DOI: 10.1111/jmcb.13028

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Competition and Bank Payout Policy

Leveraging branch-level data on bank deposits, we provide evidence of a negative impact of branching restrictions on payout ratios, which occurs only for banks with a low charter value, as proxied by the market-to-book ratio. The results for the market-to-book ratio extend to the Lerner index, the return on assets, and the Z-score, suggesting that risk-shifting incentives drive our results rather than signaling incentives or agency costs. Our results are robust to different proxies for banking competition and identification strategies, and bootstrap simulations suggest that our results are not due to confounding factors.

JEL codes: G35
Keywords: dividends, competition, payout policy, share repurchases

1. INTRODUCTION

Unlike other sectors, dividend policy in banking is highly regulated. For example, one of the crucial changes in international banking regulation following the 2007–09 financial crisis is the imposition of restrictions on undercapitalized banks. Since 1992, prompt corrective actions (PCAs) can result in restrictions

We thank the editor (Pok-sang Lam) and two anonymous reviewers, Roni Michaely, Andrew Ellul, Hanh Le, Kevin Aretz, Joan Farre-Mensa, Francesco Vallascas, Felix Irresberger, Dimitris Andriosopoulos, Mascia Bedendo, Manish Gupta, seminar participants at Birmingham Business School, Leeds University Business School, the University of Bologna, and the University of International Business and Economics for their comments and suggestions on previous versions of the paper. The paper was previously circulated under the title "Market Contestability and Payout Policy."

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Received May 27, 2021; and accepted in revised form October 31, 2022.

Journal of Money, Credit and Banking, Vol. 0, No. 0 (February 2023)

on the dividends of undercapitalized depository institutions in the United States, and regulators can stop banks that fail stress tests from paying dividends (Corona, Nan, and Zhang 2019). The main reason for such regulations is the possibility that bank shareholders may engage in risk-shifting by paying dividends (Acharya et al. 2011, Acharya, Le, and Shin 2017), at the expense of bank creditors. However, evidence suggests that PCA did not eliminate risk-shifting during 1992–2008 (Kanas 2013). During the recent Covid-19 crisis, the European Central Bank ordered banks to freeze their dividends and share repurchases to improve financial stability.[1] Similarly, banks in the UK capitulated to pressure from the Prudential Regulation Authority, the regulatory arm of the Bank of England tasked with maintaining financial stability, to suspend their payouts for 2019.[2]

Recent papers have examined the nexus between competition and dividend policy for nonfinancial firms. For example, Hoberg, Phillips, and Prabhala (2014) provide evidence that product market fluidity decreases the propensity to pay dividends, while Grullon, Larkin, and Michaely (2019) find that competition due to large tariff reductions has a positive impact on dividend ratios. To the best of our knowledge, we are the first to investigate the relationship between competition and dividend policy in banking.

Banking competition is a key topic in the banking literature because of the complex relationship between banking competition and economic growth (Diallo and Koch 2018), and between banking competition and financial stability (Bikker, Shaffer, and Spierdijk 2012). Several papers suggest that an increase in banking competition improves economic outcomes. For example, Beck, Levine, and Levkov (2010) show that the removal of intrastate branching restrictions in the 1970s–90s led to higher personal incomes for people in the lower section of the income distribution. Garmaise and Moskowitz (2006) also provide evidence that a decrease in local banking competition can be detrimental for local economic growth and might result in higher crime rates.

So far, the literature has neglected the potential impact of banking competition on banks' payout policy. In this paper, we explore whether competition affects payout ratios in the banking industry. Our findings, which suggest that an increase in competitive pressure leads to higher payout ratios, complement those provided by Grullon, Larkin, and Michaely (2019). Our results are important because of the potential trade-off between paying dividends and providing liquidity to the real economy, especially during economic downturns.

