts. The only direct evidence consistent with risk shifting that we find is that banks whose insiders were less optimistic as measured by their insider trading in 2006 and 2007 exhibit a weakly significant negative association between the 2007 change in dividend and the 2008 stock return.

As a final test of the relation between insider trading and dividend changes, we compare insider-trading patterns in banks with different dividend behavior (increase, decrease, and constant). We find that insiders of banks that increase dividends in 2007 and 2008 have significantly lower insider net buying compared to banks that do not increase dividends.

[4] We follow the payout literature on non-financials that examines whether dividend changes reflect past or future performance (Benartzi et al. (1997), Grullon et al. (2002)). Benartzi et al. (1997) show that dividend changes have some, albeit weak, association with future long-term returns, and that the stock market reacts negatively (positively) upon the announcement of dividend decreases (increases).

However, compared to the pre-crisis period, insiders of banks that increased dividends did not change their insider trading behavior significantly, while insiders of banks that held dividends constant in 2007 and 2008 and those that decreased dividends in 2008 had much higher levels of insider purchases compared to the pre-crisis period. This pattern is consistent with contrarian trading (see Jenter (2005), Piotroski and Roulstone (2006)) and regulatory and public scrutiny (Cziraki (2017)).

Overall, we do not find clear evidence of risk shifting or signaling at the beginning of the crisis. While banks may have decreased their payouts too little and too late, it is unlikely that they used their payout policy to engage in active and deliberate wealth transfer as a response to the crisis. However, we also do not find strong evidence for signaling, beyond the observation that banks did reduce repurchases, but not dividends.

Our contribution to the literature lies in developing a series of empirical tests to examine the possible motives of banks' payout decisions in 2007-2008. 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. Floyd et al. (2015) compare the payout policy of banks and non-financial firms from 1980 to 2012 and document that dividends play a more important role for banks than for non-financial firms. Floyd et al. (2015) and Hirtle (2014) argue that that at the beginning of the crisis, the main adjustments in payouts occurred through reducing share repurchases rather than dividends, consistent with the signaling argument.[5] We conduct a battery of empirical tests to examine the merits of the signaling as well as the wealth-transfer arguments for the average bank

[5] Bliss et al. (2015) document that non-financial firms cut dividends and share repurchases in order to conserve capital and dampen the effect of the reductions in banks' supply of funds.

in our sample. In addition, we use several cross-sectional tests to see whether signaling or wealth transfer considerations played a role in banks' dividend policies for various subsamples of banks.

2. Empirical Strategy

We start our analysis by describing the payout policy of US banks from 1996 to 2012. We use several measures of banks' dividend policy. In particular, we focus on the dividend per share (cash dividend paid to common share) and the dividend yield. In addition, we also look at banks total payout per share, which we define as the sum of dividends and repurchases divided by total shares outstanding, and the total payout yield.

Our main objective is to shed light on the motives underlying banks' payout policy at the beginning of the crisis. First, we investigate the relation between banks' fundamentals and their payout policy in 2007 and 2008. We estimate a linear regression model relating banks' payout policies to bank characteristics and fundamentals for the period of 1996-2006. We then use the coefficients from this estimation and bank characteristics and fundamentals in 2007 and 2008 to estimate banks' payout policy in both years. The payout policy that the model predicts provides a reference point for what banks and investors could consider "normal" relative to bank characteristics and fundamentals in 2007 and 2008. We then calculate the level of abnormal payout by comparing the actual payout to the estimated payout.

Several of the bank fundamentals that enter the regression are book values, which move slowly. As Acharya et al. (2012, p.4) argue, "*the inertia in bank accounting makes even a distressed bank appear healthy*". Therefore, finding abnormally high or even "normal" dividends relative to slowly adjusting fundamentals could be suggestive of wealth transfer.

However, 2007 and the beginning of 2008 are years characterized by uncertainty about the severity of the crisis and its effect on individual banks.

Second, as a direct test of the signaling argument, we investigate the stock market reaction to the announcements of dividend changes. To isolate the information content of dividends from other news about the firm, we restrict our sample to dividend announcements that do not overlap with earnings announcements. Of particular interest are 2007 and 2008, given the considerable uncertainty in the market during this time. However, it is also interesting to look at the time before the crisis as a reference point. If the market interprets dividend cuts to signal negative news, we expect a significant negative stock price reaction. Alternatively, if banks wait with dividend cuts until they can no longer avoid them, the market already expects them and prices them in. In this case, the relation between the share price and the announcement of dividend cuts may be insignificant.

Third, we examine the relation between dividend changes and future performance. If dividend changes contain information, dividend increases (decreases) should predict positive (negative) future performance (ROA), controlling for fundamentals that can drive both dividend changes and future performance. If the market does not completely incorporate the information, there is also a positive association between dividend changes and future stock returns. In contrast, an extreme version of risk shifting occurs if the relation between dividends and future performance is negative in the crisis. In this case, banks that anticipate low future performance increase payout.

The relation between payout policy changes and future performance may differ across banks, depending on the role of information asymmetry and incentives to engage in risk shifting. We conduct several sample splits to investigate the cross-sectional heterogeneity in the relation

between changes in payout and future performance. Banks that are smaller or are not covered by analysts may be more subject to information asymmetry. Hence, signaling through dividends may be more relevant for them. Larger banks or banks that ended up receiving TARP funds may have been more reckless with dividend increases betting on future bailouts. Hence, if the wealth-transfer hypothesis holds, we should more likely observe a negative relations between dividend changes and future performance for this group of banks. Further, banks that adopted a riskier strategy during the housing market boom may also have been more aggressive with dividends. Hence, the relation between dividend changes and future performance may be different for this set of banks, reflecting risk-shifting incentives.

Fourth, in addition to looking at the realization of bank performance, we also consider insider trading as a proxy for insiders' *expectations* about the health of a bank. If banks maintain or increase dividends in expectation of better future performance, we should observe insider net purchases (shares bought minus shares sold) moving in the same direction. We compare insider trading patterns in banks with different dividend behavior (increase, decrease and constant) in the crisis.

3. Bank payouts during the period 1995-2012: sample and univariate analyses

3.1. 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. Data on stock returns (adjusted for dividends and stock splits) are from CRSP. Table A.1 in the Appendix defines the variables used in the paper. Our full sample contains 9,464 bank-year

observations with non-missing dividend data. Panel A of Table 1 shows the coverage of our data year by year.

– Insert Table 1 here –

The number of banks in the sample 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 payouts in 2000. Panel B shows descriptive statistics of the variables we use in our regressions.

In Section 3, we provide a general overview of the dividend (total payout) policy of the banks in our sample from 1995 (2000) to 2012. The main objective in subsequent sections is to understand the payout policy of dividend paying banks in 2007-2008. Hence, we restrict our sample for the regression analysis for the period of 1995-2008. We also exclude 96 banks that never paid dividends prior to 2007 from our regressions. Our regression sample contains 3,944 bank-year observations.

The average dividend per share is 85 cent, and the average dividend yield is 2.58 percent. To derive similar measures for banks' total payout policy, we measure total payout as the sum of total dividends and total repurchases. We approximate repurchases by the annual change in treasury stocks in order to net out the effect of shares issued for employee stock option programs and to pay for acquisition. We divide total payout by the total number of common shares outstanding at the end of the year to obtain total payout per share. We divide total payout per share by the end-of-year stock price to obtain total payout yield. To mitigate the effect of outliers, we winsorize dividend per share, dividend yield, dividends to book value, total payout per share and total payout yield, as well as ROA, stock returns, asset growth, risk-weighted

capital ratios, and the ratio of interest to noninterest income at the 1st and the 99th percentile for the regression analysis.

To select our control variables, we rely on prior literature on corporate payout policy (see Farre-Mensa et al. (2014b) for a survey), and 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 regression sample has $15,374 million ($653 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 (2017). We use two proxies for investment opportunities: the rate of growth of total assets and the market to book ratio (market capitalization over book value of equity). We measure profitability as the return on assets (ROA), defined as net income to total assets. The average (median) ROA in our regression sample during 1995-2008 is 0.96% (1.05%), which is comparable to the value reported by the Federal Reserve Bank of St. Louis for the same period.[6] We control for earnings volatility, as firms may be less likely to pay dividends if their earnings are highly volatile. We measure earnings volatility as the standard deviation of quarterly ROA over the past 8 quarters. If data on the past 8 quarters are not available, we use data on the past 4 quarters. We approximate banks' market leverage ratio using the definition of Acharya et al. (2010), as (book assets – book equity + market capitalization)/(market capitalization). We measure liquidity 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)).

[6] http://research.stlouisfed.org/fred2/series/USROA, last accessed on December 10, 2017.

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, while others focus more on the traditional lending businesses. This may influence the volatility of earnings and payout decisions. 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 may 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 funds outstanding 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.

3.2. The payout policy of banks from 1995 to 2012 – univariate tests

The percentage of banks that pay dividends is high from the beginning of our sample: more than 90% 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, 82% of all banks in our sample pay dividends. Figure 1 also shows the percentage of banks that repurchase shares in a given year. The percentage fluctuates around 60% until 2008 and then decreases to just above 30% in 2009.

– Insert Figure 1 here –

Figure 2 plots the equally-weighted average ratio of dividends to the book value of equity, to the market value of equity (dividend yield), as well as the ratio of total payout (dividends + repurchases) to banks' market value of equity (total payout yield). While dividends to book equity remains relatively stable until 2007, dividend yields increase until 2008, as banks' stock prices start to deteriorate. From 2008, dividends to book equity and dividend yield decrease. The reduction in the dividends to book equity ratio is much larger as share prices declined significantly in 2008. The larger increase in total payout yield compared to dividend yield prior to 2007 suggests that banks increased share repurchases significantly before the crisis. The downward adjustment after 2008 is also more visible.

– Insert Figure 2 here –

In Figure 3, we look at a balanced panel of 240 banks from 2000 onwards. We find that banks continuously increase the total amount of dividends until 2007 and slightly decrease them in 2008. When looking only at dividends, one could hardly suspect that there is a crisis unfolding in 2007 and 2008. However, banks reduce repurchases from more than $21.52bn in 2007 to $3.51bn in 2008. From 2000 to 2007, repurchases are of a similar magnitude as dividends. Banks significantly reduce 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. To address this concern, we create a list of banks that drop out of the sample during the crisis, and cross-

reference this list with the FDIC's list of failed banks.[7] The FDIC lists none of the banks that drop out of our sample during 2007-2008 as failed. However, the panel does include 99 banks that received TARP funding. Although the TARP program did not ban dividend payments, recipients had 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.[8]

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.[9] 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 in the model of Guntay et al. (2015)) as well as regulatory pressure put on TARP banks to reduce dividends after they received TARP funds. Comparing Panels B and C of Figure 3 we see that TARP banks are larger than non-TARP banks and paid out more as a fraction of their equity (both book and market value) prior to the crisis.

– Insert Figure 4 here –

In Figure 4, we plot dividend changes over time. The percentage of banks that increase dividends is 61% in 2007, which is slightly lower than the average of the preceding four years (64%). In 2008, still 46% of banks increase dividends. We only observe a significant drop to

[7] https://www.fdic.gov/bank/individual/failed/banklist.html, last accessed on December 10, 2017.
[8] https://www.federalreserve.gov/boarddocs/srletters/2009/SR0904.pdf, last accessed on December 10, 2017.
[9] 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.

21% in 2009. At the same time, the percentage of banks that reduce dividends increases from 5% in 2007 to 18% and 43% in 2008 and 2009, respectively. The percentage of banks that do not change their dividend, which includes those banks that continue to pay no dividend, increases from 34% in 2007 to 36% in 2008, and 37% in 2009.

– Insert Figure 5 here –

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 four subsamples: (1) banks that increase dividends; (2) banks that do not change dividends; (3) banks that reduce dividends, but continue to pay positive dividends; (4) banks 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. The percentage of loss-making banks decreasing dividends is 57% in 2008 and reaches 91% in 2009.

