Rational Dividend Persistence in Banking*

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Abstract

Bank dividend policies are very persistent. In a crisis, they exacerbate systemic risk and raise concerns among regulators. However, bankers may keep dividends elevated to uphold a reputation among investors wary of agency conflicts. When raising equity becomes likelier, bankers may be unwilling to alter dividend policies to preserve this reputation. We test these hypotheses using 7,722 bank–quarter observations that span the 2007–2009 financial crisis. Our results suggest that persistence of bank dividend policies increases with agency conflicts and decreases in the presence of concentrated shareholders. When stress is acute, the influence of concentrated shareholders reverses.

Keywords: banks; agency costs; dividends; share repurchases; risk-weighted assets.
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1 Introduction

Banks paid dividends well into the global financial crisis instead of cutting or omitting them to preserve their health (e.g., Acharya *et al.*, 2011). By doing so, they weakened their solvency and made the system they were part of ever more fragile. After the crisis, they were "falling over themselves to reinstitute payouts" at the earliest opportunity (Floyd *et al.*, 2015, p. 313). This apparent absence of foresight, sometimes interpreted as recklessness, has raised significant concern among regulators and scholars alike (Brunnermeier *et al.*, 2009; Rosengren, 2010). As early as the 1970s, scholars noted that dividend cuts by banks were an exception rather than the rule (Keen, 1978, 1983).

In this paper, we use the eventual changes in bank dividend policies observed in the heat of the 2007–2009 financial crisis to assess why rational bankers maintain large dividend payouts despite threatening circumstances. We hypothesize that bankers do so because dividends mitigate agency conflicts between shareholders and managers (Jensen and Meckling, 1976; Jensen, 1986). These agency conflicts result from the difficulty of monitoring opaque banking institutions (Berger *et al.*, 1995; Bliss and Flannery, 2002), leading to significant asset substitution or transformation opportunities (Flannery, 1994; Jones *et al.*, 2013) and to bankers' expense preference behavior (Edwards, 1977). Dividends may substitute for shareholder monitoring (La Porta *et al.*, 2000) or, alternatively, may attract institutional shareholders, induce greater monitoring, and sustain higher valuations (Allen *et al.*, 2000). Through their dividend policies, banks may seek to maintain their reputation in financial markets; they may attach particular importance to this reputation during crises, when "there is enough uncertainty about future cash flows that the option of going back to the capital market is [especially] valuable"(La Porta *et al.*, 2000, p. 7). The financial crisis and its aftermath therefore provide an exceptional quasi-natural experiment for analyzing the reputational motivation of bank dividend policies, which has been hampered by the few occurrences of bank dividend cuts before the crisis.

We focus on the relation between bank dividend policies and the existence of agency

conflicts, evidenced by ownership structure, legal structure, and analyst coverage. Short of raising equity (or equity-like securities), banks may preserve or improve their regulatory capital ratios not only by cutting or omitting dividends, but also by abstaining from initiating share repurchases or by reducing risk-weighted assets. We contrast the drivers of share repurchase and risk-weighted asset decisions with those of persistent dividend policies.

Although they are not causal, our results suggest that banks that are subject to more severe agency conflicts have a lower propensity to both omit and cut dividends. Conversely, banks that can be more effectively monitored by concentrated shareholders are generally more likely to cut dividends. However, these banks are also less likely to cut dividends in times of acute stress, under the influence of the same concentrated shareholders, consistent with managers and concentrated shareholders seeking to preserve their reputation in those times. By contrast, share repurchases and risk-weighted asset changes are only likelier when shareholders are dispersed, primarily because these capital policies attract minority shareholders and induce clientele effects.

In summary, our findings make two main contributions to the literature. First, we confirm the importance of dividend payouts as a substitute or inducement for monitoring in the banking industry and as a device to maintain a reputation among dispersed shareholders. Our results suggest that the presence of and interplay between dispersed minority shareholders and large shareholders shape bank dividend policies. By contrast, dispersed shareholders only influence decisions to initiate share repurchases and to modulate risk-weighted assets through the clientele effects that they induce. Second, the concern to maintain a reputation could be rational rather than reckless, since it could be a consequence of the incentives that bank managers have to keep their banks afloat despite heavy turbulence. Under this light, the anecdotal evidence that some financial institutions, such as Merrill Lynch, increased their payouts before failing suggests that dividend payouts may act as a reward for investors when managers need to raise capital in troubled circumstances (Kroszner and Strahan, 1996).

The remainder of the paper is structured as follows. Section 2 reviews prior literature.

Section 3 describes the data set and the empirical approach. Section 4 examines whether agency conflicts between shareholders and managers influence the propensity to either cut or omit dividends and contrasts the drivers of bank dividend policies with those of repurchase and risk-weighted asset decisions to test our hypotheses. These results are backed by the robustness tests presented in Section 5. Section 6 presents the conclusions.

2 Literature Review and Hypothesis Development

In this section, we review the literature on bank payout policies by adopting in turn the perspectives of investors, managers, and regulators on these policies and we develop our hypotheses.

2.1 Investor perspective

Investors have at least three reasons to consider persistent payout policies valuable. First, investors can rely on firm payout as a source of income. In the case of dividends, investors receive regular payments, which they can consume, reinvest, or pass on to other investors, depending on their roles and objectives. In the case of share repurchases, investors do not receive such payments, but they can expect the share price to appreciate (e.g., Ikenberry *et al.*, 1995) and they can generate income by selling parts of their holdings. However, investors who seek regular revenues may prefer the certainty of receiving dividends to the expectation of increasing share prices or to the need to liquidate shares (Shefrin and Statman, 1984), although they may also express preferences shaped by tax considerations (Shleifer and Vishny, 1986; Allen *et al.*, 2000). These investors may form clienteles who induce firms to pay dividends at regular intervals (Becker *et al.*, 2011); they may prompt firms to increase dividends regularly to keep up with inflation and to continue paying despite temporary difficulties. Generally, income-seeking investors may not consider banks differently from other firms, except to the extent that banks are likelier to rely on dividends instead of repurchases and to continue doing so even in the worst of times (Floyd *et al.*, 2015). Nonetheless, dividend clienteles may

possibly exacerbate the natural tendencies of banks to pay dividends generously; they may even cause the persistence of bank payout policies to become self-fulfilling.

Second, payout decisions can act as a signal of good health or sound prospects. This signal is more potent than earnings announcement or other corporate disclosures, which are subject to management discretion (Bhattacharya, 1979). In fact, both equity and debt investors may come to rely on this signal to assess the soundness of their investments, especially if this signal is repeated and if these investments are opaque and costly to monitor (Keen, 1978; Forti and Schiozer, 2015). In such cases, equity investors may react negatively to adverse payout decisions by selling off their holdings; depositors may react by running on dividend-cutting banks. The particular importance of dividends as costly signals in opaque environments may be why the empirical evidence supports the signaling hypothesis in the banking industry but remains mixed outside of regulated industries (e.g., Del Brio and De Miguel, 2010). Banks are intrinsically more opaque than non-banks (Morgan, 2002). They may signal their value to outsiders through their dividend policies (Boldin and Leggett, 1995; Bessler *et al.*, 2006; Cornett *et al.*, 2011a) and the value of their stocks is more strongly affected than that of non-banks by positive and negative dividend changes (Keen, 1983; Filbeck and Mullineaux, 1993; Bessler and Nohel, 1996). By contrast, share repurchases appear less important as a signal (Hirtle, 2014), possibly because they are less costly to investors than dividends (Grullon and Michaely, 2002).

Third, payout policies can alleviate agency conflicts between shareholders and managers (Jensen and Meckling, 1976; Jensen, 1986). Like leverage, payout policies impose discipline upon managers. Outside of financial services, dividends and repurchases reduce the free cash flows available to managers and the opportunities that they have to overinvest and expropriate shareholders (Grullon and Michaely, 2004). Both forms of payout increase the likelihood that firms should raise capital and, in the process, be subject to the regular oversight of professional monitors (Easterbrook, 1984); they may also attract institutional owners that play a "larger role in overseeing management than dispersed retail investors" (Allen *et al.*, 2000,

p. 2532). When minority shareholders are enforceable and environments are transparent, investors may compel managers of firms subject to significant agency conflicts to pay out cash (Brockman and Unlu, 2011); dividends and repurchases are an "outcome" (La Porta *et al.*, 2000). By contrast, when minority shareholder rights are not enforceable or environments are opaque, managers may elect to pay dividends or repurchase shares to establish a reputation of moderation in appropriating shareholder wealth for their own use; dividends and repurchases substitute for shareholder monitoring (La Porta *et al.*, 2000).

In banking, agency cost explanations of payout policies have only found empirical support recently, one of the reasons being that banks have been excluded from most of the empirical research on payout because they differ from non-regulated firms (Gupta and Walker, 1975): Banks are regulated and are subject to agency conflicts between shareholders and managers of a different nature. These agency conflicts arise from the impossibility for shareholders to effectively monitor bankers' actions (Berger *et al.*, 1995; Bliss and Flannery, 2002) because banks are opaque, especially during crises (Flannery *et al.*, 2013; Forti and Schiozer, 2015). These conflicts manifest themselves with expense preference behavior (Edwards, 1977) and with asset substitution and transformation opportunities detrimental to shareholders (Flannery, 1994). In turn, these opportunities can lead to "outright theft, fraud, self-dealing, consumption in the form of perks or excessive compensation, conversion of general-purpose assets into specific assets that have little value without the manager, and risk shifting" (Jones *et al.*, 2013, p. 694).

The recent empirical evidence shows that bank payout policies help address agency conflicts in banking but does not relate these conflicts with persistent payouts. Casey and Dickens (2000) and Dickens *et al.* (2002), respectively, show that the dividend payouts of US banks are positively correlated with shareholder dispersion and negatively correlated with insider ownership. Abreu and Gulamhussen (2013) find similar evidence before and during the financial crisis of 2007–2009. Onali *et al.* (2015) observe that dividend payout decreases as the internal monitoring by board members increases. Bøhren *et al.* (2012) and Bodenhorn

(2014) show that dividend policies help address the expropriation concerns of the minority shareholders of, respectively, Norwegian saving banks—in which depositors, employees, and community citizens are the dominant owners—and US banks in the 19th century, in the presence of one or more large shareholders.[1]

2.2 Manager perspective

Rational bank managers evaluate payout policies based on their relative costs and benefits subject to the regulatory requirements that their banks must meet. These requirements include minimum thresholds for the amount of shareholder equity that banks must hold to operate in relation to the banks' risk-weighted assets (bank assets weighted by their relative level of risk). The violation of capital requirements, may have adverse consequences for banks and their managers, going as far as regulatory seizure and liquidation. Obviously, payout decisions affect regulatory capital directly, since they reduce shareholder equity. However, risk-weighted assets also affect regulatory capital and can potentially neutralize the effect of payout policies. In banking, unlike in non-regulated industries, payout and asset decisions are joint.