Measuring precisely the impact of competition poses two challenges: first, competition is hard to measure because of the dearth of data at the market level for multimarket firms; second, it is hard to establish causality between competition and dividend policy because of the potential impact of omitted variables that may be corre-

1. https://www.ft.com/content/286e2a81-c872-4d67-b760-c9ed722e7f44

2. https://www.ft.com/content/c13d3d21-b6f3-4449-a916-2ba4271818e4

lated with the competition. Previous studies on competition employ measures at the industry level based on market structure, such as the Herfindahl–Hirschman Index (HHI).[3] The HHI finds a theoretical justification in the so-called structure-conduct-performance (SCP) paradigm (Bain 1956), which posits that competition is inversely related to concentration, and firms in more concentrated markets are able to obtain higher profits because of market power. According to the SCP, therefore, market structure is the only determinant of competition. An alternative measure of market power is the Lerner (1934) index, which is based on the mark-up of price over marginal cost (Calderon and Schaeck 2016).

We borrow from the theory of contestable markets (Baumol, Panzar, and Willig 1982) to examine the impact of an increase in competition on bank payout policy. Empirical evidence on this theory suggests that indicators of competition based solely on market structure do not capture the fact that the threat of new entrants is a key driver of firm conduct (Claessens and Laeven 2004). Consistent with recent literature on the impact of competition (Chu 2018, Nguyen, Hagendorff, and Eshraghi 2018), we bring new evidence by exploiting bank-level variation in competitive pressure due to staggered state-level regulatory reforms that followed the enactment of the Riegle–Neal Interstate Banking and Branching Efficiency Act (IBBEA) to estimate the effect of competition on payout policy. We argue that the IBBEA generated shocks exogenous to banks' dividend policy because the main objective of the IBBEA was to improve consumers' welfare (Medley 1994). For example, Richard Kovacevich, chief executive of Minneapolis-based Norwest Corp., stated that the purpose of the regulation was to allow banks to serve their "[…] customers wherever they are, wherever they want to be, and doing it faster, better and at a lower cost" (Cobb, Dahl, and Fettig 1995).[4]

We combine data for the Branching Restriction Index (BRI, Rice and Strahan 2010) and branch-level data on deposits to construct a bank-level BRI that enables us to capture the causal impact of competition on payout policy. Rice and Strahan (2010) construct the BRI on the basis of deregulation events at the state level. To the best of our knowledge, while there may be similar exogenous changes in competition in nonfinancial industries, branch-level or establishment-level data are not widely available. Our branch-level data set allows us to measure the effect of state-level changes in competition on individual banks more precisely, rendering our setup uniquely suited to address this econometric challenge. Our main finding is that the exogenous increase in competition caused by the IBBEA boosts banks' payout ratios.

3. For example, Valta (2012) employs the HHI to examine the impact of product market competition on the cost of bank debt.

4. Interstate branching is generally considered a more cost-effective route than interstate banking to pursue geographic expansion, particularly for small banks (Aguirregabiria, Clark, and Wang 2016). For instance, significantly lower costs are involved when an out-of-state branch is purchased or created compared with the acquisition of a whole out-of-state operating bank. However, the IBBEA had a heterogeneous effect across the United States since it allowed states to erect barriers against the expansion of out-of-state banks through branching activities. States could even opt out from the act.

In particular, we provide evidence of a negative relationship between the BRI (which is negatively correlated with competition) and six proxies of dividend payout ratios and total payout ratios (which consider both dividends and share repurchases), suggesting that an increase in competition leads to higher payout ratios. This result is robust to different econometric methodologies and different types of fixed effects, including tests based on bootstrap simulations to check the extent to which our results might be driven by pure chance or data mining. We also provide robustness tests using two different dummies related to the quarter in which a certain state deregulates its banking market: the first dummy considers any type of deregulation, while the second one considers only the removal of barriers to branch acquisitions and deposit caps on branch acquisitions (Nguyen, Hagendorff, and Eshraghi 2018). We additionally report that state-level deregulation mainly affects the payout ratios of banks with branches just in the affected state and of banks that are more exposed to competition from new entrants from neighboring states (i.e., banks with at least one branch in a county that borders another state).