The relation between dividend changes and performance may not be linear. One may be concerned that it is banks with the worst performance that fail to decrease dividends – which may be interpreted as an attempt to transfer wealth to shareholders. To examine whether this is the case Figure 6 plots the contemporaneous relation between performance and dividend changes for banks in the lowest 5%, 10%, 25%, 33%, and 50% of the performance distribution. We use two measures of performance: annual stock returns and ROA. Panels A and B of Figure 6 show that for both performance measures, worse performing banks generally have lower dividend growth over our sample period. Consistent with this pattern, banks with worse performance

reduced dividends by more in 2008 than do banks with better performance. On average, banks in the bottom 50% of the performance distribution cut dividends in 2008.

– Insert Figure 6 here –

Critics of bank payout policies during the crisis maintained that banks ought to have scrapped or reduced payout to preserve their equity capital. As Farre-Mensaet al. (2014a) show, it is not always the case that dividends are paid out of cash reserves: industrials often issue equity to make dividend payments.

Table A.2 in the Appendix provides descriptive statistics on the percentage of banks in the sample that issue common equity over time. We distinguish between issuance of common shares, preferred shares issued outside of TARP, and preferred shares issued related to TARP. In 2007, 3% of banks issue common shares, and 1% issue preferred shares. In 2008, the percentage of banks that issue common (preferred) shares increases to 5% (4%). In 2009-2010, 15% of banks in our sample issue common shares. Hence, only a very small fraction of banks issue equity until 2009.

4. Sizing up crisis payouts: an empirical model of fundamentals and bank payouts

We use variation in bank payouts and fundamentals in a panel setting to examine whether banks' dividend policy in 2007 and 2008 differs from the time before the crisis, taking into account changes in banks' fundamentals. We first estimate a model of payout policy for the period 1995-2006. We then use the coefficients from this model to predict banks' payout policy in 2007 and 2008 and compare it to their actual payout policy. Fama and Babiak (1968) and Brav et al. (2005) suggest that the level of dividend per share is the key metric for payout policy. We use both dividend per share and dividend yield to measure a bank's dividend policy. We also

perform the same analysis replacing dividends by total payout (the sum of dividends and share repurchases). When comparing changes in payout policy in the crisis with normal times, we aim to analyze banks that pay dividends in normal times. Therefore, we drop banks that never pay dividends from this analysis.

Table 2 reports the results for the period of 1995-2006. In column 1, our dependent variable is dividend per share; in column 2, it is the dividend yield. In column 3 and 4, we present the regression results using total payout per share and total payout yield as dependent 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 2 here –

Our fixed-effects regressions show that in normal times, dividend per share increases with bank size and past profitability (column 1). The dividend yield in normal times (column 2) also increases with bank size and past profitability, and decreases in contemporaneous profitability and earnings volatility. Further, the dividend yield increases with the leverage ratio and the Fed funds rate. Finally, dividend yield decreases with the net interest expense in the Fed and repo market and the share of deposit financing. We note that the positive effect of contemporaneous ROA on a bank's share price is likely driving the negative coefficients in the dividend yield regression.[10]

[10] Because the distribution of dividends and total payouts is censored from below at 0, for robustness, we also estimate fixed-effects panel Tobit regressions with the same independent variables. These regressions use the estimator of Honoré (1992). The results are similar to the ones obtained from the linear fixed-effects panel regressions and are omitted.

In Table 3, we show the average residuals estimated out of sample and test whether these are significantly different from zero.[11] Our out-of-sample residuals are calculated by using the coefficients of the models presented in Table 2 and bank fundamentals in 2007 and 2008.

– Insert Table 3 here –

Based on this analysis, the average payout of banks in 2007 looks excessive, as the average residuals are significantly positive for all payout measures. This evidence suggests that the average bank's payout in 2007 was higher than in the time before 2007 compared to fundamentals, which could raise concerns that banks engaged in wealth transfer to the benefits of shareholders, increasing the risk of bank failure. The dividend yield and the total payout yield in 2008 are both still excessive compared to the time before 2007, as share prices dropped to historical lows by the end of 2008. The dividend per share is no longer excessive in 2008, suggesting that some banks reduced dividends to levels commensurate with normal times. One may argue, however, that dividend levels commensurate with normal times may not have been appropriate in 2008 given the crisis. However, reducing dividends below these levels may have created even bigger problems if unexpectedly high dividend cuts had triggered bank runs. Thus, it is possible that banks chose not to cut dividends further for fear that the market would interpret this as a negative signal.

In contrast to dividend per share, the average residual for total payout per share in 2008 is significantly negative. Thus, in 2008 banks reduced total payouts to a level that is below what our model predicts. As banks reduced repurchases already at the beginning of 2008, it is unlikely that this decision was due to exogenous constraints that affected repurchases, but not dividends. The difference between the abnormal residuals for dividends per share and total payout per share

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

in 2008 is consistent with the argument that banks were afraid to cut their dividends in 2008, but were willing to reduce repurchases. The finding that banks adjusted their repurchases suggests that it is unlikely that banks used payouts to transfer wealth from creditors (or the government, in expectation) to shareholders during 2008.

5. Dividend changes, performance and insider trading

5.1. The stock market reaction to changes in bank payouts

Proponents of the signaling argument point out that banks may have been reluctant to cut dividends because they feared an adverse price reaction. We assess the merits of this argument by examining stock market reactions to announcements of dividend decreases and increases. As market reaction to dividend changes may differ in a crisis compared to normal times, we also perform a separate analysis for 2007-2008 and the rest of the sample period. We calculate the cumulative abnormal returns (CARs) around the announcement day using various event windows. 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 et al. (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 4 here –

Table 4 summarizes our results from the event study. In Panel A of Table 4, we calculate CARs from the day of the announcement to the 3rd day after the announcement for dividend

increases and decreases in our sample. In Panel B, we extend the event window 3 days before the announcements, and in Panel C, we measure CARs over a period of 10 days around the announcement. For the full sample, we find that the market reacts negatively to dividend decreases. The abnormal return after such events is significantly different from zero at the 1% level. Similarly, we find that the market reacts positively to dividend increases, with a statistically significant CAR following such announcements. This confirms that the results of Benartzi et al. (1997) hold also for our sample of large US bank holding companies.

Once we split the sample period we find that before the crisis (1995-2006), the market reaction to dividend cuts is insignificant, while increases trigger positive and significant abnormal price reaction. More importantly, we find a similar pattern for 2007-2008. If dividend cuts signaled unanticipated negative news, we would expect a significant negative stock price reaction to the announcement of dividend reductions. If banks delay dividend cuts until they can no longer avoid them, it is likely that the market already expects them and prices them in. In this case, we should not see a significant announcement effect. However, an insignificant announcement effect does not imply that dividends are not important. Indeed, banks may delay the dividend cut as long as possible because of the negative effect that unexpected dividends cuts would have. Furthermore, if dividend reductions are at least partially involuntary, i.e., the result of regulatory pressure, the market reaction should be muted.[12]

We also analyze the market reaction to share repurchases. Consistent with the existing literature on repurchases (e.g. Comment and Jarrell (1991), Grullon and Michaely (2004), Farre-Mensa et al (2014b), and Dittmar and Field (2015)), we also find that the market reacts favorably

[12] Relatedly, Cornett and Tehranian (1994) find that share issuances that are required to meet regulatory capital requirements (involuntary) are not associated with the same level of negative price reaction following voluntary equity issuances. Nevertheless, they find that the negative effect of equity issuance on the share price is still significant.

to repurchase announcements: for example, the average announcement CAR(0,3) equals 1.28% for the entire period. Once we split our sample into normal, crisis, and post-crisis periods, it becomes clear that the significant abnormal price reaction following repurchase announcements is largely limited to the pre-crisis years. The absence of a significant price reaction may be due to the small sample size. The number of repurchase announcements drops sharply in 2008, consistent with our evidence presented in Figures 1 and 3.

5.2. Payout policy and crisis performance

In this section, we relate changes in bank payout policy to future performance. If dividend changes contain information, we should find that dividend growth and future bank performance (ROA) are positively related, even after controlling for fundamentals that can drive both. If the market price does not completely incorporate all private and public information, we should also see a positive association between dividend changes and future stock returns.

We regress performance in year t+1 on dividend changes in year t, and control variables.[13] We employ a separate dummy variable for 2007 and 2008.[14] The coefficient of the interaction term captures whether there is a significant difference in this relation in 2007 or 2008 compared to the time before. Risk-shifting in 2007 and 2008 should weaken any positive relation between dividend changes (decreases) and future performance that we find in the time before the crisis. Indeed, a strong form of risk shifting occurs when the relation between dividend changes and future performance turns negative in 2007 or 2008.

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

[14] In this section, we do not use the dividend yield, as we are interested in dividend changes that stem from managerial decisions, not stock price movements. For banks that stopped paying a dividend, we set the dividend change equal to zero in years where the bank does not pay a dividend in two consecutive years.

Columns 1 and 3 of Table 5, Panel A display the relation between dividend changes and future performance without controls, while columns 2 and 4 include controls. In panel A, we include the percentage change in dividends. In Panel B, replace the continuous variable by a dummy for negative dividend growth to understand whether the relation between dividend changes and crisis performance differs for reductions and increases of dividends. We find a positive and significant relation between dividend growth and future stock returns before 2007. Before the crisis, the relation between dividend growth and future ROA is not significant once we control for fundamentals. Examining the interaction terms, we find that the relation between dividend growth and future performance is weaker in 2007 than it is before the crisis, but the difference is not significant. In contrast, the relation between dividend changes and future performance is stronger in 2008 than before the crisis, and significant for ROA even in the specification with controls. Panel B shows that the positive and significant association between dividend growth and future ROA stems from banks that reduced dividends in 2008 and had low ROA in 2009.

– Insert Table 5 here –

In Table 6, we examine the relation between dividend growth and future performance separately for 2007 and for 2008.[15] The relation between dividend changes in 2007 and performance in 2008 is insignificant in all specifications, except for a weak positive relation for dividend-increasing banks, which becomes insignificant once we include controls. The relation between dividend changes in 2008 and performance in 2009 is positive, and highly significant for future ROA. This effect is driven by banks that reduce dividends, which have significantly lower performance than banks that did not change their dividends. Panel B also shows that banks

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

that increase dividends in 2008 have lower ROA in 2009 than banks that do not change their dividends. While the coefficient is not significant, it shows that there is some heterogeneity in the types of banks and a non-trivial number of banks may have increased dividends in 2008 despite low future performance.

– Insert Table 6 here –

Overall, we find no, or only a very weak, association between dividend changes and future performance in 2007 and 2008. One reason could be that there is large cross-sectional heterogeneity of banks with different motives. The relation between dividend changes and future performance may differ across banks, depending on the role of information asymmetry and incentives to engage in risk shifting. We therefore repeat the regression of Table 6, columns 5-8 for different subsamples of banks to investigate the cross sectional heterogeneity in banks' payout policy. For continuous variables, we split banks at the median to form groups.

For robustness, we also split banks in terciles and use the bottom and top tercile of the respective variable. While terciles benefit from larger cross-sectional variation, the main disadvantage is the small sample size so that insignificant results could stem from a lack of power. We report the results for the median-split in Table 4, and mention cases where the tercile-split yields significant results in contrast to the median split.

Of particular interest are significant negative associations between dividend growth and future performance as such a relation could be consistent with risk shifting if they stem from increases in dividends that are associated with negative future performance. However, even if the relation is positive or insignificant, it may be consistent with risk shifting if the relation between dividend policy and future performance is significantly weaker for banks that have higher incentives to engage in risk shifting than for banks that have lower incentives. Therefore, we also

test whether there is a significant difference in the relation between dividend changes and future performance for the banks in the different subsamples.