In bad times, bank managers who rely on payout policies to satisfy shareholders or keep agency costs in check but must satisfy capital requirements may face a tradeoff. Short of raising capital, there are three ways for bankers to preserve regulatory capital, each with different implications.

First, bankers can shrink risk-weighted assets. They can sell assets or reduce lending.

[1]Two additional historical studies support an agency cost or a clientele explanation of bank payout policies. Robinson (1948, p. 407) discusses optimal bank dividend policies and recommends that

> Those [banks] with close-knit ownership could follow [dividend] policies best adapted to the advantage of both the bank and its owners. Banks with wider distribution of stock ownership could afford, other things being equal, to consider a more generous distribution of earnings.

Mayne (1980) establishes that, in the 1970s, at a time when many banks were converting into bank holding companies (BHCs), banks that were affiliated with BHCs had more generous dividend payouts than banks that were not. (Mayne, 1980, p. 474) argues that "this may be due to differences in the pattern of ownership or in responsiveness to capital market pressures, the stock of the large firms being more likely to be widely held and publicly traded."

However, only the sale of riskier, more illiquid assets may bring significant capital relief; but such sales will not always be possible at reasonable prices or at all (Cornett *et al.*, 2011b). A reduction in lending may not yield much immediate relief to capital ratios, but, if synchronous between banks, it will hurt the supply of bank loans and the economy as a whole (Dermine, 2013). Risk-weighted asset reductions may, therefore, not substitute for payout cuts but may complement them. More importantly, managers may consider that investors are unlikely to be concerned by risk-weighted asset reductions as much as by adverse payout decisions: Risk-weighted asset shrinkages may enable payouts to be persistent, may not be considered costly signals, and may also mitigate adverse asset transformation opportunities.

Second, bankers can abstain from initiating share repurchases or interrupt existing buy-back programs. On the one hand, a decision not to initiate a share repurchase program is a negative decision that may not be visible to investors, that may not be considered significant because share repurchases are less costly than dividends (Grullon and Michaely, 2002), or that may be welcomed by investors if it preserves the distribution of dividend income in times of low capital gain expectations. On the other hand, a decision to initiate or to continue a share repurchase program may mitigate agency conflicts between shareholders and managers but will result in a reduction of the shareholder base (Bodnaruk and Östberg, 2013) and, therefore, in a drop in bank monitoring. Overall, bankers appear to have mixed incentives with respect to repurchase programs; when they are concerned about preserving their shareholder base, they may prefer to halt rather than initiate share repurchase programs.

Third, bankers can decide to cut or omit dividends. On the one hand, dividend cuts or omissions will provide immediate, unconditional relief to regulatory capital ratios. On the other hand, a decision to cut or omit will frustrate investors who rely on dividends as a source of income and can cause them to sell their stakes, leading to a reduction in bank monitoring (Allen *et al.*, 2000). Further, dividend cuts or omissions can put off other shareholders either because dividends substitute for inefficient bank monitoring (La Porta *et al.*, 2000; Brockman and Unlu, 2011) or because dividends act as reliable but costly signals of bank

health (Hirtle, 2014). Unless there are large monitoring shareholders trusted by minority shareholders, bankers will expect a decision to cut or omit dividends to bring about a drop in the share price and a decrease of the shareholder base.

Overall, bankers seem to have incentives to maintain or even increase dividends when they want to preserve their shareholder base or uphold a reputation among dispersed shareholders unable to efficiently monitor the bankers' actions. Bank managers have lower incentives to do so in the presence of controlling shareholders. However, in bad times, bank managers may nonetheless seek to maintain a reputation among as broad a shareholder base as possible, especially if they consider that they may need to raise equity (La Porta *et al.*, 2000), for at least two reasons. First, dividend cuts and omissions may put off minority shareholders who are concerned that they could be expropriated by controlling shareholders, as observed by Bøhren *et al.* (2012) and Bodenhorn (2014). Second, risky dividend policies may act as a reward for investors when managers need to raise capital in troubled circumstances; controlling shareholders may implicitly approve or even encourage such policies, as banking regulators did during the thrift crisis of the 1980s (Kroszner and Strahan, 1996).

2.3 Regulator perspective

Banking regulators generally consider payout policies costly, since these policies deplete capital buffers, weaken banks, and cause the banking system as a whole to become more fragile (Roukny *et al.*, 2013). During times of crisis, regulators are especially concerned that larger, systemic banks should maintain large dividend payouts and, by doing so, shift risks from shareholders to public authorities (Kanas, 2013; Onali, 2014). In effect, regulators are mostly concerned about bank dividend policies, which have proven to be far more persistent than repurchase policies (Rosengren, 2010). Accordingly, many regulators have secured the authority to restrict bank payouts, in addition to setting minimum capital requirements.

Nonetheless, regulators are in a difficult position to take action against persistent bank dividend policies for at least two reasons. First, regulators rely on backward-looking ac-

counting measurements (Acharya *et al.*, 2011). In effect, they focus "on the ability to pay dividends out of earnings." (Rosengren, 2010, p. 4) Because earnings often lag behind the onset of crises, regulatory responses have been late and, to a certain extent, ineffective (Abreu and Gulamhussen, 2013). Second, regulators may not want to restrict the dividend policies of undercapitalized banks for fear of sending a signal of their bad health (Calomiris and Khan, 2015). In fact, regulators that have the power to restrict dividend policies may induce bankers to pay dividends "only to demonstrate to the market that the regulator approved of it doing so" (Guntay *et al.*, 2015, p. 2). Instead of curtailing the incentives for banks to pay persistent dividends, regulators may unwillingly increase these incentives.

2.4 Hypotheses

From our discussion on the costs and benefits of persistent payouts, we advance the following three hypotheses. First, banks that are subject to more severe agency conflicts between shareholders and managers will be more likely to maintain their dividend policies to preserve their reputation, as a substitute or inducement for shareholder monitoring. Second, during crises, banks in which large shareholders normally mitigate agency conflicts between shareholders and managers will be especially careful to maintain their reputation among dispersed shareholders; they will exhibit more persistent dividend policies. Third, repurchase and risk-weighted asset decisions will not be driven by agency conflicts but by the imperative to meet regulatory capital requirements.

3 Empirical Approach and Data

3.1 Sample formation

Larger and more complex banks are subject to more significant agency conflicts between shareholders and managers (Fama and Jensen, 1983; Milbourn *et al.*, 1999; Laeven and Levine, 2007). They are more likely to be concerned about maintaining their reputation

among more dispersed minority shareholders. By contrast, smaller banks attract geographically proximate investors as monitors (Becker *et al.*, 2011). Since we assess the importance of maintaining a reputation when agency conflicts are material, our sample is focused on larger banks.

We select all listed US firms categorized as banks by the Industry Classification Benchmark, with over USD 1 billion in total assets as of December 31, 2006.[2] The sample covers the period between January 1, 2004, and December 31, 2012, so that bank dividend policies (and, similarly, decisions to initiate repurchases and to set risk-weighted assets) can be observed before, during, and after the 2007–2009 financial crisis.

We collected the histories of regular cash dividends, share repurchases, and quarterly accounting variables and non-accounting measurements from Bloomberg. We obtained quarterly institutional holdings from the Thomson Reuters Institutional Holdings database (13F). This database aggregates the quarterly holdings reported to the US Securities and Exchange Commission (SEC) by banks, brokers–dealers, insurance companies, pension funds, investment companies, not-for-profit institutions, colleges, and foundations under Section 13F of the US Securities Exchange Act of 1934. We also sourced analyst coverage data from the Thomson Reuters I/B/E/S US Detail History file, a database of individual earnings estimates from a majority of sell-side analysts covering listed US firms. We identified the BHCs in our sample based on the Federal Reserve Bank of Chicago Holding Company data set.[3]

During the crisis, most of the banks in the sample received capital support from the US Treasury through the Capital Purchase Program (CPP), itself part of the Troubled Asset Relief Program (TARP). We source transaction-level CPP data from the US Treasury.[4]

[2]The smaller banks in our sample were not subject to any analyst coverage according to I/B/E/S; some had ordinary shares that did not trade on continuous markets. The sample includes banks categorized as national commercial banks (Standard Industrial Classification, or SIC, code 6021), state commercial banks (SIC code 6022), commercial banks not elsewhere classified (SIC code 6029), federal savings institutions (SIC code 6035), and savings institutions (SIC code 6036).

[3]Available from *https://www.chicagofed.org/banking/financial-institution-reports/bhc-data*.

[4]We obtain the amount and type of capital support received by each bank, as well as the dates they received it and when it was repaid or disposed of on the market, from the Transactions Report Investment Programs, dated July 26, 2013, available from *http://www.treasury.gov/initiatives/financial-stability/reports/Pages/TARP-Investment-Program-Transaction-Reports.aspx*.

We reconcile data sets by CUSIP number (Thomson Reuters, Bloomberg, and Chicago Fed data) and by name and US State (US Treasury data). After excluding observations with missing data or negative equity, as well as those banks that never pay dividends (19 banks) or pay them irregularly (6), the panel comprises 243 BHCs (84.2%) and 44 listed commercial banks and savings institutions (15.8%), jointly referred to as banks.[5] The aggregate assets of all banks in the panel (including non-federally regulated banks) on December 31, 2006, equal 94.6% of the banking assets in the United States as reported by the Federal Reserve. The panel is unbalanced either because some banks have become listed, been acquired, or failed during the period or because of exclusions.

Prior literature typically relates payout policies to the financial statements of the previous accounting year (e.g., Fama and French (2001)). Our analysis requires a more granular approach to match payout policies with financial statements in a period during which both payout policies and financial statements evolved rapidly. Banks, as other firms, synchronize their dividend declaration and accounting cycles. In our sample, most banks declare dividends together, shortly before or after they disclose their quarterly financial statements, within a period of 31 days from the end of an accounting quarter.

We assume that dividend declarations and repurchases decisions announced during the period starting 60 days before and ending 31 days after an accounting quarter reflect a bank's situation as reported in the financial statements of the previous quarter. We illustrate this approach in Figure 1. We relate these announcements to the institutional ownership records at the end of the quarter preceding the decisions to reduce issues of endogeneity. In addition, when no dividend is declared and there is no corresponding announcement, we assume that a dividend declaration takes place 91 days (or a multiple thereof) after the previous one.

[Figure 1 about here.]

[5]The BHCs in the sample are, on average, slightly larger than listed commercial banks, but there is considerable overlap between the ranges of bank sizes in the subsamples of BHCs, listed banks, and savings institutions. For example, not only the largest but also the smallest banks in our sample are BHCs. In addition, 103 of the 243 BHCs are domestic financial holding companies.