Regulatory capital (Panel A) is the total risk-weighted capital ratio in 2006. Banks can only engage in risk shifting if their regulatory capital constraint is not binding. Thus, banks with higher regulatory capital ratios are more able to engage in risk shifting. However, for most banks, the regulatory capital constraint was not binding in 2006 or 2007, and banks with lower regulatory capital ratios have higher incentives to engage in risk shifting than banks with high levels of regulatory capital. *Size* (Panel B) is the level of total assets in 2006. Large banks may have a higher incentive to engage in risk shifting than small banks, given their status of too-big-to-fail.

Participation in TARP (Panel C) captures whether a bank received funding from TARP. It is possible that TARP banks followed a particularly risky strategy and paid out dividends to shareholders to engage in risk shifting, needing to be bailed out later. TARP is an ex-post proxy for possible risk shifting and prudence. We also define two ex-ante measures: the exposure to troubled assets and diligence in mortgage lending. *Mortgages to total loans* (Panel D) is the total dollar value of mortgages divided by the total dollar value of loans, averaged over the pre-crisis period 2004-2006. *Approved to total mortgages* (Panel E) is the total value of mortgages approved during 2004-2006 divided by the total value of loan applications during the same period. Information on mortgages is from the HMDA database. The share of approved mortgages to loan applications is a measure of the diligence of a bank's effort to screen loan applicants (see e.g. Dell'Ariccia, Igan, and Laeven (2012)).

Analyst coverage (Panel F) indicates whether the bank has any security analysts covering it in 2006. Information on analyst coverage comes from I/B/E/S. Analyst coverage reduces

information asymmetry. Thus, for banks not covered by analysts, signaling is more important. *Managerial ownership* (Panel G) is the number of shares owned by managers divided by the total number of shares outstanding in 2006. Data on managerial ownership is from SNL. Equity ownership aligns the incentives of managers with those of shareholders.[16] Thus, CEOs who hold more shares may also be more willing to engage in risk shifting. However, it is also possible that CEOs who hold more shares are more risk averse about the risk of their bank, recuing incentives to engage in risk shifting. *Equity issuance* (Panel H) refers to whether the bank issues common equity unrelated to TARP in 2007-2008. Banks that issued equity in 2007-2008 are banks that are unlikely to engage in risk shifting. Thus, the subset of banks that did not issue equity, is the group of banks more likely to have engaged in risk shifting and therefore more likely to exhibit a negative association between changes in dividends and future performance.

A direct measure of insiders' information about the prospects of the bank is insider trading. There are several measures of insider trading that the literature proposes. In our sample split, *insider net buying* (Panels I-L), we use the average net purchase ratio, calculated as the ratio of net purchases to total insider transactions of a bank, $NPR\ count = \frac{number\ of\ purchases - number\ of\ sales}{number\ of\ purchases + number\ of\ sales}$ (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. Thus, banks with a lower level of insider net buying are banks where insiders are relatively less optimistic about the prospects of the bank and where risk shifting is more likely.

– Insert Table 7 here –

[16] Managerial equity incentives are positively correlated with dividend policies in non-financial companies (e.g. Fenn and Liang (2001), Kahle (2002)), and several papers discuss the role of managerial incentives in the recent crisis (e.g. Bebchuk et al. (2010), Fahlenbrach and Stulz (2011), Bhagat and Bolton (2014), Cheng et al. (2015)).

In many specifications, the relation between the change in dividend and future performance is insignificant. Where it is significant, the relation is positive. In particular, the association between dividend changes in 2008 and ROA in 2009 is stronger for larger banks and for TARP banks, for which we would have expected higher risk shifting incentives. We also find that when significant, the relation between dividend growth and future performance is stronger for banks with a higher share of mortgage lending.

The only finding consistent with risk shifting is that for banks where insiders are less optimistic as measured by the insider net purchase ratio in 2006 and 2007, we find a negative association between the 2007 change in dividends and 2008 stock returns. The significance is weak for the median-split; for the tercile-split, the relation is significant at the 5% level for insider trading in 2006.[17] For banks with high managerial ownership, the association between dividend growth and future performance is insignificant. In contrast, for banks with low managerial ownership, the relation is positive and significant for the 2008 dividend growth. Interestingly, for the tercile-split, for these banks the association between the 2007 dividend growth and the 2008 stock return is negative and significant at the 5% level.

Panel M contains Chi-squared statistics for tests of coefficient equality between the coefficients estimated in the subsamples presented in Panels A-L. The null hypothesis is that the coefficient of dividend changes across the two subsamples is equal. We do not find a statistically significant difference in the relation between dividend changes and future performance for subsamples of banks associated with high or low risk shifting incentives. In some cases the difference is significant, the relation is stronger for banks for which we would have expected

[17] In Panel J, we split our sample based on net buying in 2008. In the tercile-split analysis, we find a weak association between dividend growth in 2007 and future performance in 2008, which is significant at the 10 percent level. One possible interpretation of the result is contrarian trading. Insiders increased buying activity in banks whose share price suffered after a reduction in dividends.

higher, not lower risk-shifting incentives. The only case where we find a pattern consistent with risk shifting is for the subsample split based on insider trading in 2007. Banks with low insider net buying have a significantly more negative relation between dividend changes and future performance in 2007 than banks with high insider net buying. We take a closer look at insider trading and payout policy in the next section.

5.3. Insider trading and payout policy

In this section, we expand our analysis of the relation between insider trading and the change in dividend policy. We split banks into three groups and show insider-trading measures for these groups. The first group consists of banks that decrease dividends, the second group consists of banks that increase dividends, and the third group consists of banks that do not change dividends. The idea behind this analysis is that insiders who anticipate poor performance of their bank sell their shares. (See, for example, Cohen et al. (2012) for insider trading in general or Cziraki (2017) for insider trading at banks during the crisis.)

We rely on prior literature to select variables that measure whether insiders are buying or selling. In addition to the variable *NPR count* used in the previous section, we now also use *NPR volume*, which 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 the ratio of insiders who buy more shares than they sell to the number of all insiders (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 may 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 de-mean values by taking the time-series average of the variable for each bank during the pre-crisis period 1995-2006 and subtract this average from each of the observations.

– Insert Table 8 here –

Table 8 shows the averages of the (de-meaned) insider net buying measures for each of the three groups of banks around the crisis. There is no significant difference between the three groups in 2006. In contrast, for 2007 to 2009, we find significant differences in the three insider-trading measures between the three groups. In 2007, all three insider net buying measures are significantly higher for banks that keep their dividends constant than for banks in the other two groups. Looking at dividend-increasing banks, insider net buying is significantly lower according to *NPR count*, but the relation is ambiguous for the other two measures in 2007. In 2008, comparing each group with the two other groups again, all three insider net buying measures are significantly higher for dividend-decreasing banks and significantly lower for dividend-increasing banks.

– Insert Figure 7 here –

In Figure 7, we plot the *NPR volume* for the three types of banks for the period from 2000 to 2012 and then disaggregate these results by TARP status. The top figure shows that the insider trading at the three groups of banks is very similar between 2002 and 2006. In 2007, insider net buying increases at banks that do not change their dividends. Even more striking is the jump in insider net buying at banks that decrease dividends in 2008. Finally, insider net buying at dividend-increasing banks is generally lower than in the other two groups (it is slightly higher in 2007 than at dividend-decreasing banks). However, looking at the time-series, insiders at dividend-increasing banks buy more (sell less) shares in 2007 or 2008 than in previous years.

The result in Table 8 that dividend-decreasing banks have higher insider net buying in 2008 may stem from low levels of insider net buying in the other two groups of banks. One explanation for the large increase in insider net buying in banks that kept dividends constant in 2007 and in dividend-decreasing banks in 2008 is contrarian trading. Banks that did not increase dividends in 2007 or reduce dividends in 2008 may have had low stock prices, so that insiders expected prices to increase (see e.g. Jenter (2005) and Piotroski and Roulstone (2006)). Consistent with this idea, Figure 6 shows that larger decreases in dividends are associated with larger decreases in stock prices 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 (2017)).

6. Conclusion

We provide a systematic study of the payout behavior of U.S. banks around 2007-2008, to understand the possible motives and drivers of banks' payout policy at the beginning of the financial crisis, which regulators criticized (Rosengren (2010), US Treasury (2010)). Overall, while banks may have decreased their payouts too little, and too late, we do not find evidence that they used their payout policy to engage in a deliberate wealth transfer as a response to the crisis, or betting on bailouts.

We employ standard models of dividend policy and use the prediction from these models as a reference to determine whether banks altered their payout behavior in an unusual way during the crisis. In 2007, the average bank paid out high dividends relative to normal times, controlling for fundamentals. Including share repurchases does not alter this conclusion. In 2008, dividends

of the average bank did not look abnormally high, controlling for fundamentals. However, the average bank reduced share repurchases significantly, which decreased total payouts below the amount predicted by our model. We would not expect such a drop if banks' main motive was to transfer funds to shareholders.

We find substantial heterogeneity among banks in response to the unfolding crisis. However, there is little evidence that points directly to risk shifting as an underlying motive. At the same time, our study also provides mixed evidence on signaling through dividend changes for banks in 2007 and 2008.

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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.

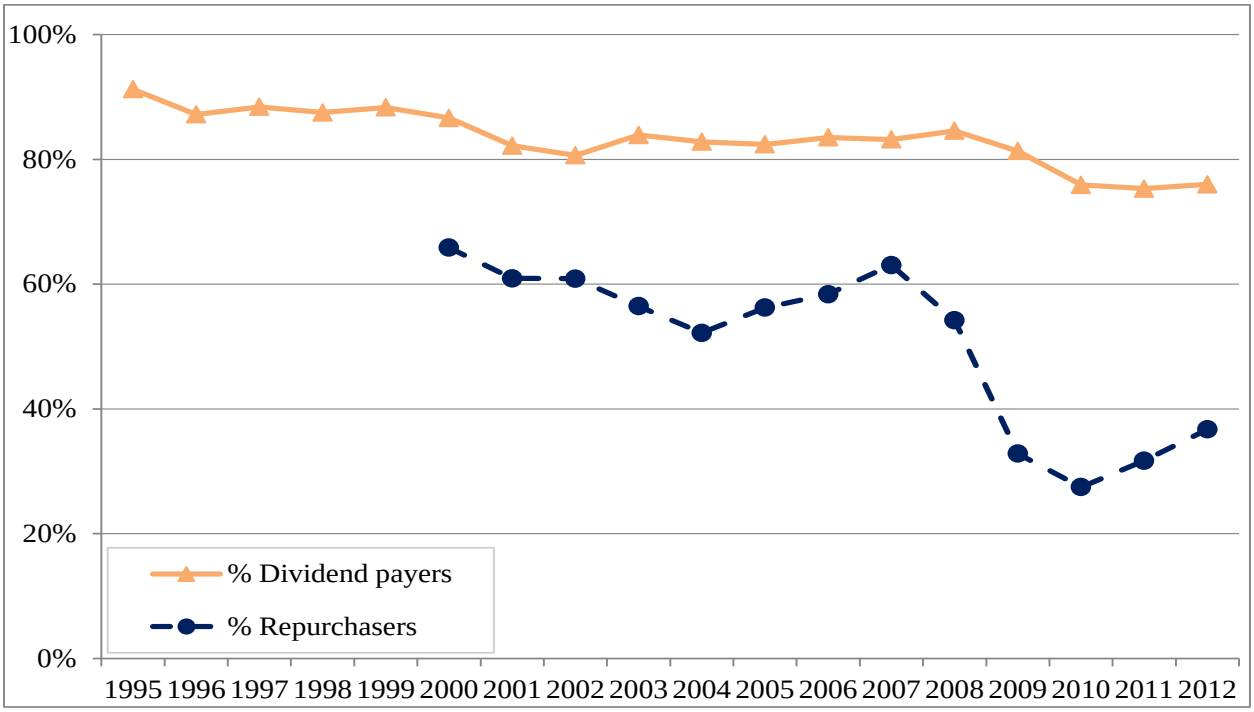


Figure 2: The level of bank payouts over time

Dividend measures for our sample banks over time. The graphs show the average dividends to book equity (rectangles), dividend yield (triangles) and total payout yield (circles) for our sample banks over time. Total payout yield is defined as dividends plus repurchases divided by market capitalization. The data on dividends span 1995-2012, and the data on total payout span 2000-2012.

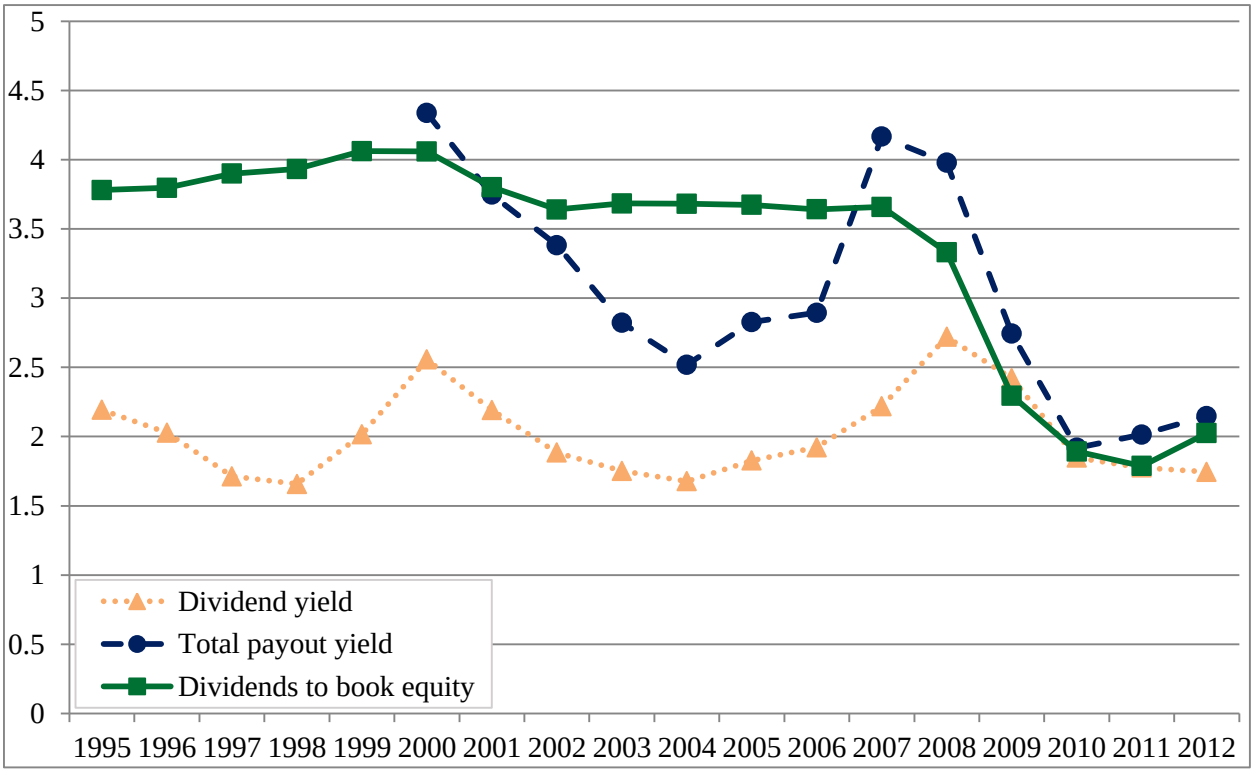
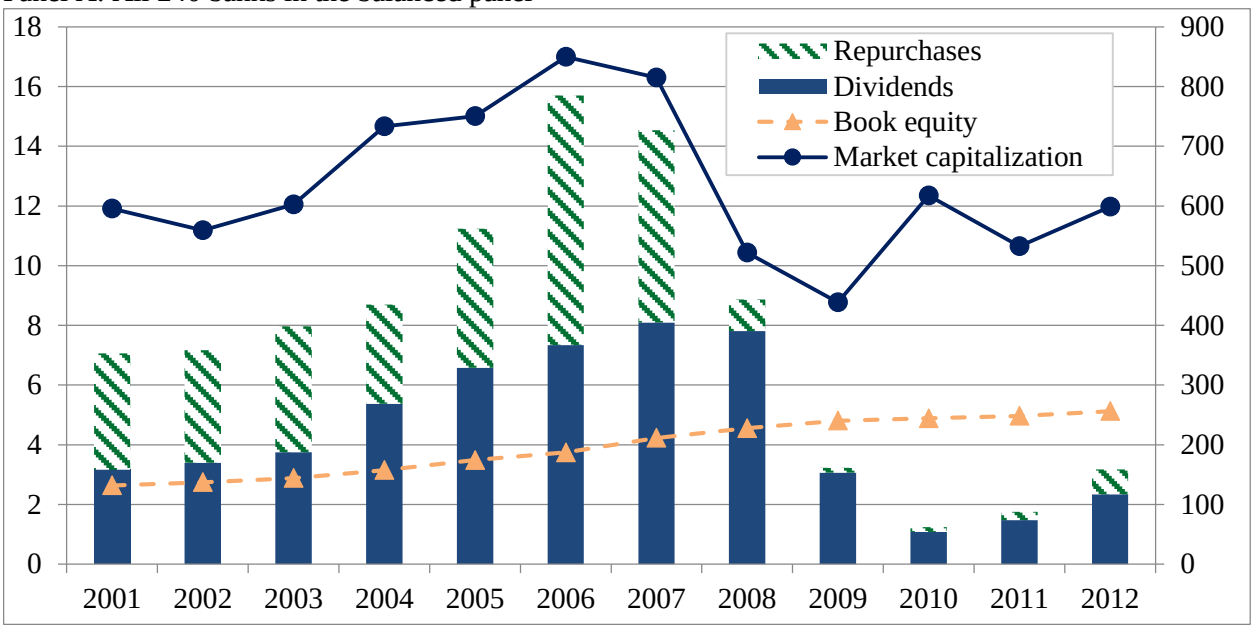


Figure 3: The dynamics of bank payouts over time in a balanced panel

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 repurchases is measured in billions on the left vertical axis. The lines show how the book equity 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, 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)

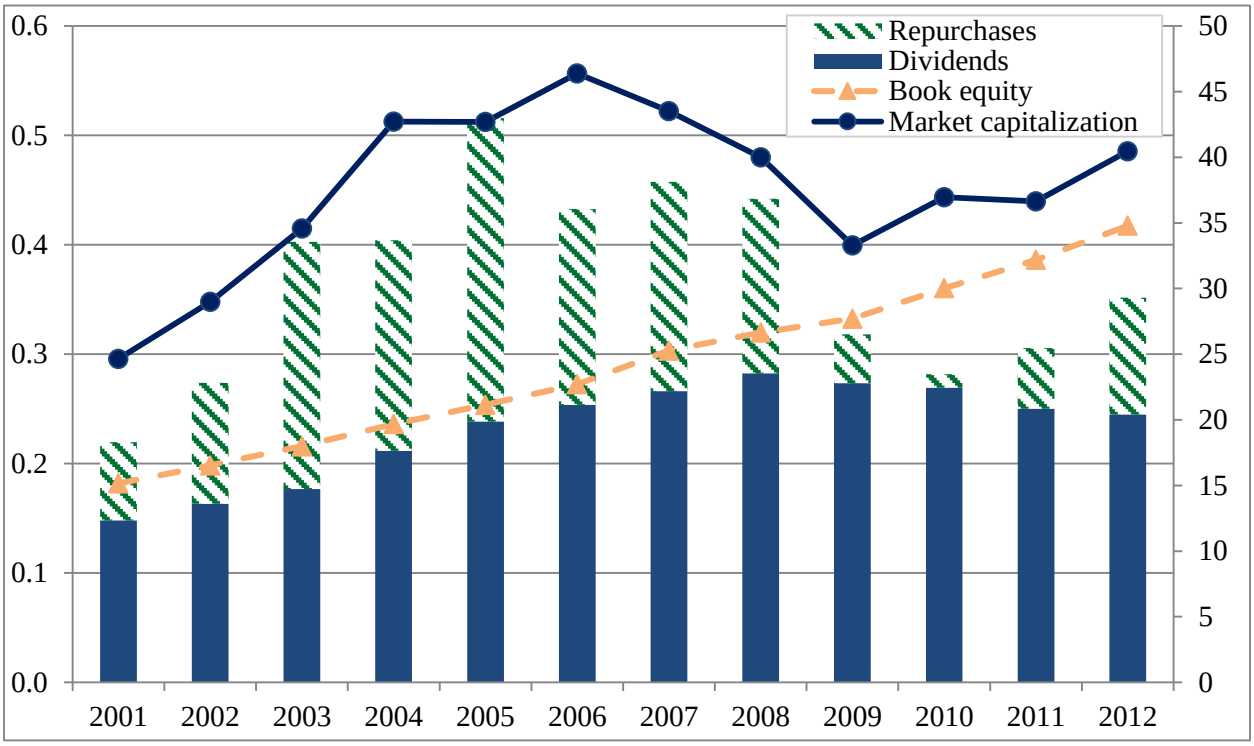


Figure 3 – continued

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

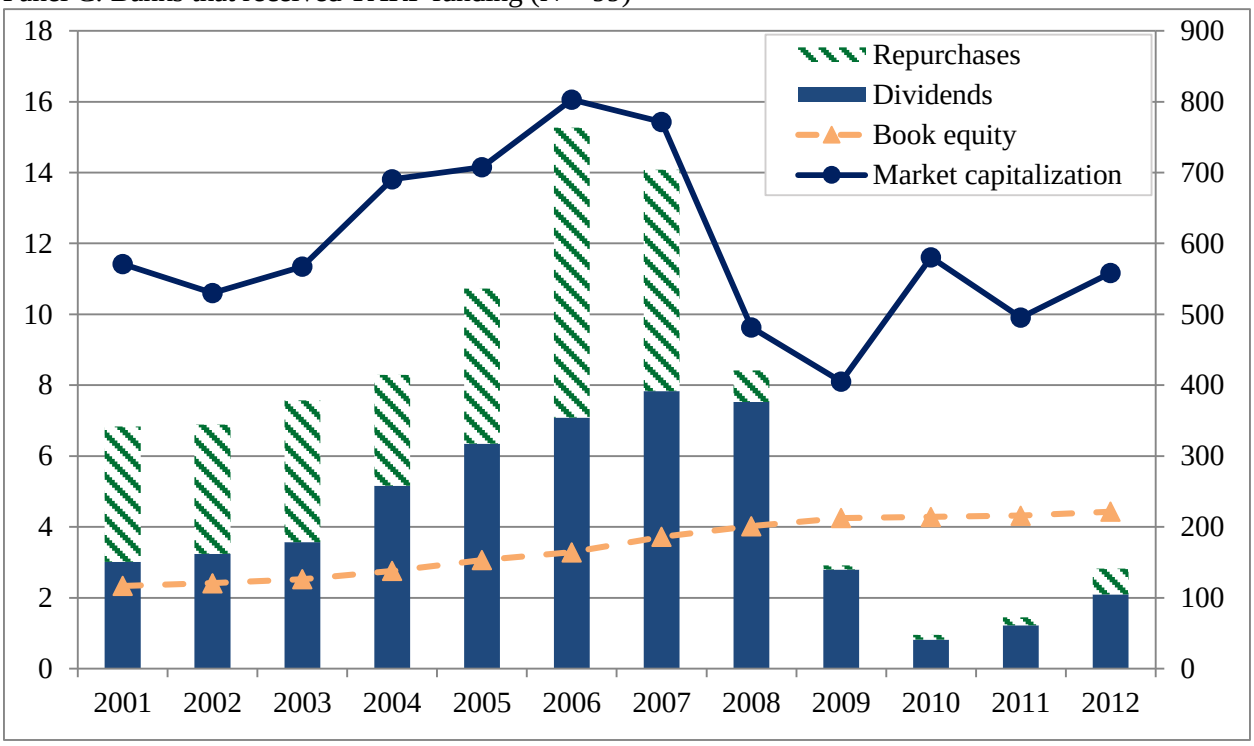


Figure 4: Changes in dividends over time

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 not having TARP funding if it does not hold TARP funds in a given year, i.e. has either not received any TARP funding, or has repaid it in full. Dividend data are available for 1995-2012, so 1996 is the first year in which we calculate dividend changes.