Because of this approach, combined with the availability of data in our sample through December 31, 2012, the end of the sample period must be brought back by one quarter to the accounting quarter ending September 30, 2012. In addition, to account for dividend persistence based on past quarter dividend declarations, the start of the sample period must be pushed forward by one quarter to start with the accounting quarter ending June 30, 2004. Ultimately, the sample comprises 7,722 bank–quarter observations. Because of the limited availability of quarterly risk-weighted asset data, especially early in the sample period and for smaller banks, the sample reduces to 5,029 bank–quarter observations whenever risk-weighted assets are necessary.

We use the dispersion and concentration of institutional shareholders, as well as analyst coverage, bank type, and activity restrictions, as the main regressors to test the influence of agency conflicts between shareholders and managers on bank dividend policies (and similarly, on decisions to initiate repurchases and to set risk-weighted assets). However, we also test alternative courses of action and influences that could affect these policies. The regression variables are summarized in Table 1.

[Table 1 about here.]

Dispersion and concentration of institutional shareholders Shleifer and Vishny (1986) argue that dispersed shareholders only have limited incentives to monitor the managers of a firm, in contrast to concentrated shareholders, who have the power to positively influence the firm's value. Through their monitoring, concentrated owners also create value for dispersed shareholders, for example, by moderating risk taking (e.g., Shehzad *et al.*, 2010).

In banking, the opaqueness of firms makes it difficult and costly to efficiently monitor them (Berger *et al.*, 1995; Bliss and Flannery, 2002). This opaqueness heightens the agency conflicts between shareholders and managers. Arguably, this opaqueness also reduces the already limited incentives that individual investors have to monitor and express their voice

and magnifies the role of larger institutional shareholders. As Allen *et al.* (2000), we therefore posit that bank managers need to establish a reputation primarily among institutional shareholders.

Accordingly, we use both the dispersion of (Form 13F) institutional shareholders and their concentration as proxies for the presence of agency conflicts. As Bodnaruk and Östberg (2013), we measure the dispersion of institutional shareholders as the number of these shareholders. Because shareholder dispersion is strongly correlated with bank size, we use the residuals of a regression of the number of shareholders on bank size instead (RES_NUM_OWNERS). We use the institutional ownership concentration of Hartzell and Starks (2003) as a proxy for monitoring by large shareholders (INSTIT_CONCENTRATION). These authors calculate institutional ownership concentration as the holdings of the largest five institutional investors divided by total institutional holdings.

To uphold our hypotheses, we should observe that the persistence of dividend policies increases with (residual) shareholder dispersion and/or decreases with shareholder concentration. We should also observe a limited influence of agency conflicts on decisions to initiate repurchases and to reduce risk-weighted assets. If market access influences dividend policies, we also expect differentiated results between dividend omission and dividend cut models, such that the severity of omissions appears more significant than that of cuts.

Analyst coverage Moyer *et al.* (1989) show that analyst coverage responds to the demand for monitoring agency costs arising from the separation of ownership and control. Security analysts act as delegated monitors. They are attracted to the firms in which agency costs are more severe and in which informational demands are higher. Security analysts are especially well represented when shareholders are dispersed, when the proportion of institutional holdings is high, and in the financial services industry.[6]

[6]Independently, we replicate the conclusions of Moyer *et al.* (1989) using our sample. We find that monitoring efforts are influenced by demand (they increase with the holdings and dispersion of institutional investors and with the share of uninsured short-term creditors in the balance sheet; they decrease with the concentration of institutional investors), opaqueness (they increase with the proportion of short-term investments and loans in the balance sheet), and agency conflicts (they are higher for BHCs than for other

Consistently with this observation, we posit that banks that are subject to more severe agency conflicts may seek to attract and maintain a reputation among delegated monitors in addition to monitoring investors, consistent with the model of Allen *et al.* (2000). Accordingly, we use analyst coverage as a proxy for the severity of agency costs, with banks subject to more severe agency costs attracting more sell-side analysts. Because analyst coverage is strongly correlated with bank size, we also substitute it with the residuals of a regression of the number of analysts on bank size (RES_NUM_ANALYSTS), following Hong *et al.* (2000). If our first hypothesis holds, banks with greater (residual) analyst coverage should have more persistent dividend policies.

Bank type and activity restrictions Laeven and Levine (2007) find evidence that the agency problems caused by the greater diversification of financial conglomerates outweigh the benefits of a greater scope and induce lower market values. Similarly, Doukas *et al.* (2000) find that security analysts are less effective monitors in multi-segment companies than in single segment companies. They conclude that "the usefulness of security analysis as a monitor diminishes with the industrial diversification of the company" (p. 61). Historically, Mayne (1980) observes that banking firms owned by BHCs pay out significantly more in dividends than other banking institutions. Accordingly, we use the fact that a bank is a BHC rather than a listed commercial bank or savings institution (BHC_INDICATOR) as another proxy for agency conflicts, based on the fact that the former are usually more complex organizations and the latter are subject to activity restrictions that curtail asset substitution opportunities under the Home Owners Loan Act of 1933 (US Code, Title 12, Chapter 12, Sections 1461–1470). If our first hypothesis holds, we should find that the dividend policies of BHCs are more persistent than those of listed banks and savings institutions.

Regulatory influence The discussion in Section 2.3 suggests that the regulatory influence on bank dividend policies may be muted or delayed. During the financial crisis, the US

listed saving institutions).

Treasury launched the CPP to recapitalize the US banking industry by investing in the capital of US banks, including the largest ones. The US Treasury did not force the banks to curb their dividend policies as a condition for participating because the largest banks "balked at any limit on their dividends" (Calomiris and Khan, 2015, p. 58). Nevertheless, the US authorities may have exerted pressure on undercapitalized banks that took CPP funds to shrink dividends. Following Abreu and Gulamhussen (2013), we control for this regulatory pressure with a dummy variable (UNDER_TARP) that takes the value of one the moment a sample bank has received CPP capital from the US Treasury and zero before that and after it has repaid the US Treasury in full.

After the financial crisis, the US Federal Reserve conducted stress tests on the 19 largest US BHCs, first in the context of the Supervisory Capital Assessment Program (SCAP), in 2009, and later in the context of the Comprehensive Capital Analysis and Review (CCAR), in 2011 and subsequent years (Hirtle and Lehnert, 2015). As part of SCAP, the US Federal Reserve conditioned increases in bank payouts to satisfactory stress test results; as part of CCAR, the Fed also conditioned such increases on the submission of satisfactory capital plans. In 2009, the US Federal Reserve found that 10 out of the 19 largest US banks would be short on capital in stressed macroeconomic circumstances. Subsequently, the US Federal Reserve rejected the capital plans of several BHCs. In all of these cases, the banking regulator prevented the concerned banks from increasing their payout. We do not control for the restrictions imposed by banking regulators after the SCAP and CCAR stress tests because the early tests are idiosyncratic and difficult to replicate with simple variables (Glasserman and Tangirala, 2015). However, the regulatory stress tests only concern few of the banks in our sample (14 out of 287, or 4.9%). We also consider that the absence of controls for SCAP and CCAR is conservative: If our first two hypotheses hold without controls for stress tests, which possibly prevent increases in payout, they must also hold with controls for these stress tests.[7]

[7]We confirm in unreported regressions that our conclusions are unaffected if we exclude the sample BHCs subject to SCAP and CCAR stress tests between 2009 and 2012.

Crisis According to our hypotheses, banks should be especially cautious to preserve a reputation when a crisis peaks. At these times, they may need to tap equity markets, among others, to survive, because they may be unable to shed all but the safest assets to preserve their capital ratios. We proxy the intensity of the banking crisis with the TED spread, that is, the difference between the three-month London Interbank Offered Rate (LIBOR) and secondary market rates on three-month US Treasury bills.[8] If the crisis has a muting influence on bank dividend policies, we should find that the persistence of bank dividend policies decreases with the TED spread.

Bank size Fama and Jensen (1983) argue that agency conflicts between managers and shareholders are more severe in large rather than small organizations. Large organizations are characterized by the inability of owners to get involved in decision making, diffuse decision systems that rely on specialized knowledge and skills, and complex hierarchies and monitoring mechanisms. Milbourn *et al.* (1999) argue that the increasing size of banking institutions may be a consequence of agency conflicts between reputation-seeking managers and powerless shareholders. However, in banking, larger firms also induce greater systemic risk and may benefit from implicit government guarantees (Pais and Stork, 2013). Larger banks may be induced by these guarantees to shift risks away from shareholders to debt holders (Acharya *et al.*, 2011) and to public authorities (Kanas, 2013; Onali, 2014). We control for bank size with the understanding that both the severity of agency conflicts and the presence of government safety nets may influence banks' payout and risk-weighted asset decisions.

[8]There is little evidence in the academic literature that artificially low LIBOR submissions by certain LIBOR-quoting banks had any meaningful impact on LIBOR rates (e.g., Abrantes-Metz *et al.*, 2012). This is possibly a consequence of excluding the top and bottom quartiles of quote submissions to calculate these rates. Our conclusions are qualitatively unchanged if we replace the TED spread with the CBOE Volatility Index or with a dummy variable that takes the value one between June 30, 2007, and June 30, 2009, and zero outside of this period.

Other controls Other controls are consistent with those in prior literature; they include quarterly change in assets (QCH_ASSETS), the ratio of equity capital to assets (EQUITY_TO_ASSETS), and the ratio of retained earnings to assets (RET_EARN_ TO_ASSETS). Quarterly change in assets controls for decisions to grow or shrink the balance sheet, a cruder measurement than risk-weighted assets but one that is available every quarter for all sample banks. The capital-to-assets ratio measures banks' leverage and the extent to which they can suffer losses on their assets before exhausting their capital. The ratio of retained earnings to assets is a related metric that captures shareholders' historical preferences for distributing earnings as dividends (DeAngelo *et al.*, 2006).

Controls specific to the banking industry address prior claims in the literature. First, cash and short-term securities holdings (CASH_MKT_SEC_TO_ASSETS) and quarterly profits deflated by assets (QUARTER_ROA) control for Keen's (1978, p. 5) hypothesis that "no banker would cut dividends unless his bank were in a severe earnings or liquidity crunch." Second, regulatory capital (CAP_TO_RBC) controls for scholarly hypotheses that banks may have continued paying dividends well into the crisis because of ## flattering, backward-looking capital ratios (Acharya *et al.*, 2011) and on regulator's focus "on the ability to pay dividends out of earnings." (Rosengren, 2010, p. 4) ##

3.2 Descriptive statistics

[Figure 2 about here.]

Figures 2(a) to 2(d), respectively, plot the fractions of banks that cut dividends, omitted them, initiated share repurchases, and reduced risk-weighted assets, quarter by quarter, over the sample period. The figures suggest that banks reacted to the crisis (represented by a shaded area) first by abstaining from initiating share repurchases and by reducing risk-weighted assets and subsequently by adjusting their dividend policies, consistent with our third hypothesis. At the beginning of the crisis, no sample bank was omitting dividends, 18% of the sample banks were initiating share repurchases, and 36% were shrinking assets.

By the end of the crisis, 26% of the sample banks were omitting dividends, hardly any bank was initiating any share repurchase, and 57% were shrinking assets. The banks did not start cutting dividends until the last quarter of 2007. The number of banks that cut dividends peaked in the first quarter of 2009. The number of banks that shrank risk-weighted assets peaked after the financial crisis, as if banks were unable to reduce risk-weighted assets in the midst of the crisis. After reaching the peak of dividend omissions in the last quarter of 2010, banks slowly started paying dividends again.

Table 2 reports statistics on dividend changes by sample banks. The reported proportions can be compared with those documented by Grullon *et al.* (2002) for a broad sample of companies from 1967 to 1993: Increases accounted for 79.4% of 7,642 dividend changes and cuts for 21.6%. Before the onset of the global financial crisis, banks hardly ever cut dividends; they omitted them even more rarely. The pre-sample evidence at our disposal suggests that this pattern is typical and not attributable to boom times.[9] During and after the crisis, the number of cuts and omissions exceeded that of increases, consistent with banks being forced to take drastic measures. Importantly, a large number of banks reacted to the crisis only in the two years following it, as Figure 2 also shows. During the last year of the sample period, banks reverted to their former policies of paying and regularly increasing dividends, as if nothing had happened. Floyd *et al.* (2015) document similar patterns using yearly Compustat data.

[Table 2 about here.]

In our sample, a majority (51%) of banks cut dividends once or more in the heat of the crisis, whereas a large majority (69%) of banks never omitted dividends. More than half (60%) of banks cut dividends at least once at the height of the crisis before eventually omitting them. Both facts are consistent with prior evidence that omission is a last resort. A large majority (74%) of sample banks initiated at least one repurchase during the sample

[9]The dividend history available from Bloomberg for 1,371 US banks for the period preceding the sample period comprises 38,983 dividend decisions going back to the late 1970s. Among these decisions, we find 9,915 dividend changes consisting of 9,127 increases (92.0%), 136 cuts (6.1%), and 186 omissions (1.9%).

period. In total, they announced 514 buybacks, or 2.44 per bank, on average. The repurchase programs were predominantly open market repurchases (97.3%), except for five Dutch auctions (1.0%), one odd-lot buyback (0.2%), and eight tender offers (1.5%).

Summary statistics are provided in Table 3 for subsamples partitioned by quarterly dividend decisions and in Table 4 for subsamples partitioned by quarterly buyback and risk-weighted asset decisions.

[Table 3 about here.]

[Table 4 about here.]

The statistics in Table 3 suggest that banks that omit dividends differ significantly from those that pay them. First, the omitting banks are owned by a less dispersed and more concentrated institutional investor base. Second, the omitting banks are covered by fewer sell-side analysts. Third, the omitting banks are smaller, on average, than dividend-paying banks. Larger banks may have more to lose or may feel protected because they are too big to fail. These three observations are consistent with the influence of agency costs on dividend payout that we hypothesize. Fourth, the omitting banks hold more cash than the paying banks. They may be more prudent; equally, they may be facing a cash crisis. Fifth, the omitting banks report lower retained earnings on their balance sheet, consistent with the fact that they may have exhausted their capital buffers. Sixth, the omitting banks experience low asset growth or even contraction and are much more likely to have received support from the US Treasury through the CPP.

Banks that cut dividends share many of the same characteristics as banks that omit dividends. However, unlike omitting banks, the cutting banks are less likely to be financial conglomerates, consistent with our first hypothesis. In common with the dividend-omitting banks, the cutting banks have higher leverage and lower capital ratios, consistent with the findings of Onali (2014). Interestingly, the TED spread suggests that, unlike dividend-cutting decisions, omission decisions are made during periods of lower stress.

The statistics in Table 4 show that banks that initiate share repurchases also differ from the banks that do not. First, the initiating banks are owned by a widely dispersed institutional shareholder base. This may be consistent with agency costs inducing share repurchases; alternatively, it may result from clientele effects, such as those documented by Grinstein and Michaely (2005). Second, the initiating banks hold less cash, more equity, and more retained earnings than the others. Third, the repurchasing banks are larger. Fourth, they are more profitable, consistent with share repurchases being launched in good times and opportunistically, at times when banks are most likely to overinvest (Grullon and Michaely, 2002). The statistics also suggest that, in contrast with dividend policies, share repurchase decisions are not driven by shareholder concentration, bank type, or analyst coverage.

Table 4 also shows differences between the banks that increase risk-weighted assets and those that shrink risk-weighted assets, very similar to those between paying and omitting banks. Interestingly, consistent with Figure 2(d), the TED spread also suggests that banks shrink risk-weighted assets outside of stress periods.

3.3 Empirical approach

Our empirical focus is on the persistence of bank dividend policies and, therefore, on banks' reluctance to cut or omit dividends, rather than on absolute or relative dividend payouts. We also contrast the drivers of this persistence with the drivers of share repurchases and risk-weighted asset decisions.

Our empirical approach models dividend, buyback, and risk-weighted asset decisions as binary outcomes. For dividend omissions, following Fama and French (2001), outcomes take the value one when banks pay a dividend, regardless of its level, and zero when they omit it.[10] For dividend cuts, following Benito and Young (2003), outcomes take the value one when banks maintain or increase the nominal value of a dividend compared to the last

[10]Our conclusions are unaffected when the binary dependent variable takes the value one when banks pay a significant fraction (above 5%, 10%, or 20%) of their highest prior dividend over the period and zero when they pay only a small fraction (below 5%, 10%, or 20%, respectively) of that dividend or omit it altogether.

paid dividend and zero when they pay a lower nominal dividend. Distinguishing omissions from cuts makes it possible to compare the drivers and implicit severity of the two dividend decisions. For share buybacks, outcomes take the value one when banks initiate repurchases and zero when they do not. For risk-weighted asset decisions, outcomes take the value one when banks increase risk-weighted assets and zero when they do not.

Two of our main variables of interest, ownership concentration and bank legal structure, are essentially time invariant. Fixed effects models do not estimate the effects of these variables. We therefore estimate random effects probit regressions with maximum likelihood while controlling for time effects:[11]

$$Prob\left(D_{it}=1 \mid D_{it-1}, X_{it}, T_t\right)=\Phi\left(\alpha+\tau Ts_t+\beta X_{it}^{\prime}+\delta D_{it-1}+\upsilon_i+\epsilon_{it}\right) \tag{1}$$

where, for bank i and quarter t, $Prob$ is the probability operator; D_{it} is the bank's binary outcome, as described above; X_{it} is a vector of bank characteristics; T_t is a vector of bank-independent control variables; Φ is the cumulative distribution function of the standard normal distribution; α (the intercept), τ, β, and δ are the regression parameters to be estimated; and ϵ_{it} is an error term.

We account for dividend persistence in omission regressions via the autoregressive term D_{it-1}.[12] We account for the fact that buybacks may span two or more quarters during which banks do not initiate new buybacks via a similar autoregression term.[13] We include random

[11]Bell and Jones (2015) show that there are few instances in which fixed effects models are preferable to random effects models, since the former can be seen as constrained forms of the latter. The authors find that the assumptions underlying random effects are no more demanding than those relating to their fixed effects counterparts. They also show that, on the one hand, fixed effects dummy coefficients are not measured reliably and that, on the other hand, only random effects models reveal specific time-invariant characteristics at the aggregate level. As robustness checks, we ran all regressions using the pooled probit estimator with standard error clustering at the bank level and the fixed effects logit estimator. We confirm that our conclusions are qualitatively unchanged, except for time-invariant or sluggish independent variables in fixed effects logit regressions, for which fixed effects regressions are inappropriate as robustness checks.

[12]The variable δ takes a non-zero value for omission and buyback regressions and a zero value for other regressions.

[13]Among our regressions, only the omission regression is subject to the initial conditions problem due to the use of a lagged version of the dependent variable in a binary response model (Heckman, 1981). This problem occurs because the model cannot account for responses prior to the sample period and, in particular, at the start of the underlying process. The problem can lead to an estimator that is inconsistent

effects, that is, company-specific time-independent factors that are assumed to be randomly distributed, via the variable υ_i, with $\upsilon_i \sim N(0, s_\upsilon^2)$.[14] We control explicitly for time effects through T_t and through bank-specific time effects included in X_{it} rather than through fixed effects.

4 Empirical Results

Table 5 reports estimates of the random effects probit models that assess the influence of our variables of interest on the propensity to omit or cut dividends, initiate repurchases, and shrink risk-weighted assets. This and other tables in this section report goodness-of-fit statistics appropriate for such models (Nakagawa and Schielzeth, 2013). More specifically, the tables report the marginal R^2 values, which are concerned with the variance explained only by the tested variables (and fixed effects, if any). The tables additionally report the conditional R^2 values, which are concerned with the variance explained by random effects.

[Table 5 about here.]

We discuss our results by describing what the regressions tell us about our hypotheses.

4.1 Agency conflicts

Regressions (1) to (4) of Table 5 show the clear influence of our main variables of interest on bank dividend policies. First, banks with a more widely dispersed shareholder base

and biased. However, under our hypotheses that reputational concerns drive payout decisions, the binary pay/omit process should not have long-term memory. In particular, this process should not depend on an initial condition with or without a dividend payment. Only the very recent history of the process should matter to bank managers. Unreported regressions in which we test the influence of pre-sample omissions for all sample banks suggest the absence of long-term memory. We find that a dummy variable taking the value one if a bank omitted dividends at least once prior to the sample period (12 occurrences for 12 distinct banks over a history of 13,919 dividend decisions going back to the late 1970s for certain banks) and zero otherwise is not statistically significant in omission regressions. Likewise, pre-sample decisions to cut (136 occurrences) do not affect decisions to omit. Similarly, a measurement of the number of omissions or cuts divided by the number of dividend decisions on record for sample banks is no more significant. Finally, our conclusions are identical to those presented below if we omit the lagged dependent variable in regressions, except for the fact that the intensity of the crisis (AVG_TED) becomes statistically insignificant.

[14] By contrast, the error term ϵ_{it} is both time and bank dependent, with $\epsilon_{it} \sim N(0, s_\epsilon^2)$.