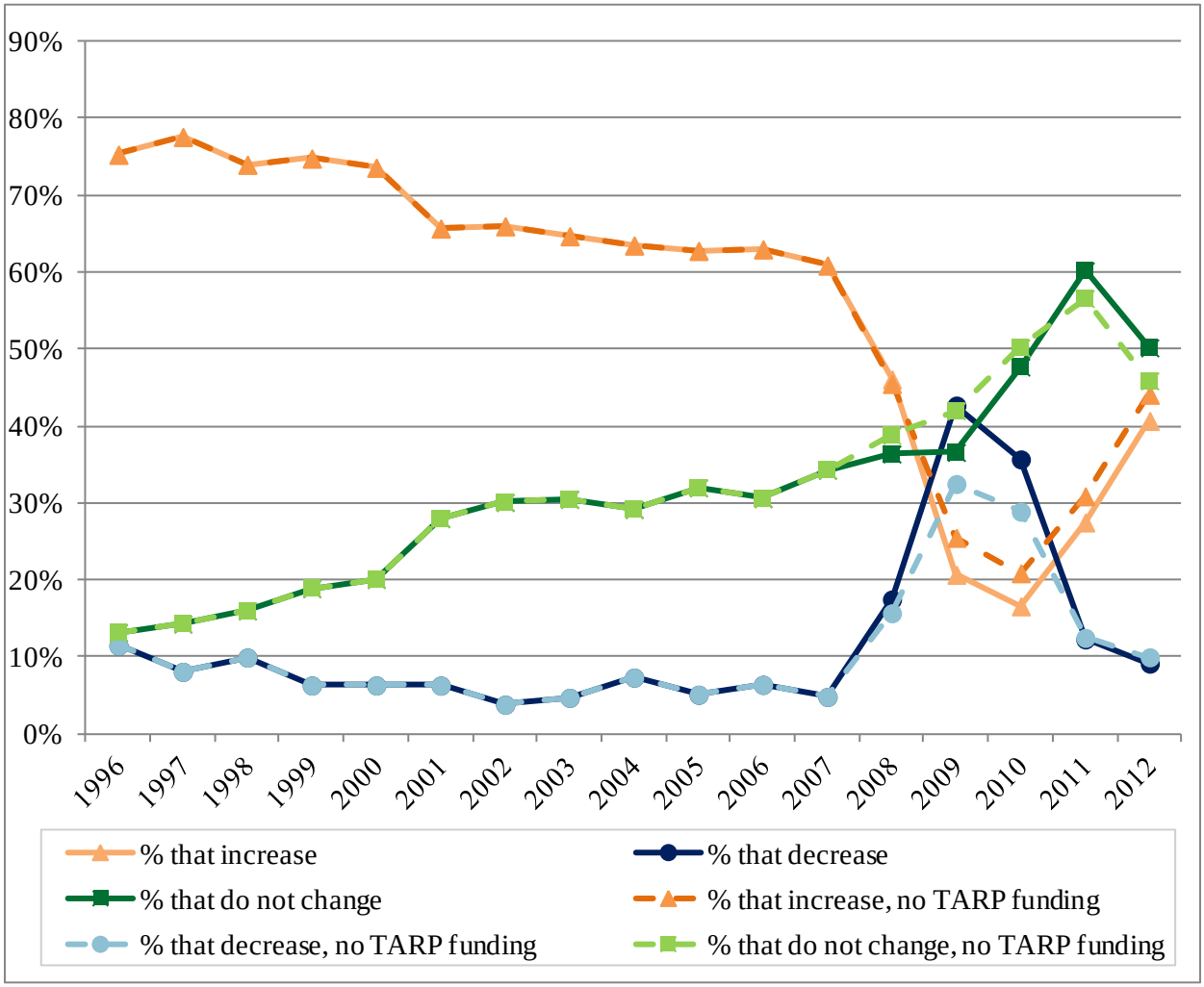


Figure 5: Dividend behavior of banks with negative earnings

The figure shows the dividend adjustments of banks with negative net income. It shows the percentage of banks with negative net income relative to all banks. Among these banks, we distinguish banks that increased, decreased, or kept their dividends constant. The latter group includes banks that do not pay dividends and continue to do so. 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.

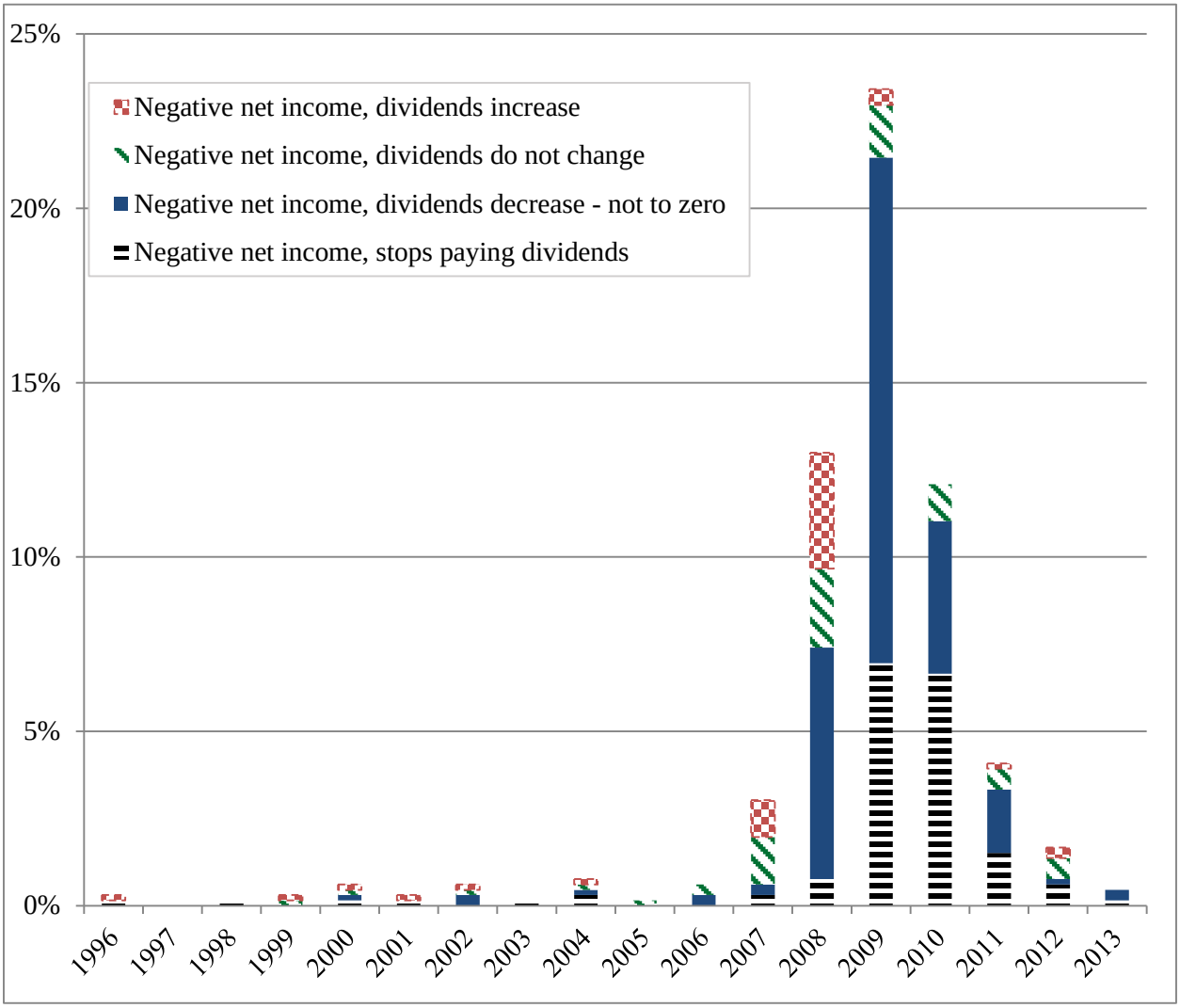
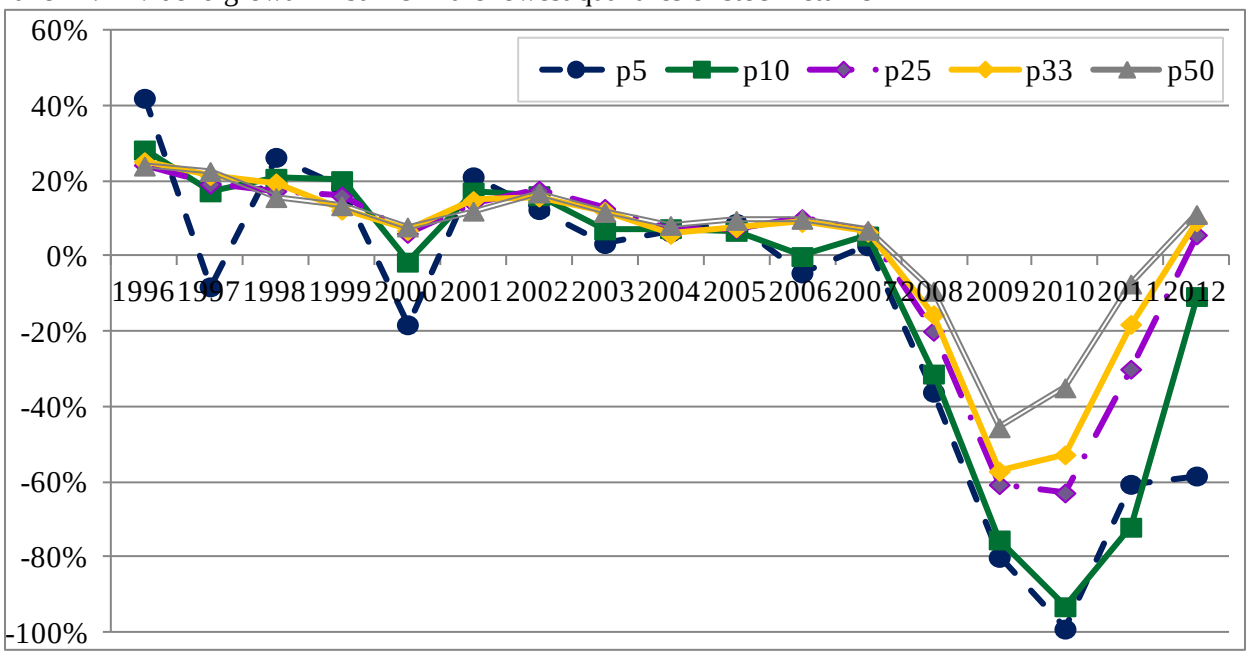


Figure 6: Dividend growth of poorly performing banks over time

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 by 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)