(RES_NUM_OWNERS) are less likely to both omit or cut dividends.[15] Second, banks with a more concentrated shareholder base (INSTIT_CONCENTRATION) have a greater propensity to omit and cut dividends. Third, reluctance to omit and cut dividends increases with analyst coverage (RES_NUM_ANALYSTS). Fourth, BHCs (BHC_INDICATOR set at one) have a higher propensity than listed banks to maintain or increase dividends rather than cut them. [16]

Bank managers appear to maintain dividends to defuse a situation in which minority shareholders are unable or unwilling to invest in monitoring the banks. Minority shareholders may be unable to effectively monitor banks because they are opaque. They may be unwilling to do so because the costs of monitoring are excessive. By contrast, concentrated shareholders appear to alleviate the pressure on management to maintain dividends at high levels. They have stronger incentives to invest in monitoring. They may also be represented on boards of directors and gain access to private information.

The lower propensity of BHCs to cut dividends compared to listed banks is consistent with this explanation. It is consistent with Mayne's (1980) historical findings that banking firms owned by BHCs have more generous dividend payouts than the others, as are the payout regressions presented in Section 5.2. BHCs may give rise to greater agency conflicts for two reasons. First, BHCs are less restricted in their scope of activity than other savings institutions and provide managers more opportunities for asset substitution and transformation. Second, BHCs may attract a greater diversity of investors that may not be adequately captured by our ownership structure variables.

We interpret these results as providing empirical support for our hypothesis that agency

[15]The independent variable RES_NUM_OWNERS is only borderline insignificant in regressions (3) and (4) of Table 5.

[16]Unreported regressions show that these results are robust to alternative specifications of the regressions, including using strictly lagged accounting measurements as independent variables, replacing QUARTER_ROA with the natural logarithm of the Z-score, a measurement of bank risk taking (see Laeven and Levine (2009)), substituting the market capital ratio, calculated as the value of equity divided by the book value of liabilities plus the market value of equity, for regulatory capital, omitting the prior quarter's dividend decision D_{it-1} and removing random effects altogether. Additional robustness tests are documented in Section 5.

conflicts induce the greater persistence of bank dividend policies. By paying dividends, those in control seek to uphold a reputation among those shareholders who are the least capable of exerting control over management actions. Upholding this reputation is more important for banks in which agency conflicts are more severe. Upholding this reputation is also more significant among the most transient investors, whose loss would trigger a higher cost of capital (Derrien and Kecskés, 2013) and possibly greater difficulty in accessing equity markets, as the regressions in Section 5.1 suggest.

Regressions (5) and (6) of Table 5 suggest that banks with widely dispersed ownership are more likely to initiate share repurchases and to increase risk-weighted assets. By contrast, banks are no less likely to initiate purchases and to increase risk-weighted assets when institutional ownership is concentrated, when analyst coverage is greater, or when asset transformations are likelier. Thus, the influence of agency conflicts on share repurchase and risk-weighted asset decisions appears limited.[17]

4.2 Regulatory influence

The regressions presented in Table 5 suggest that the acceptance of capital injections under the CPP program coincided with a higher propensity to cut and omit dividends and to shrink risk-weighted assets and with a lower propensity to initiate repurchases.[18] In other words, regulators appear to have been successful in inducing banks to adopt more cautious capital

[17]We reach the same conclusion when we assess the joint decisions to initiate repurchases and to pay (rather than omit) dividends or to maintain/increase (rather than cut) dividends. In these decisions, the drivers of share repurchase initiations dominate. This result is consistent with dividend policies being rather independent from decisions on repurchases, as observed by Leary and Michaely (2011).

[18]Unreported regressions, in which UNDER_TARP is replaced by a measurement of capital injected, further highlight that the pressure imposed by US authorities could have been proportional to the injected capital and may have differed according to the securities that they purchased. Alternatively, managers could have been relieved by the CPP capital injections of the need to raise capital and to attract new equity investors by paying out dividends (Kroszner and Strahan, 1996). We reach these conclusions by replacing the binary variable UNDER_TARP with either the log of capital injected (plus one) or the ratio of capital injected by the US Treasury to total assets and by incorporating binary variables corresponding to different types of securities purchased by the government. All other conclusions described above are robust to the inclusion of these variables as well as to the omission of any influence of the CPP program. Other unreported regressions, in which banks that failed during the crisis are removed from the sample, also confirm that our conclusions are robust to forceful regulatory actions at failing banks.

policies when banks accepted CPP capital.

Interestingly, the results of the regressions in Table 5 and in Section 5.2 show that banks with elevated regulatory capital ratios (CAP_TO_RBC) are more likely to cut and omit dividends and to shrink risk-weighted assets than their peers are. These banks are also more likely to initiate share repurchases, which likely reflects the opportunistic nature of buying back shares (Jagannathan *et al.*, 2000; Leary and Michaely, 2011). By contrast, banks appear less likely to omit or cut dividends or to reduce risk-weighted assets if their equity (EQUITY_TO_ ASSETS) or their retained earnings (RET_EARN_TO_ASSETS) are higher, consistent with a preparedness to exhaust capital buffers before adjusting their capital policies.

4.3 Crisis

The results of the regressions in Table 5 further suggest that banks, when faced with stress, exhibit moderation in their dividend policies: They are more likely to cut and omit dividends. By contrast, after controlling for other influences, the banks increase, rather than reduce, risk-weighted assets. At these times, the banks may be unable to shed risky assets with large weights; in a number of cases, they may have to honor the guarantees they provide to off-balance sheet vehicles and return assets to the balance sheet (Covitz *et al.*, 2013).

However, according to our second hypothesis, bank managers should be especially concerned about preserving their reputation in the presence of large shareholders when tapping equity markets may be a matter of survival. If so, concentrated shareholders should induce banks to maintain their dividend policies when a crisis strikes, rather than risk their reputation by cutting dividends. We should observe a reversal of the influence of controlling owners when tensions peak. We test this by interacting shareholder concentration with the intensity of the crisis, measured through the TED spread. Consistent with our second hypothesis, we observe, in regression (2) of Table 6, that the influence of highly concentrated shareholders reverses: These shareholders induce a lower propensity to cut in times of crisis, contrary to

"normal times."

[Table 6 about here.]

4.4 Bank size

After agency conflicts between shareholders and managers are controlled for, bank size has a contrasting influence on bank dividend policies. Larger banks have a lower propensity to omit dividends altogether, but a greater propensity to cut dividends. This finding concurs with prior evidence that the stakes are higher for larger banks, possibly because they are more reliant on markets and have a more crucial need to establish a reputation in capital markets (Bessler and Nohel, 1996). It is also consistent with the notion of larger banks being induced by too-big-to-fail guarantees to maintain dividend policies unchanged and to risk shift (Kanas, 2013; Onali, 2014). By contrast, larger banks do not have a greater propensity to initiate share repurchases or to cut risk-weighted assets, consistent with our interpretation that agency costs drive neither share repurchase nor risk-weighted asset decisions.

4.5 Joint decisions

Our empirical approach does not lend itself easily to the assessment of the complementarity or substitutability of dividend policy, repurchase, and risk-weighted assets decisions. ## The approach focuses on the determinants of binary decisions to cut or omit dividends, initiate share repurchases or cut risk-weighted assets. It does not assess the influence that these decisions have on capital ratios. Therefore, it only expresses the tradeoff faced by managers, including the complementarity or substitutability of dividend policy, repurchase, and risk-weighted assets decisions, in simplified terms. ##

From the results of the regressions in Table 5, we conclude that bank dividend policies coincide with balance sheet ## size ## trends: Banks tend to omit or cut dividends when they shed assets and to pay or maintain or increase dividends when they grow assets. In addition, we determine if decisions to repurchase shares or to grow risk-weighted assets

are complements or substitutes of dividend policy decisions by incorporating the binary variables for share repurchase initiations and for risk-weighted asset increases in dividend policy regressions. The regression estimates in columns (3) to (6) of Table 6 suggest that dividend policy, repurchase, and risk-weighted assets decisions are complements rather than substitutes. Together with the regressions of Table 5, these estimates support our hypotheses.

Consistent with our hypotheses, our findings suggest that (i) the persistence of bank dividend policies is greater when agency conflicts between shareholders and managers are more severe; (ii) large shareholders have a moderating influence on bank dividend policies, except in times of crisis, when agency conflicts with minority shareholders or the need to maintain the shareholder base or to attract new shareholders induce the influence of large shareholders to reverse; and (iii) repurchase and risk-weighted assets decisions complement dividend decisions and do not appear to be induced by agency conflict considerations.

5 Robustness tests

5.1 Endogeneity: Clientele effects

On the one hand, the relationship between payout policy and ownership dispersion that we observe could be endogenous if it is driven by clientele effects similar to those observed by Grinstein and Michaely (2005). Such clientele effects would translate into institutional shareholders selecting the banks they invest in based on their ex ante expectations of bank dividend policies (and, similarly, of share repurchases and risk-weighted asset decisions) rather than managers adopting policies influenced by their owners and seeking to maintain a reputation. On the other hand, the fact that the relationship between bank dividend policies and ownership concentration could be endogenous is consistent with our second hypothesis.

Importantly, all of our variables of interest are binary policy decisions. It is not obvious that dispersed shareholders would self-select the banks they invest in based on their ex ante expectations of dividend decisions in times of crisis rather than on dividend payout levels.

By contrast, it seems more reasonable to expect that dispersed shareholders would self-select those banks that (i) have a habit of initiating share repurchases when shareholder concerns over agency conflicts are heightened or (ii) have experienced above-average risk-weighted asset growth, possibly as a consequence of excess risk taking.

We address the potential endogeneity that may affect our interpretation of reputation effects by estimating additional regressions in which we split the ownership variables between their mean for each bank over the sample period and quarterly variations compared to this mean. If clientele effects drive our results, the propensity to maintain dividends unchanged, to initiate share repurchases, and to grow risk-weighted assets should increase with the mean dispersion of shareholders. By contrast, if reputation effects drive our results, these capital policy decisions should be significantly influenced by variations of our variables of interest around the mean.

We adopt the regression specification suggested by Bell and Jones (2015) to address potential endogeneity problems in random effect regressions:

$$Prob\left(D_{it}=1 \mid D_{it-1}, X_{it}, T_t\right) = \Phi\left(\alpha+\tau T_t'+\beta_1\left(X_{it}'-\overline{X'}_i\right)+\beta_2\overline{X'}_i+\delta D_{it-1}+\upsilon_i+\epsilon_{it}\right) \quad (2)$$

where $\overline{X}_i$ is a vector with the mean characteristics of bank i over the full sample period.

[Table 7 about here.]

We show regression estimates in Table 7. In the regressions, we denote $\overline{X}_i$ by MEAN_i and $\left(X_{it}-\overline{X}_i\right)$ by DEMEANED_i.

The regressions support our prior conclusions that reputation, rather than clientele effects, increases the persistence of dividend policies. The propensity to omit (cut) is permanently lower for banks with higher analyst coverage (financial conglomerates). The propensity to pay (maintain or increase) dividends is greater when shareholder dispersion (analyst coverage) is above average prior to dividend decisions. This is consistent with management

seeking to establish a reputation among the most transient investors. These investors are arguably the least informed and the least willing to invest in monitoring and therefore those for which agency costs appear the most severe. The loss of these investors may be a financial shock that management wants to avoid, especially in times of stress, since it would translate into a smaller shareholder base (Bodnaruk and Östberg, 2013), higher costs of capital (Derrien and Kecskés, 2013), and may threaten access to equity markets.

By contrast, the propensity to cut dividends is permanently higher for banks whose ownership is more concentrated and this propensity increases when ownership becomes more concentrated. This result is once again consistent with our first two hypotheses. There is less need for management to preserve a reputation if large shareholders constantly invest in monitoring (or are granted privileged access to private information) and the other dispersed shareholders rely on the largest shareholders to monitor management.

As expected, share repurchases are not primarily driven by reputational aspects, but by clientele effects. A high average dispersion of institutional owners is associated with a greater propensity to initiate buybacks. In addition, risk-weighted asset increases appear to be driven by both reputational and clientele concerns. High and above-average dispersion of institutional shareholders is associated with a greater propensity to grow risk-weighted assets, although this may also reflect a permanent preference of institutional shareholders for greater risk taking (Laeven and Levine, 2009; Foos *et al.*, 2010).

Finally, the larger banks are more likely to pay rather than omit dividends and to initiate share repurchases, possibly because agency conflicts are more significant. Alternatively, the stakes may be higher for larger banks if they omit dividends (Bessler and Nohel, 1996). Banks of above-average size are more likely to cut dividends to avoid initiating buybacks and reduce risk-weighted assets. This observation may be a feature of the financial crisis and of the ensuing period. Alternatively, it may be a consequence of excessive risk taking leading to overall lower bank quality (Foos *et al.*, 2010), which in turns forces management to take decisive actions.

5.2 Intensity: Payout levels

To further test the robustness of the dividend cut regressions shown in Tables 5 and 6, we seek to explain changes in the quarterly dividend payouts of the banks in our data set. If our results concerning dividend decisions are robust, we should observe that ownership structures influence dividend payouts and not only binary dividend policies. More specifically, if agency conflicts influence dividend payout, we should find that payout increases together with the dispersion of institutional shareholders and decreases with their concentration. We should also find that, in times of stress, concentrated shareholders induce a higher payout to help maintain the bank's reputation among dispersed shareholders.

Following Lintner (1956), we estimate a partial adjustment model in which the dependent variable is the quarterly dividend payout P_{it} and the explanatory variables are those described previously:

$$P_{it}\left(X_{it}, T_t\right) = \alpha + \tau T_t' + \beta X_{it}' + \upsilon_i + \epsilon_{it} + P_{it-1} \tag{3}$$

As Abreu and Gulamhussen (2013), we scale payout by total assets instead of the stock price or earnings, considering the heightened volatility of either measurement during the financial crisis. Because payout is censored at zero, we estimate Equation (3) using Tobit regression models. As previously, we address the heterogeneity in our sample by controlling for bank random effects in the Tobit regressions.

[Table 8 about here.]

The results of the regressions in Table 8 are consistent with our prior conclusions. The growth of scaled dividend payouts is restrained when there are strong controlling shareholders, during times of acute stress, and after a capital injection by the US Treasury under the CPP. This growth is amplified (although not significantly at conventional statistical levels) for financial conglomerates, when shareholders are dispersed, when analyst coverage is significant, or under the joint influence of the crisis and controlling shareholders.

Both the alternative specifications of our main regressions following Bell and Jones (2015) and the replications of the partial adjustment model of Lintner (1956) with bank random effects support our hypotheses. The former suggest that bank ownership structures mostly influence decisions to initiate share repurchases and to increase risk-weighted assets through the clientele effects that they create, contrary to dividend policies. The latter confirm the influence of agency conflicts on dividend payout and, in particular, the moderating effect of large shareholders. The mildly statistically significant results of the latter also hint at the relevance of our empirical approach to assess the persistence of dividend policies.

6 Conclusion

During the 2007–2009 financial crisis, most banks ended up reducing or even omitting dividends. A number of banks only took these radical actions seemingly under regulatory pressure. Other financial institutions, such as Merrill Lynch, nearly collapsed after increasing dividends. After the crisis, most surviving banks reverted to their prior policies of paying and regularly increasing dividends.

The persistence of bank dividend policies is a major cause of concern for regulators because it makes the banking system more fragile in times of stress. Nonetheless, this persistence has not frequently been studied, one of the reasons being the lack of opportunities offered by seldom-changing dividend policies. Sometimes interpreted as reckless, this persistence may be adopted by rational managers seeking to maintain their banks afloat. This would be the case, at least, if two conditions are met. First, banks should be subject to severe agency conflicts between shareholders and managers but cannot be monitored efficiently by investors. Banks would establish a reputation among minority shareholders through their dividend policies; they would have few alternatives. Second, managers and controlling owners should attribute particular value to the reputation of their bank in times of crisis, when issuing equity becomes likelier.

The empirical evidence described in this paper suggests that the level of persistence of

bank dividends grows with the severity of the agency conflicts to which banks are subject and lessens in the presence of large shareholders, consistent with the first condition. However, the evidence also suggests that the influence of large shareholders reverses when crisis strikes: These shareholders induce greater dividend persistence, consistent with the second condition. The remainder of the second condition calls on different research methods to assess the value that bank managers attribute to their reputation, for example, using surveys, and is left for further study.

In contrast with bank dividend policies, the paper suggests that share repurchases and growing risk-weighted assets attract minority shareholders and induce clientele effects; recurrence of these capital management decisions does not appear to be otherwise exacerbated by the severity of agency conflicts. However, buybacks are optional rather than persistent; risk-weighted assets can be modulated, except when a crisis peaks. Accordingly, share repurchase and risk-weighted asset decisions raise limited concerns among regulators.

The message of this paper to regulators is that the role that dividends play as a monitoring device and the detrimental persistence it generates are deeply intertwined. The persistence of bank dividend policies may be broken through forceful regulatory intervention. However, such intervention may also make dividend policies less effective as a monitoring device. Indirectly, restricting bank dividend policies may affect the capacity of certain banks to attract external capital. Just as importantly, curbing bank dividend policies may trigger market reactions mitigated by persistent dividends. When considering restrictions, regulators should be prepared to intervene in capital markets, possibly going as far as providing a capital backstop in case their decisions make banks unable to raise private capital.

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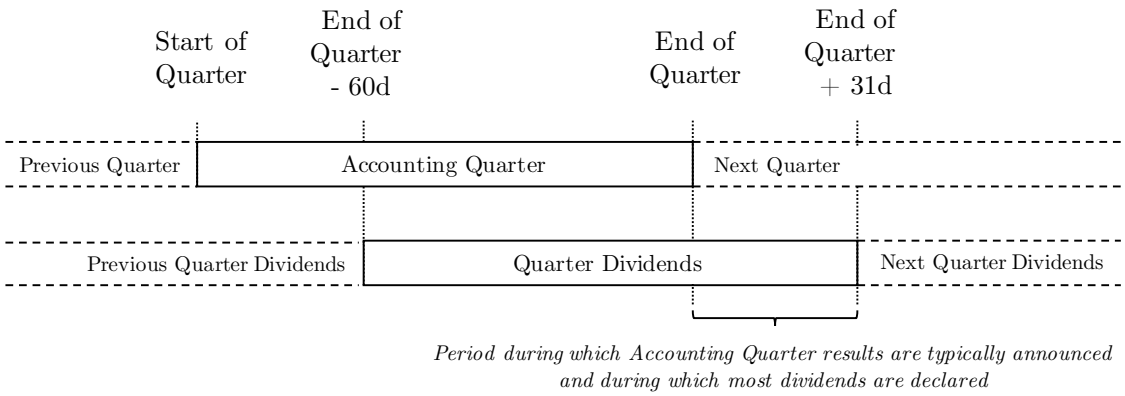
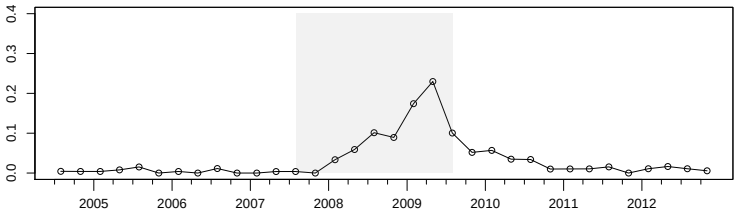
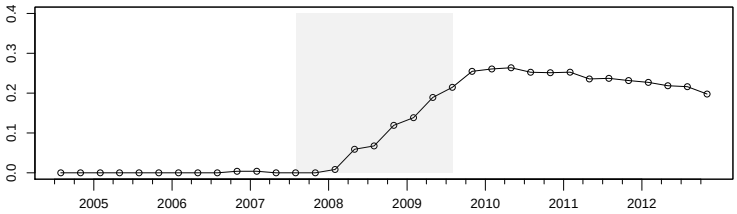


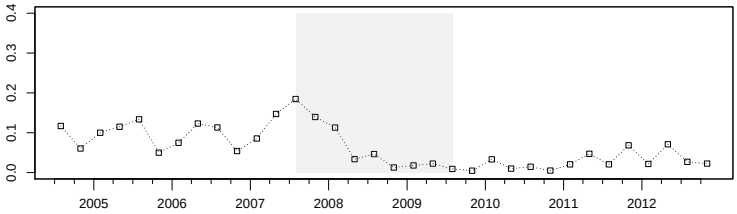
Figure 1. Lag between the accounting and dividend declaration cycles.



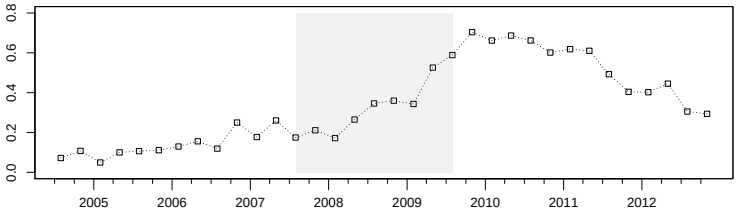
(a) Fraction of sample banks cutting dividends



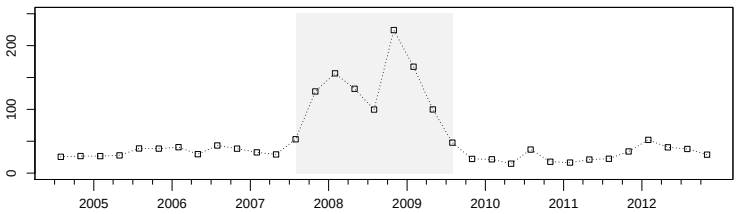
(b) Fraction of sample banks omitting dividends



(c) Fraction of sample banks initiating share repurchases



(d) Fraction of sample banks shrinking risk-weighted assets



(e) Mean quarterly TED spread (in basis points)

Figure 2. Evolution of dividend policy, share repurchase, and risk-weighted asset (level) decisions by sample banks and of the mean quarterly TED spread from June 30, 2004, to September 30, 2012. In all the plots, the shaded area highlights the financial crisis period.