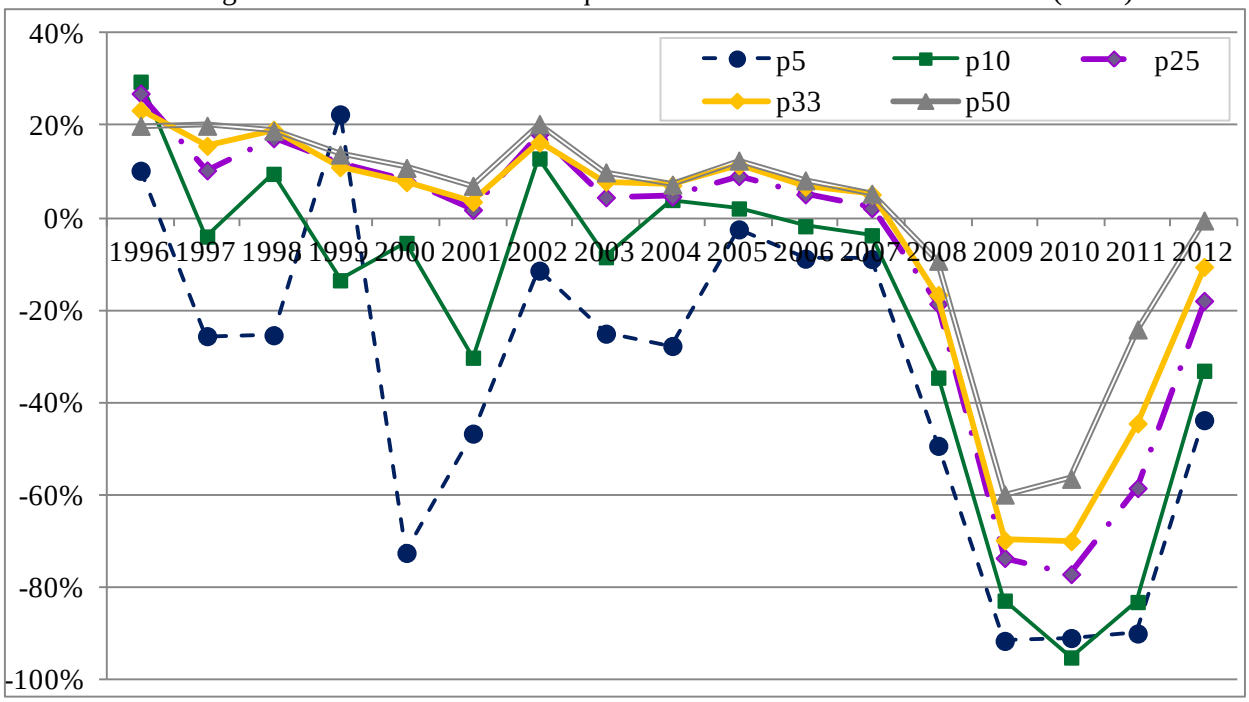


Figure 7: Insider trading and changes in bank dividends

The graphs show *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 figures show the demeaned *NPR volume*, which we obtain by subtracting the bank-level average, calculated during the pre-crisis period of 1995-2006. 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.

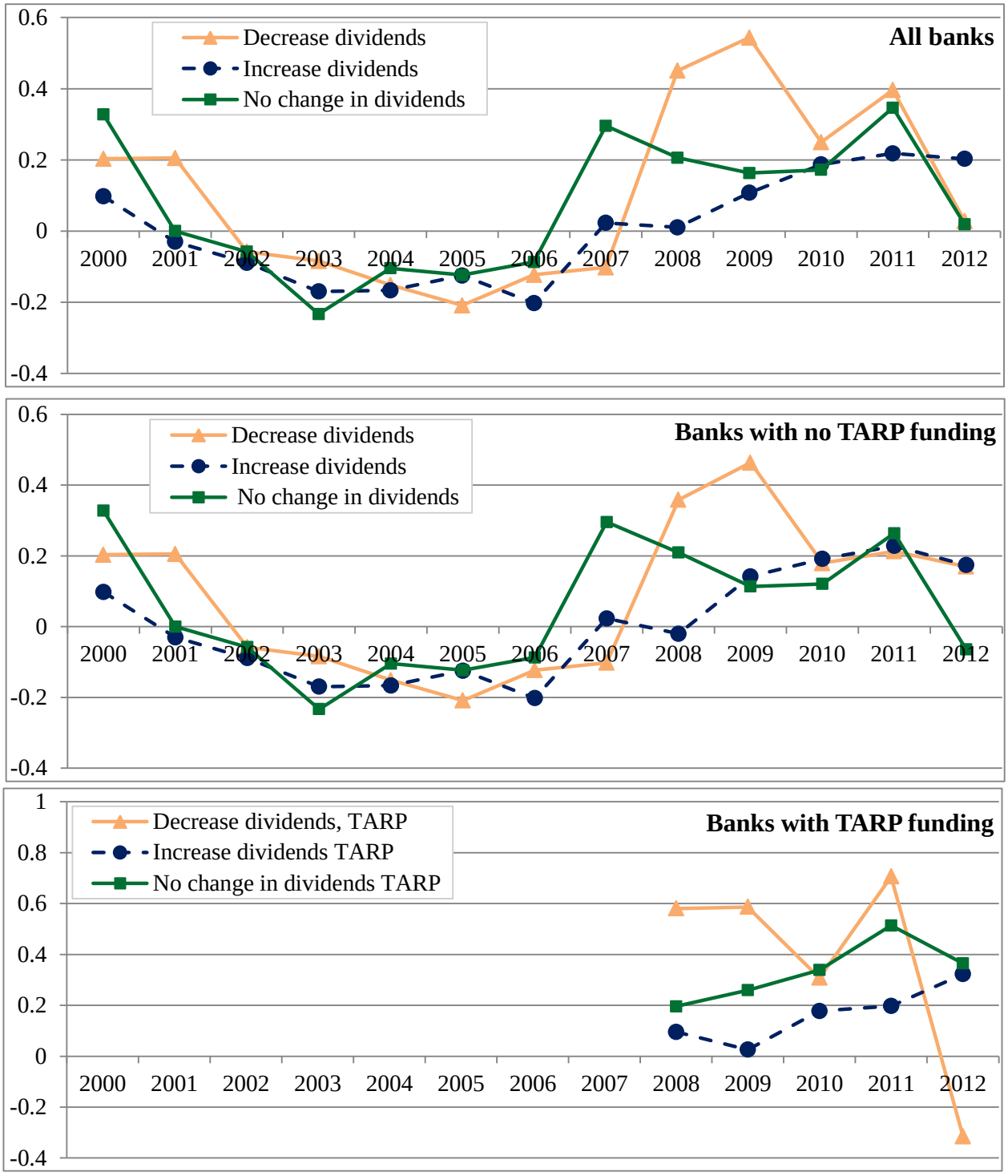


Table 1: Sample descriptives

Summary statistics for the sample of banks used in the analysis. 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. Panel B shows descriptive statistics of the variables used in the empirical analysis. We show observation numbers for the period 1995-2012. In all other panels, the data span 1995-2008 for dividends, and 1994-2007 for the explanatory variables, and 1994-2009 for stock returns and ROA as some regressions use lagged control variables, and forward looking ROA and stock returns.

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

	Data on dividends	Data on repurchases
1995	236	2
1996	272	3
1997	312	4
1998	336	10
1999	364	60
2000	398	379
2001	469	407
2002	572	462
2003	613	489
2004	645	520
2005	656	527
2006	662	526
2007	662	532
2008	662	519
2009	662	521
2010	661	524
2011	658	520
2012	656	502

Table 1 – continued

Panel B: Summary statistics of key variables used in the regressions

Variable	Mean	Median	Standard Deviation	Minimum	Maximum	N
Dividend payer dummy	0.95	1.00	0.22	0.00	1.00	3,944
Dividend per share	0.85	0.51	1.40	0.00	9.00	3,944
Dividend yield (%)	2.58	2.55	1.29	0.00	6.09	3,944
Dividends to book value (%)	4.54	4.37	2.41	0.00	11.45	3,944
Dividend growth	0.27	0.08	3.23	-1.00	199.00	3,708
Repurchase dummy	0.65	1.00	0.48	0.00	1.00	2,859
Total payout dummy	0.96	1.00	0.18	0.00	1.00	2,859
Total payout per share	1.29	0.74	2.01	0.00	12.60	2,859
Total payout yield (%)	3.89	3.48	2.57	0.00	13	2,859
Total assets (in millions)	15,374	653	110,379	48	2,196,781	3,944
Log total assets	20.74	20.30	1.67	17.68	28.42	3,944
Market to book ratio	1.77	1.66	0.70	0.28	7.16	3,944
ROA (%)	0.96	1.05	0.64	-4.10	2.33	4,394
Earnings volatility	0.58	0.36	0.68	0.00	8.29	3,708
Leverage	8.27	7.02	5.77	2.45	177.89	3,944
Total asset growth	0.10	0.07	0.13	-0.42	3.37	3,708
Liquidity ratio	0.28	0.27	0.12	0.01	0.78	3,944
Institutional ownership	0.13	0.03	0.19	0.00	1.00	3,944
Retained earnings to total equity	0.59	0.63	0.29	-0.86	2.57	3,944
Risk-weighted capital ratio (%)	14.40	13.44	3.76	8.61	39.60	3,944
Deposits over total assets	0.78	0.79	0.09	0.23	0.94	3,944
Short-term to total liabilities	0.05	0.03	0.06	0.00	0.68	3,944
Interest to noninterest income	7.75	6.29	5.79	0.70	50.80	3,944
Fed funds rate (%)	3.55	3.50	1.76	1.06	6.38	3,944
Net interest paid of Fed funds and repos	0.64	0.08	2.25	-20.24	31.37	3,944
Stock return	0.04	0.02	0.30	-0.74	1.12	4,394

Table 2: What determines the level of payouts?

Fixed-effects panel regressions of dividends and total payout on bank fundamentals. Independent variables are defined in Table 1. The dependent variable is dividend per share in column 1, dividend yield in column 2, total payout (dividends + repurchases) per share 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 heteroskedascity-robust standard errors, clustered at the bank level. *, **, and *** indicate that the coefficient is statistically significant at the 10%, 5%, and 1% level.

	Dividend per share	Dividend yield	Total payout per share	Total payout yield
Sample period	1995-2006	1995-2006	2000-2006	2000-2006
Log total assets	0.4724***	0.3987***	0.6573***	0.0695
	(5.104)	(4.545)	(3.585)	(0.203)
Market to book ratio	0.0078		-0.0431	
	(0.260)		(-0.706)	
Lag ROA	0.2234***	0.3619***	0.2481*	0.2710
	(2.710)	(3.246)	(1.942)	(1.032)
ROA	0.0141	-0.2115***	0.0746	-0.3118*
	(0.473)	(-3.188)	(1.360)	(-1.885)
Earnings volatility	-0.0022	-0.1633***	-0.0921***	-0.3894***
	(-0.081)	(-3.799)	(-2.778)	(-3.391)
Leverage	-0.0090	0.0816***	-0.0218*	0.0124
	(-1.305)	(5.195)	(-1.725)	(0.440)
Total asset growth (% year-on-year)	0.1589	-0.0713	-0.3023	-2.2633***
	(1.291)	(-0.482)	(-1.493)	(-4.479)
Liquidity ratio	-0.1334	0.3469	-0.5312	-0.3920
	(-0.725)	(1.058)	(-1.163)	(-0.275)
Institutional ownership	-0.0722	0.0595	-0.0538	-0.4487
	(-0.250)	(0.216)	(-0.081)	(-0.474)
Retained earnings to total equity	0.2606	0.0952	0.2806	-1.6959
	(1.616)	(0.478)	(0.636)	(-1.508)
Risk-weighted capital ratio	-0.0004	0.0089	0.0348**	0.2577***
	(-0.070)	(0.800)	(2.137)	(4.055)
Deposits over total assets	-0.4585	-1.9677***	-0.1028	-1.1250
	(-0.928)	(-2.624)	(-0.119)	(-0.472)
Short term to total assets	-0.6110	0.5147	-0.2815	-0.1912
	(-1.586)	(0.919)	(-0.508)	(-0.106)
Interest to non-interest income	-0.0000	-0.0058	-0.0055	-0.0251
	(-0.002)	(-0.730)	(-1.024)	(-1.257)
Fed funds rate	-0.0056	0.0605***	0.0215	0.2462***
	(-0.599)	(3.941)	(1.383)	(5.629)
Net interest paid on Fed funds and repos	-0.0050	-0.0260*	-0.0338**	-0.0763
	(-0.386)	(-1.866)	(-2.314)	(-1.508)
Observations	3,128	3,128	2,178	2,178
R^2	18.40%	11.80%	9.70%	10.30%
Bank FE	Yes	Yes	Yes	Yes

Table 3: Abnormal payouts predicted out of sample for the crisis

The table shows the average out-of-sample residuals based on the regressions for yearly data shown in Table 2. 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 2, based on the coefficients estimated for 1995-2006 for dividends and 2000-2006 for total payout. T-tests are shown below the point estimates in parentheses. *% of one standard deviation* is the average residual divided by the standard deviation of the corresponding variable (shown in Table 1, Panel B) multiplied by 100. *, **, and *** indicate that the estimate is significantly different from 0 at the 10%, 5%, and 1% level.