Table 1. Definition of variables used in regressions. Dividend declarations made on date d, where $Q - 60 \leq d \leq Q + 31$ and Q is a quarter end date, are related to the financial statements of the quarter ending on Q. Accounting variables are those of the quarter ending on Q. Institutional ownership is measured on Q', where Q' is a quarter end date and $Q' < d$. Market measurements are also made during the period $[Q - 60, Q + 31]$. Sources: Institutional ownership data from the Thomson Reuters Institutional Holdings Database (13F), accounting variables from Bloomberg, analyst coverage based on the I/B/E/S US Detail History file, TARP CPP from the US Treasury, TED spread based on data from the Federal Reserve Bank of St. Louis.

Variable	Description
Institutional ownership	
RES_NUM_OWNERS	Residual number of institutional shareholders, determined as the residual of a regression of the number of institutional shareholders on bank size
INSTIT_CONCENTRATION	Concentration of institutional shareholders, measured as the holdings of the largest 5 institutional investors divided by total institutional holdings
Agency conflicts	
BHC_INDICATOR	Binary variable taking the value 1 if a bank is a BHC and 0 otherwise
RES_NUM_ANALYSTS	Residual analyst coverage, determined as the residual of a regression of the number of analysts having issued at least one recommendation on a bank over the prior 365-day period on bank size
Accounting and related measurements	
CAP_TO_RBC	Risk-based capital ratios
CASH_MKT_SEC_TO_ASSETS	Ratio of cash holdings and marketable securities to total assets
EQUITY_TO_ASSETS	Ratio of total equity to total assets
LOG_ASSETS	Natural logarithm of total assets, used as a measurement of bank size
QCH_ASSETS	Difference between total assets on Q and on $Q - 1$, divided by total assets on Q
QUARTER_ROA	Quarterly return on assets, defined as quarter earnings divided by total assets
RET_EARN_TO_ASSETS	Ratio of retained earnings to total assets

Table 1. Definition of variables used in regressions (continued).

Time effects	
AVG_TED	Average TED spread measured over the period $[Q-60, Q+31]$. The TED spread is the difference between the 3-month LIBOR and secondary market rates on 3- month US Treasury bills
D_{it-1}	In dividend regressions, binary variable taking the value 1 if a bank declared a dividend during the quarter ending on $Q-1$ and 0 otherwise. In buyback regressions, binary variable taking the value 1 if a bank initiated a share buyback during the quarter ending on $Q-1$ and 0 otherwise
UNDER_TARP	Binary variable taking the value 1 during the period when a bank receives financial support from the US Treasury under TARP and 0 outside of this period (or if the bank does not receive such support)

Table 2. Statistics on dividend changes by sample banks over subperiods preceding, during, and after the global financial crisis. The proportions are calculated based on the number of changes in each period or subperiod.

	From	Jun 30, 2004	Sep 30, 2007	Sep 30, 2009	Sep 30, 2011
	To	Jun 30, 2007	Jun 30, 2009	Jun 30, 2011	Sep 30, 2012
Changes	Total	838	411	175	142
	Increases	822	173	104	132
	Cuts & omissions	16	238	71	10
	Omissions	1	59	25	2
Proportions	Increases	98.09%	42.09%	59.43%	92.96%
	Cuts & omissions	1.91%	57.91%	40.57%	7.04%
	Omissions	0.12%	14.36%	14.29%	1.41%

Table 3. Summary statistics: Means (and standard deviations) of dependent and control variables, clustered by the dividend status of sample banks in each quarter. The dividend paid column clusters bank–quarters during which a dividend was declared, dividend omitted clusters bank–quarters during which no dividend was paid despite a prior history of dividend payments, and dividend maintained or increased (dividend cut) clusters bank–quarters during which banks maintained or increased (reduced) their nominal quarterly dividend. The superscripts ***, **, and * denote statistical significance levels of 1%, 5%, and 10% for a t-test between the mean of each subsample and that of the dividend paid subsample.

Variable	Dividend Paid	Dividend Omitted	Dividend Maintained or Increased	Dividend Cut
RES_NUM_OWNERS	0.714	-5.953**	1.193	-11.537**
	(88.734)	(72.743)	(88.357)	(89.990)
INSTIT_CONCENTRATION	0.534	0.702***	0.533	0.571***
	(0.178)	(0.183)	(0.177)	(0.186)
RES_NUM_ANALYSTS	0.153	-1.336***	0.198	-1.075***
	(3.856)	(3.677)	(3.852)	(3.750)
BHC_INDICATOR	0.866	0.850	0.867	0.815**
	(0.341)	(0.357)	(0.339)	(0.389)
AVG_TED	57.144	48.739***	55.557*	99.484***
	(50.177)	(49.312)	(48.951)	(64.585)
UNDER_TARP	0.113	0.512***	0.100	0.433***
	(0.316)	(0.500)	(0.300)	(0.496)
LOG_ASSETS	8.579	7.941***	8.568	8.665
	(1.513)	(1.104)	(1.502)	(1.649)
CAP_TO_RBC	0.140	0.137	0.141	0.131***
	(0.039)	(0.073)	(0.039)	(0.027)
CASH_MKT_SEC_TO_ASSETS	0.046	0.075***	0.046	0.047
	(0.046)	(0.051)	(0.046)	(0.044)
EQUITY_TO_ASSETS	0.097	0.070***	0.097	0.082***
	(0.031)	(0.074)	(0.031)	(0.023)
QCH_ASSETS	0.019	-0.024***	0.019	0.001***
	(0.053)	(0.215)	(0.053)	(0.057)
QUARTER_ROA	0.002	-0.004***	0.002***	-0.004***
	(0.003)	(0.010)	(0.003)	(0.011)
RET_EARN_TO_ASSETS	0.038	-0.006***	0.038	0.025***
	(0.032)	(0.050)	(0.032)	(0.032)
D_{it-1}	0.996	0.111***		
	(0.065)	(0.314)		
N	6,935	787	6,687	335

Table 4. Summary statistics: Means (and standard deviations) of dependent and control variables, clustered by the share buyback and risk-weighted asset decisions of sample banks in each quarter. The buyback initiated (no buyback initiated) column clusters bank–quarters during which a (no) share buyback is initiated, and RWA increased (shrunk) clusters bank–quarters during which risk-weighted assets increased (decreased). The superscripts ***, **, and * denote statistical significance levels of 1%, 5%, and 10% for a t-test between the means of the second and the first subsample.

Variable	Buyback Initiated	No Buyback Initiated	RWA Increased	RWA Shrunk
RES_NUM_OWNERS	18.868	-1.309***	8.442	-9.678***
	(109.762)	(85.277)	(100.276)	(94.088)
INSTIT_CONCENTRATION	0.533	0.553**	0.529	0.554***
	(0.185)	(0.185)	(0.182)	(0.191)
BHC_INDICATOR	0.839	0.866	0.870	0.866
	(0.368)	(0.341)	(0.336)	(0.340)
RES_NUM_ANALYSTS	0.161	-0.010	0.241	-0.280***
	(3.673)	(3.877)	(4.075)	(4.327)
AVG_TED	53.453	56.490	59.887	52.174***
	(41.707)	(50.696)	(51.827)	(50.408)
UNDER_TARP	0.006	0.164***	0.094	0.331***
	(0.076)	(0.370)	(0.292)	(0.471)
LOG_ASSETS	8.664	8.503**	8.695	8.729
	(1.702)	(1.472)	(1.667)	(1.624)
CAP_TO_RBC	0.142	0.140	0.139	0.145***
	(0.049)	(0.043)	(0.048)	(0.043)
CASH_MKT_SEC_TO_ASSETS	0.044	0.049**	0.045	0.058***
	(0.044)	(0.048)	(0.047)	(0.053)
EQUITY_TO_ASSETS	0.101	0.094***	0.098	0.089***
	(0.032)	(0.039)	(0.041)	(0.038)
QCH_ASSETS	0.017	0.014	0.027	-0.011***
	(0.053)	(0.088)	(0.057)	(0.039)
QUARTER_ROA	0.003	0.001***	0.002	-0.001***
	(0.002)	(0.005)	(0.003)	(0.007)
RET_EARN_TO_ASSETS	0.039	0.033***	0.037	0.021***
	(0.032)	(0.037)	(0.034)	(0.045)
D_{it-1}	0.070	0.068		
	(0.255)	(0.252)	(0.267)	(0.205)
N	514	7,208	3,315	1,714

Table 5. Random effects probit regressions to assess the influence of the crisis on the propensity of US banks to pay rather than omit dividends (regressions (1) and (2)), maintain/increase rather than cut dividends (regressions (3) and (4)), initiate share repurchases rather than not (regression (5)), or increase rather than shrink risk-weighted assets (regression (6)) between June 30, 2004, and September 30, 2012. The binary dependent variable takes the value zero if a bank omitted a dividend (regressions (1) and (2)), cut a dividend (regressions (3) and (4)), did not initiate a share repurchase (regression (5)), or shrunk risk-weighted assets (regression (6)) in a quarter and one otherwise. The sample includes 287 banks and 7,722 bank–quarters for dividend omissions and share repurchase initiations, 286 banks and 7,022 bank–quarters for dividend cuts, and 278 banks and 5,029 bank–quarters for risk-weighted asset reductions. The dependent variables are described in Table 1. The superscripts ***, **, and * denote statistical significance levels of 1%, 5%, and 10%, respectively, and z statistics are reported in parentheses below the parameter estimates.