	Dividend per share		Dividend yield		Total payout per share		Total payout yield	
Year	2007	2008	2007	2008	2007	2008	2007	2008
Average residual	0.0690**	0.0362	0.1434***	0.7684***	0.3309***	-0.0787**	0.8694***	0.7853***
T-test	(2.521)	(1.224)	(3.372)	(8.628)	(4.905)	(-2.144)	(6.077)	(5.216)
% of one std. dev.	0.0507	0.0266	0.1010	0.5411	0.1697	-0.0404	0.3318	0.2990
Observations	414	402	414	402	348	333	348	333

Table 4: The market reaction to announcements of dividend changes and repurchases

Cumulative abnormal returns (CARs) following announcements of dividend decreases and dividend increases. Panel A shows CARs measured from the day of the announcement (day 0) to the 3rd day after. Panel B shows CARs measured from 3 days before the announcement to 3 days after, and Panel C shows CARs measured from 5 days before the announcement to 5 days after. We discard dividend change and repurchase announcements that occur on the same day as earnings announcements. 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.

	Dividend decreases		Dividend increases		Repurchases	
Panel A: CAR(0,3)						
Year	CAR(0,3)	N	CAR(0,3)	N	CAR(0,3)	N
Full sample	-0.28***	568	0.44***	3,137	1.28***	665
1995 – 2006	0.06	298	0.49***	2,419	1.43***	523
2007 – 2008	0.33	72	0.37**	348	0.62*	89
2009 – 2012	-1.02***	198	0.25	370	0.91	53
Panel B: CAR(3,3)						
Year	CAR(3,3)	N	CAR(3,3)	N	CAR(3,3)	N
Full sample	-0.54**	568	0.40***	3,137	1.25***	665
1995 – 2006	0.31	298	0.47***	2,419	1.47***	523
2007 – 2008	-0.23	72	-0.04	348	0.18	89
2009 – 2012	-1.92***	198	0.42*	370	0.86	53
Panel C: CAR(5,5)						
Year	CAR(5,5)	N	CAR(5,5)	N	CAR(5,5)	N
Full sample	-0.63**	568	0.54***	3,137	1.25***	665
1995 – 2006	0.03	298	0.59***	2,419	1.37***	523
2007 – 2008	0.99	72	0.10	348	0.95	89
2009 – 2012	-2.21***	198	0.62**	370	0.54	53

Table 5: Dividend growth and future performance

OLS regressions of one-year-ahead 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 period *t+1*. Independent variables include dividend growth in year (quarter) *t*, period dummies, and the control variables from Table 2. 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 1996-2008 with respect to dividend changes. *Year 2007* and *Year 2008* are dummy variables indicating that the dividend growth is measured in 2007 and 2008, respectively. Underneath each coefficient we show t-statistics that are based on heteroskedascity-robust standard errors, clustered at the bank level. *, **, and *** indicate that the coefficient is statistically significant at the 10%, 5%, and 1% level.

Panel A: Percentage growth in dividends

	Future Returns		Future ROA	
	(1)	(2)	(3)	(4)
Dividend growth	0.0648***	0.0430**	0.1825***	0.0254
	(2.689)	(2.168)	(5.309)	(1.044)
Dividend growth × Year2007	-0.0788	-0.0800	-0.0550	-0.1164
	(-1.450)	(-1.430)	(-0.404)	(-1.002)
Dividend growth × Year2008	0.1717***	0.0364	1.3421***	0.5215***
	(2.838)	(0.648)	(5.595)	(3.120)
Year2007	-0.2991***	-0.2545***	-0.6522***	-0.4765***
	(-19.628)	(-15.155)	(-15.361)	(-12.621)
Year2008	-0.2238***	-0.1699***	-0.9556***	-0.4287***
	(-10.551)	(-7.962)	(-19.773)	(-10.965)
Controls	No	Yes	No	Yes
Observations	3,670	3,670	3,758	3,669
Adjusted R^2	13%	23%	32%	62%

Panel B: Dividend decrease dummy

	Future Returns		Future ROA	
	(1)	(2)	(3)	(4)
Dividend decrease dummy	0.0226	0.0107	-0.1823***	-0.0114
	(0.755)	(0.461)	(-4.132)	(-0.433)
Dividend decrease dummy × Year2007	-0.0836	-0.0722	0.1067	-0.0016
	(-1.389)	(-1.246)	(0.577)	(-0.012)
Dividend decrease dummy × Year2008	-0.1676***	-0.0414	-0.7674***	-0.2994**
	(-3.265)	(-0.848)	(-4.856)	(-2.547)
Year2007	-0.3053***	-0.2601***	-0.6774***	-0.4895***
	(-21.447)	(-16.568)	(-17.002)	(-13.509)
Year2008	-0.2036***	-0.1679***	-0.8092***	-0.3739***
	(-8.277)	(-7.343)	(-18.111)	(-9.132)
Controls	No	Yes	No	Yes
Observations	3,670	3,670	3,758	3,669
Adjusted R^2	13%	23%	32%	62%

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

OLS regressions of future stock returns and future operating performance on payout growth. The dependent variable is indicated in the column heading. Panel A (Panel C) uses the percentage change in dividends (total payout) per share to measure dividend growth. Panel B (Panel D) includes two dummy variables, one for an increase and one for a decrease in dividends (total payout). Columns 1, 3, 5, and 7 examine the relation between dividend (total payout) growth in 2007 and returns (ROA) in 2008. Columns 2, 4, 6, and 8 examine the relation between dividend (total payout) growth in 2008 and returns (ROA) in 2009. We use the same control variables as in Table 2. These control variables are defined in Table 1 and 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. Underneath each coefficient we show t-statistics based on heteroskedascity-robust standard errors. *, **, and *** indicate that the coefficient is statistically significant at the 10%, 5% and 1% level.

	Future returns		Future ROA		Future Returns		Future ROA	
Payout growth measured in	2007	2008	2007	2008	2007	2008	2007	2008
Controls	No	No	No	No	Yes	Yes	Yes	Yes
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Continuous measure of dividend growth								
Dividend growth	-0.0140	0.2365***	0.2064	1.8575***	-0.0347	0.1200*	0.1042	0.8517***
	(-0.285)	(4.123)	(1.292)	(5.964)	(-0.711)	(1.670)	(0.553)	(3.478)
Observations	424	418	424	418	424	418	424	418
Panel B: Dividend increases vs. decreases								
Dividend decrease	-0.0113	-0.1738**	0.1483	-1.0455***	-0.0466	-0.0883	-0.3002	-0.5781***
	(-0.187)	(-2.083)	(0.495)	(-4.652)	(-0.847)	(-1.047)	(-1.323)	(-3.101)
Dividend increase	0.0615*	-0.0390	0.2600	0.2083*	0.0176	-0.0386	-0.1652	-0.0680
	(1.732)	(-0.501)	(1.529)	(1.747)	(0.507)	(-0.691)	(-1.071)	(-0.624)
Observations	424	418	424	418	424	418	424	418
Panel C: Continuous measure of total payout growth								
Total payout growth	-0.0084	0.0406	-0.0280	0.5072***	-0.0127	-0.0084	0.0327	0.2109*
	(-0.353)	(1.208)	(-0.228)	(3.231)	(-0.545)	(-0.253)	(0.353)	(1.667)
Observations	356	356	356	356	356	356	356	356
Panel D: Total payout increases vs. decreases								
Total payout growth decrease	-0.0875	-0.0086	0.0538	-0.3408	-0.0960	-0.0067	-0.2713	-0.3232**
	(-1.270)	(-0.115)	(0.134)	(-1.633)	(-1.570)	(-0.089)	(-0.864)	(-1.972)
Total payout growth increase	-0.0329	0.0204	0.2694	0.1053	-0.0787	-0.0123	-0.1664	-0.0952
	(-0.504)	(0.267)	(0.753)	(0.508)	(-1.365)	(-0.162)	(-0.599)	(-0.627)
Observations	356	356	356	356	356	356	356	356

Table 7: Dividend growth and crisis performance – subsample analysis

This table summarizes the results of OLS regressions of future stock returns and future operating performance on dividend growth. The dependent variable is indicated in the column heading. Each panel repeats the regressions of Table 6 columns 5-8 in subsamples of banks as indicated in the column title. For continuous variables, we split banks into below and above the median to form groups. *Regulatory capital* (Panel A) is measured using the risk-weighted capital ratio in 2006. *Size* (Panel B) is measured using total assets in 2006. *Participation in TARP* (Panel C) captures whether a bank received funding from TARP. *Mortgages to total loans* (Panel D) is the total dollar value of mortgages divided by the total dollar value of loans, averaged over the pre-crisis period 2004-2006. *Approved to total mortgages* (Panel E) is the total value of mortgages approved during 2004-2006 divided by the total value of loan applications during the same period. Information on mortgages is from the HMDA database. *Analyst coverage* (Panel F) indicates whether the bank has any security analysts covering it in 2006. Information on analyst coverage comes from I/B/E/S. *Managerial ownership* (Panel G) is calculated as the number of shares owned by managers divided by the total number of shares outstanding in 2006. Data on managerial ownership are from SNL. *Equity issuance* (Panel H) refers to whether the bank issues common equity unrelated to TARP in 2007-2008. *Insider net buying* (Panels I-L) is measured using the net purchase ratio calculated based on the number of shares bought and sold by insiders as $\frac{number\ of\ shares\ purchased - number\ of\ shares\ sold}{number\ of\ shares\ purchased + number\ of\ shares\ sold}$. This measure is demeaned by subtracting the bank-level average, calculated during the pre-crisis period of 1995-2006. All regressions use the same control variables as in Table 2. These control variables are defined in Table 1 and are lagged one year with respect to dividend growth, i.e. are measured in year *t-1*. Underneath each coefficient we show t-statistics based on heteroskedascity-robust standard errors. Panel M presents Chi-squared statistics and shows statistical significance for tests of coefficient equality between the coefficients estimated in the subsamples presented in Panels A-L. The null hypothesis is that in a regression of future returns (future ROA) on dividend changes and control variables the point estimate of the coefficient of dividend changes across the two subsamples is equal. *, **, and *** indicate that the difference is statistically significant at the 10%, 5%, and 1% significance level.