	Dividend Paid		Dividend Maintained or Increased		Buyback Initiated	RWA Increased
	(1)	(2)	(3)	(4)	(5)	(6)
RES_NUM_OWNERS	0.002*	0.002	0.001	0.001	0.001***	0.001***
	(0.001)	(0.001)	(0.0004)	(0.0004)	(0.0003)	(0.0004)
INSTIT_CONCENTRATION	−0.860*	−0.925**	−0.901***	−0.994***	−0.047	−0.047
	(0.453)	(0.460)	(0.260)	(0.259)	(0.213)	(0.216)
RES_NUM_ANALYSTS	0.055**	0.051**	0.033***	0.026**	0.003	0.003
	(0.022)	(0.022)	(0.010)	(0.010)	(0.008)	(0.008)
BHC_INDICATOR		0.258		0.374***	−0.112	0.038
		(0.187)		(0.102)	(0.091)	(0.108)
AVG_TED	−0.005***	−0.005***	−0.005***	−0.005***	−0.0002	0.002***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.0004)
UNDER_TARP	−0.690***	−0.729***	−0.874***	−0.927***	−1.364***	−0.665***
	(0.148)	(0.152)	(0.084)	(0.085)	(0.215)	(0.066)
LOG_ASSETS	0.257***	0.244***	−0.043	−0.059*	0.033	−0.047
	(0.089)	(0.089)	(0.033)	(0.032)	(0.027)	(0.029)
CASH_MKT_SEC_TO_ASSETS	−4.688***	−4.805***	−1.114	−1.300*	−1.575**	−3.032***
	(1.393)	(1.404)	(0.796)	(0.787)	(0.694)	(0.612)
CAP_TO_RBC	−4.062*	−3.786*	1.908	2.824*	−0.642	−7.113***
	(2.109)	(2.114)	(1.451)	(1.457)	(0.876)	(0.935)
EQUITY_TO_ASSETS	4.724**	4.436*	4.457***	3.964**	0.999	5.121***
	(2.329)	(2.339)	(1.728)	(1.694)	(1.030)	(1.131)
QCH_ASSETS	3.904***	3.881***	1.516***	1.517***	0.070	
	(0.940)	(0.949)	(0.566)	(0.570)	(0.247)	
QUARTER_ROA	49.034***	48.587***	57.660***	56.387***	63.849***	75.163***
	(6.179)	(6.191)	(5.884)	(5.867)	(11.767)	(6.347)
RET_EARN_TO_ASSETS	7.093***	7.243***	1.295	1.100	0.196	4.023***
	(2.529)	(2.532)	(1.199)	(1.179)	(0.952)	(0.886)
D_{it-1}	3.727***	3.730***			−0.317***	
	(0.157)	(0.157)			(0.096)	
Intercept	−2.115**	−2.181**	2.474***	2.290***	−1.710***	1.379***
	(0.858)	(0.864)	(0.433)	(0.430)	(0.332)	(0.355)
Observations	7,722	7,722	7,022	7,022	7,722	5,029
Marginal R^2	70.3%	70.3%	27.2%	28.2%	29.8%	29.9%
Conditional R^2	78.3%	78.5%	33.2%	33.5%	36.6%	42.6%

Table 6. Random effects probit regressions to assess the influence of the crisis on the propensity of US banks to pay rather than omit dividends (regressions (1), (3), and (5)) or to maintain/increase rather than cut dividends (regressions (2), (4), and (6)) between June 30, 2004, and September 30, 2012. The binary dependent variable takes the value zero if a bank omitted a dividend (regressions 1, 3, and 5) or cut a dividend (regressions 2, 4, and 6) in a quarter and one otherwise. BUYBACK_INITIATED (RWA_INCREASED) takes the value one if a bank initiated a repurchase (increased risk-weighted assets) and zero otherwise. The sample includes 287 banks and 7,722 bank–quarters for dividend omissions and share repurchase initiations, 286 banks and 7,022 bank–quarters for dividend cuts, and 278 banks and 5,029 bank–quarters for risk-weighted asset reductions. The dependent variables are described in Table 1. The superscripts ***, **, and * denote statistical significance levels of 1%, 5%, and 10%, respectively, and z-statistics are reported in parentheses below the parameter estimates. For conciseness, the control variables and the intercept are not reported.

	Dividend Paid	Dividend Maintained or Increased	Dividend Paid	Dividend Maintained or Increased	Dividend Paid	Dividend Maintained or Increased
	(1)	(2)	(3)	(4)	(5)	(6)
INSTIT_CONCENTRATION	0.003	0.008***				
* AVG_TED	(0.005)	(0.003)				
BUYBACK_INITIATED			1.050**	0.318*		
			(0.530)	(0.179)		
RWA_INCREASED					0.537***	0.335***
					(0.142)	(0.086)
RES_NUM_OWNERS	0.002*	0.001*	0.002	0.001	0.001	0.0004
	(0.001)	(0.0004)	(0.001)	(0.0004)	(0.001)	(0.0005)
INSTIT_CONCENTRATION	−1.188**	−1.663***	−0.896*	−1.008***	−1.034*	−1.100***
	(0.584)	(0.335)	(0.459)	(0.261)	(0.545)	(0.329)
RES_NUM_ANALYSTS	0.051**	0.023**	0.052**	0.026**	0.073***	0.041***
	(0.022)	(0.011)	(0.022)	(0.010)	(0.026)	(0.013)
BHC_INDICATOR	0.264	0.385***	0.243	0.378***	0.148	0.335***
	(0.189)	(0.102)	(0.186)	(0.103)	(0.220)	(0.128)
AVG_TED	−0.007**	−0.010***	−0.005***	−0.005***	−0.004***	−0.005***
	(0.003)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)
UNDER_TARP	−0.735***	−0.926***	−0.693***	−0.915***	−0.532***	−0.857***
	(0.153)	(0.086)	(0.153)	(0.086)	(0.178)	(0.105)
LOG_ASSETS	0.249***	−0.055*	0.248***	−0.060*	0.240**	−0.060
	(0.091)	(0.033)	(0.090)	(0.033)	(0.095)	(0.038)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	7,722	7,022	7,722	7,022	5,029	4,527
Marginal R^2	70.4%	29.3%	71.4%	28.6%	73.0%	30.8%
Conditional R^2	78.8%	34.5%	79.0%	34.0%	80.2%	36.7%

Table 7. Alternative specification of random effects probit regressions, following Bell and Jones (2015), to assess the influence of the crisis on the propensity of US banks to pay rather than omit dividends (regression (1)), maintain/increase rather than cut dividends (regression (2)), initiate share repurchases rather than not (regression (3)), or increase rather than shrink risk-weighted assets (regression (4)) between June 30, 2004, and September 30, 2012. The binary dependent variable takes the value zero if a bank omitted a dividend (regression (1)), cut a dividend (regression (2)), did not initiate a share repurchase (regression (3)), or shrank risk-weighted assets (regression (4)) in a quarter and one otherwise. The sample includes 287 banks and 7,722 bank–quarters for dividend omissions and share repurchase initiations, 286 banks and 7,022 bank–quarters for dividend cuts, and 278 banks and 5,029 bank–quarters for risk-weighted asset reductions. The dependent variables are described in Table 1. The superscripts ***, **, and * denote statistical significance levels of 1%, 5%, and 10%, respectively, and z-statistics are reported in parentheses below the parameter estimates. For conciseness, the control variables and the intercept are not reported.

	Dividend Paid	Dividend Maintained or Increased	Buyback Initiated	RWA Increased
	(1)	(2)	(3)	(4)
MEAN_RES_NUM_OWNERS	0.001	0.0004	0.001**	0.001**
	(0.001)	(0.0005)	(0.0004)	(0.0004)
MEAN_INSTIT_CONCENTRATION	−0.495	−1.119***	0.084	−0.038
	(0.544)	(0.322)	(0.281)	(0.331)
MEAN_RES_NUM_ANALYSTS	0.067**	0.007	0.001	0.013
	(0.026)	(0.012)	(0.010)	(0.012)
MEAN_LOG_ASSETS	0.345***	−0.032	0.057*	−0.017
	(0.098)	(0.037)	(0.030)	(0.036)
DEMEANED_RES_NUM_OWNERS	0.010***	0.002	0.001	0.002**
	(0.003)	(0.001)	(0.001)	(0.001)
DEMEANED_INSTIT_CONCENTRATION	−0.483	−0.836*	−0.336	−0.127
	(0.737)	(0.498)	(0.342)	(0.295)
DEMEANED_RES_NUM_ANALYSTS	0.002	0.081***	0.007	−0.005
	(0.036)	(0.020)	(0.013)	(0.011)
DEMEANED_LOG_ASSETS	−0.453	−1.150***	−0.364***	−0.500***
	(0.403)	(0.243)	(0.126)	(0.118)
BHC_INDICATOR	0.185	0.427***	−0.128	0.010
	(0.169)	(0.105)	(0.092)	(0.109)
AVG_TED	−0.005***	−0.005***	0.00003	0.002***
	(0.001)	(0.001)	(0.001)	(0.0004)
UNDER_TARP	−0.610***	−0.789***	−1.314***	−0.635***
	(0.148)	(0.088)	(0.217)	(0.068)
Controls	Yes	Yes	Yes	Yes
Observations	7,722	7,022	7,722	5,029
Marginal R^2	70.4%	29.3%	29.7%	29.8%
Conditional R^2	78.8%	34.4%	36.5%	42.6%

Table 8. Random effects Tobit regressions to explain the quarterly dividend payout of US banks scaled by total assets (multiplied by 1,000) between June 30, 2004, and September 30, 2012. The sample includes 287 banks and 7,722 bank–quarters. The dependent variables are described in Table 1. The superscripts ***, **, and * denote statistical significance levels of 1%, 5%, and 10%, respectively, and z-statistics are reported in parentheses below the parameter estimates.

	Normalized Payout	
	(1)	(2)
RES_NUM_OWNERS	0.000	0.000
	(0.000)	(0.000)
INSTIT_CONCENTRATION	−0.328***	−0.388***
	(0.078)	(0.091)
INSTIT_CONCENTRATION*AVG_TED		0.001
		(0.001)
RES_NUM_ANALYSTS	0.003	0.002
	(0.003)	(0.003)
BHC_INDICATOR	0.037	0.037
	(0.035)	(0.035)
AVG_TED	−0.001**	−0.001
	(0.000)	(0.001)
UNDER_TARP	−0.169***	−0.167***
	(0.027)	(0.027)
LOG_ASSETS	−0.023*	−0.023*
	(0.013)	(0.013)
CAP_TO_RBC	−0.545*	−0.551*
	(0.329)	(0.329)
CASH_MKT_SEC_TO_ASSETS	−0.884***	−0.880***
	(0.228)	(0.228)
EQUITY_TO_ASSETS	0.558*	0.557*
	(0.318)	(0.319)
QCH_ASSETS	0.128	0.127
	(0.156)	(0.156)
QUARTER_ROA	13.665***	13.630***
	(2.306)	(2.310)
RET_EARN_TO_ASSETS	1.282***	1.267***
	(0.278)	(0.284)
P_{it-1}	0.997***	0.997***
	(0.011)	(0.011)
Intercept	0.358**	0.393***
	(0.145)	(0.146)
Observations	7,722	7,722
Log-likelihood	−6,838.958	−6,838.091