	Future Returns		Future ROA		Future Returns		Future ROA	
Covariates measured in	2007	2008	2007	2008	2007	2008	2007	2008
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Panel A: Regulatory capital								
	Low regulatory capital				High regulatory capital			
Dividend growth	-0.1016	0.1593	-0.0579	0.7806*	0.0291	0.0915	0.2403	0.9337***
	(-1.184)	(0.933)	(-0.137)	(1.888)	(0.495)	(1.286)	(1.228)	(2.651)
Panel B: Size								
	Small banks				Large banks			
Dividend growth	-0.0093	0.0945	0.0632	0.5941**	-0.0551	0.1259	0.3438	1.3253**
	(-0.161)	(1.156)	(0.308)	(2.379)	(-0.608)	(1.160)	(1.079)	(2.574)
Panel C: Participation in TARP								
	Non-TARP (N = 290)				TARP (N = 134)			
Dividend growth	-0.0130	0.0962	0.2232	0.3970*	-0.0769	0.2240**	0.4464	1.7271**
	(-0.270)	(1.227)	(0.955)	(1.744)	(-0.447)	(2.192)	(0.581)	(2.544)
Panel D: Mortgages to total loans								
	Low share of mortgages				High share of mortgages			
Dividend growth	-0.0832	0.1018	0.4096	0.1656	-0.0631	0.1957*	0.2578	1.5086**
	(-0.957)	(0.498)	(0.941)	(0.355)	(-0.704)	(1.686)	(0.712)	(2.527)
Panel E: Approved to total mortgages (value)								
	Low percentage of mortgages approved				High percentage of mortgages approved			
Dividend growth	-0.1296*	0.2370*	0.7373	0.7853**	-0.0549	0.0601	0.0484	1.2728
	(-1.745)	(1.797)	(1.280)	(2.391)	(-0.661)	(0.471)	(0.166)	(1.501)

Table 7 – continued

Panel F: Analyst coverage								
	Not covered by analysts (N = 260)				Covered by analysts (N = 164)			
Dividend growth	-0.0107	0.1354*	0.1618	0.7432***	-0.1663	0.0843	0.0792	1.1065*
	(-0.213)	(1.702)	(0.666)	(2.873)	(-1.081)	(0.525)	(0.171)	(1.688)
Panel G: Managerial ownership								
	Low managerial ownership				High managerial ownership			
Dividend growth	-0.1006	0.2360*	0.9590	2.0549***	0.0017	0.0472	0.2456	1.0009
	(-0.881)	(1.735)	(1.157)	(2.876)	(0.019)	(0.318)	(0.751)	(1.504)
Panel H: Equity issuance in 2007-2008								
	Does not issue equity (N = 384)				Issues equity (N = 40)			
Dividend growth	-0.0181	0.1019	0.1075	0.7499**	-0.7583**	0.0537	2.4769	0.8744
	(-0.354)	(1.480)	(0.709)	(2.560)	(-2.659)	(0.201)	(0.518)	(0.997)
Panel I: Insider trading in 2006								
	Low insider net buying				High insider net buying			
Dividend growth	-0.2115*	0.5482	0.3125	1.0863*	0.0150	0.0077	-0.2035	1.2406*
	(-1.811)	(1.270)	(0.530)	(1.800)	(0.139)	(0.051)	(-0.935)	(1.742)
Panel J: Insider trading in 2007								
	Low insider net buying				High insider net buying			
Dividend growth	-0.2198*	0.0543	-0.3554	0.5267	0.1923*	0.3632**	1.0053*	1.5598**
	(-1.823)	(0.352)	(-0.818)	(0.883)	(1.957)	(2.268)	(1.753)	(2.327)
Panel K: Insider trading in 2008								
	Low insider net buying				High insider net buying			
Dividend growth	-0.0419	0.1830	0.3351	0.4843	0.0340	-0.0370	0.5156	1.8453
	(-0.146)	(1.106)	(0.852)	(1.067)	(0.377)	(-0.140)	(1.018)	(1.589)
Panel L: Insider trading 2006-2008								
	Low insider net buying				High insider net buying			
Dividend growth	-0.0831	1.0347	0.1331	0.7873	-0.0003	0.2632	-0.0328	0.8568
	(-0.363)	(1.478)	(0.290)	(1.254)	(-0.004)	(1.432)	(-0.137)	(1.359)

Table 7 – continued

Panel M: Tests for differences in regression coefficients between the subsamples in Panels A-L

	Future Returns		Future ROA	
Covariates measured in	2007	2008	2007	2008
Controls	Yes	Yes	Yes	Yes
Panel A: Regulatory capital	1.71	0.15	0.44	0.09
Panel B: Size	0.20	0.06	0.59	1.77
Panel C: Participation in TARP	0.05	0.12	0.07	4.95**
Panel D: Mortgages to total loans	0.03	0.18	0.08	3.50*
Panel E: Approved to total mortgages (value)	0.5	1.04	1.26	0.32
Panel F: Analyst coverage	1.17	0.00	0.10	0.54
Panel G: Managerial ownership	0.54	0.99	0.72	1.31
Panel H: Equity issuance in 2007-2008	10.27***	0.13	1.03	0.01
Panel I: Insider trading in 2006	2.30	1.58	0.76	0.03
Panel J: Insider trading in 2007	8.56***	2.36	4.40**	1.63
Panel K: Insider trading in 2008	0.08	0.63	0.10	1.53
Panel L: Insider trading 2006-2008	0.14	1.36	0.12	0.01

Table 8: Dividend policy and insider trading during the crisis

Measures of insider trading averaged across banks grouped according to their dividend behavior in each of the years 2006-2009. *NPR count* is the net purchase ratio calculated based on the number of trades placed as $\frac{number\ of\ purchases - number\ of\ sales}{number\ of\ purchases + number\ of\ sales}$, and *NPR volume* is the net purchase ratio calculated based on the number of shares bought and sold as $\frac{number\ of\ shares\ purchased - number\ of\ shares\ sold}{number\ of\ shares\ purchased + number\ of\ shares\ sold}$. Finally, *% net buyers*, is the percentage of insiders that are net buyers of their firm's stock (i.e. buy more shares than they sell). The table 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. For each of the three insider trading measures, we use a two-sample t-test to analyze whether the insider trading measure in one group of dividend behavior is significantly different from the insider trading measure in the other two groups. *, **, and *** indicate that the insider trading measure in a given group is different from that of the other two groups at the 10%, 5%, and 1% significance level.

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*

Appendix

Table A.1: Variable definitions
This table defines the variables in our analyses and indicates their data source.

Variable	Definition	Source
Dividend payer	Dummy variable that equals 1 if a bank pays a dividend and zero otherwise	SNL Financial
Dividend per share	Cash dividends paid per common share	SNL Financial
Dividend yield	Dividend per share divided by the share price at the end of the year	SNL Financial
Dividend growth	Percentage change of dividends from one year to the next	SNL Financial
Repurchase dummy	Dummy variable that equals 1 if a bank repurchases shares and zero otherwise	SNL Financial
Total payout per share	Sum of dividends paid to common shares and repurchases divided by the number of common shares outstanding	SNL Financial
Total payout yield	Total payout per share divided by the share price at the end of the year	SNL Financial
Total assets	Value of total assets	SNL Financial
Size / log total assets	Natural logarithm of total assets	SNL Financial
Market to book ratio	Market capitalization of equity relative to book value of equity	SNL Financial
Return on assets (ROA)	Net income divided by total assets	SNL Financial
Earnings volatility	Standard deviation of quarterly ROA over the past 8 quarters (or past 4 quarters if data on the past 8 quarters is unavailable)	SNL Financial
Leverage	(Book assets – book equity + market capitalization) / (market capitalization)	SNL Financial
Total asset growth	Percentage change in the book value of total assets from one year to the next	SNL Financial
Liquidity ratio	Sum of cash and cash equivalents, securities held for trading, and securities available for sale, normalized by total assets	SNL Financial
Institutional ownership	Total ownership stake of all institutions	SNL Financial and Thomson Reuters
Retained earnings to total equity	Retained earnings divided by total book value of equity	SNL Financial

Table A.1 – continued

Risk-weighted capital ratio	Regulatory Tier 1+Tier 2 capital divided by risk-weighted assets	SNL Financial
Deposits over total assets	Ratio of total deposits to book assets	SNL Financial
Short-term to total liabilities	(Short-term borrowings + repurchase agreements)/(total liabilities)	SNL Financial
Interest to noninterest income	Ratio of interest income to noninterest income	SNL Financial
Fed funds rate	Yearly average of the Fed funds rate, based on quarterly values	Federal Reserve Bank of New York.
Net interest paid of Fed funds and repos	(Interest expense on Fed funds and repos – interest revenue on fed funds and repos)/(book assets)×1,000	SNL Financial
Stock return	Yearly return adjusted for dividends and stock splits	CRSP
NPR count	Net purchase ratio calculated based on the number of trades placed by insiders of the bank in a given year as $\frac{number\ of\ purchases - number\ of\ sales}{number\ of\ purchases + number\ of\ sales}$,	Thomson Reuters
NPR volume	Net purchase ratio calculated based on the number of shares bought and sold by insiders of the bank in a given year as $\frac{number\ of\ shares\ purchased - number\ of\ shares\ sold}{number\ of\ shares\ purchased + number\ of\ shares\ sold}$,	Thomson Reuters
% net buyers	Percentage of insiders that are net buyers of their bank's stock (i.e. buy more shares than they sell).	Thomson Reuters
Mortgages to total loans	Total dollar value of mortgages divided by the total dollar value of loans, averaged over the pre-crisis period 2004-2006.	HMDA Database
Approved to total mortgages	Total value of mortgages approved during 2004-2006 divided by the total value of loan applications during the same period.	HMDA Database
Covered by analysts	Dummy variable that equals 1 if the bank is covered by equity analysts	I/B/E/S
Managerial ownership	Number of shares owned by managers divided by the total number of shares outstanding	SNL Financial

Table A.2: Bank equity issuance and its interaction with dividend policy

Table A.2 shows the share of banks that issue common stock and preferred stock in each year from 1999-2012. We classify preferred stock issuance as related or unrelated to TARP in the years 2008 and 2009. Panel B shows the dividend behavior of banks that issue equity and contrasts it with banks that do not issue equity in each of the years 2006-2009. The top part of Panel B shows a break-down of the dividend behavior in year *t* for banks that issue (do not issue) equity in year *t*. The bottom part of Panel B shows a break-down of the dividend behavior in year *(t+1)* for banks that issue (do not issue) equity in year *t*.

Panel A: the percentage of banks issuing equity

Year	Common stock	Preferred, not TARP	Preferred, TARP
1999	0.01	0.00	
2000	0.04	0.01	
2001	0.04	0.00	
2002	0.06	0.01	
2003	0.05	0.01	
2004	0.05	0.00	
2005	0.06	0.00	
2006	0.05	0.01	
2007	0.03	0.01	
2008	0.05	0.04	0.26
2009	0.15	0.04	0.14
2010	0.15	0.04	
2011	0.09	0.03	
2012	0.07	0.09	

Table A.2 – continued

Panel B: Equity issuance and dividend policy

Same-year dividend behavior of banks that issue equity in a given year					
Year	Increase	Constant	Constant, at zero	Decrease	Decrease to zero
2006	0.43	0.57	0.47	0.00	0.00
2007	0.33	0.56	0.28	0.11	0.11
2008	0.36	0.50	0.29	0.14	0.14
2009	0.11	0.58	0.42	0.31	0.08

Same-year dividend behavior of banks that do not issue equity in a given year					
Year	Increase	Constant	Constant, at zero	Decrease	Decrease to zero
2006	0.64	0.29	0.20	0.07	0.00
2007	0.62	0.34	0.20	0.05	0.01
2008	0.46	0.39	0.21	0.16	0.01
2009	0.27	0.41	0.21	0.33	0.09

Next-year dividend behavior of banks that issue equity in a given year					
Year	Increase	Constant	Constant, at zero	Decrease	Decrease to zero
2006	0.47	0.50	0.37	0.03	0.00
2007	0.28	0.61	0.33	0.11	0.06
2008	0.14	0.57	0.43	0.29	0.07
2009	0.14	0.64	0.50	0.22	0.08

Next-year dividend behavior of banks that do not issue equity in a given year					
Year	Increase	Constant	Constant, at zero	Decrease	Decrease to zero
2006	0.62	0.34	0.19	0.05	0.01
2007	0.47	0.36	0.19	0.18	0.01
2008	0.24	0.39	0.21	0.37	0.09
2009	0.22	0.50	0.27	0.28	0.09

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