The finding of a negative relationship between the BRI and payout ratios can be explained by a "risk-shifting" channel. This channel operates as follows. As the threat of new entrants increases, banks' charter values (also named "franchise values") decrease, in turn leading to an incentive for banks to reduce their capital (Keeley 1990) and increase bank risk-taking (Bushman, Hendricks, and Williams 2016). Acharya, Le, and Shin (2017) introduce a theoretical model highlighting that when charter value is below a critical threshold, shareholders benefit from dividend payments that shift default risk to creditors and, if there is a public bailout, taxpayers. The risk-shifting channel is also consistent with a theoretical model by Corona, Nan, and Zhang (2019), which suggests that when banks perceive that a bailout is likely, they might engage in excessive risk-taking. In support of the link between competition and charter values, Berger et al. (2018) find that the IBBEA led to a decrease in banks' charter values and a higher cost of equity.

While there are already theoretical and empirical contributions on the impact of risk-shifting incentives due to a low charter value on bank dividend policy (Onali 2014, Acharya, Le, and Shin 2017), there is currently no evidence on the impact of an increase in competition on dividend policy. This paper fills this gap and examines how exogenous shocks in competition affect bank dividend policy.

It is important to emphasize that competition might affect bank dividend policy through mechanisms that do not involve risk-shifting incentives. In particular, a possible alternative channel (the "signaling" channel) is that banks may have raised payouts as a result of an increase in market competition to signal their strength to the stock market (Bhattacharya 1979, Floyd, Li, and Skinner 2015). Moreover, an "agency costs" channel (Easterbrook 1984, Jensen 1986) can also be suggested. First, the deregulation might have incentivized banks to reduce operating costs and increase lending quality, causing higher amounts of free cash flow (Jayaratne and Strahan 1996, 1997) that may require larger cash distributions to shareholders. Second, Grullon, Larkin, and Michaely (2019) argue that competition exercises a disciplining effect on firms and pushes them to increase payout ratios.

We run a battery of tests to check whether the channel through which the IBBEA affects the payout ratios of U.S. banks is indeed related to a shock in risk incentives or whether the alternative channels are better supported empirically. In line with the "risk-shifting" channel, we show that the positive relationship between competition and payout ratios holds only for banks with a lower charter value, proxied by the market-to-book ratio. Moreover, consistent with the view that dividends can be a risk-shifting device, we also find that the banks that increase payout ratios during periods of high competition are those with low values of the Lerner index, Return On Assets (ROA), and Z-score. The above findings are at odds with a signaling explanation, given that banks with better growth opportunities (a high market-to-book ratio), with higher and more sustainable earnings (a high ROA and Lerner index), and more financially sound (a high Z-score) should tend to use a dividend to convey a positive signal about future prospects. We report mixed support for the "agency costs" channel. Consistent with this channel, we find a positive effect of deregulation on payout ratios in banks with low growth opportunities and high cash holdings. However, such a positive effect exists in banks with low values of variables that should positively affect a bank's free cash flow, such as the Lerner index and ROA.

Our findings contribute to several strands of literature. First, we contribute to the literature on competition and payout policy, which has so far focused on nonfinancial firms (Grullon, Larkin, and Michaely 2019). In this context, we are the first to highlight the link between an exogenous shock to competition, charter values, and payout policy in banks. In particular, we show that greater competition resulting from the IBBEA interstate branching deregulation leads to an increase in payout ratios and demonstrate that such an increase occurs in banks with low charter values. Our findings, therefore, corroborate studies highlighting banks' incentives to reduce their capital (Keeley 1990), increase risk-taking (Bushman, Hendricks, and Williams 2016), and boost dividend payments (Acharya, Le, and Shin 2017) because of reductions in charter values.

Second, our study contributes to the underdeveloped but growing literature on the payout policy of banks. Specifically, Onali (2014) suggests that the impact of default risk on bank payout ratios depends on bank charter value as well as proximity to capital requirements because high charter value and capital requirements help to reduce risk-shifting incentives. Floyd, Li, and Skinner (2015) argue that signaling motives are more important than agency costs for banks' dividend policy, and that banks increased payout ratios to historically high levels before the financial crisis to use dividends as a signaling device. In this respect, banks are different from industrial firms: the payout policy of industrial firms is driven more by agency costs of free cash flows rather than signaling motives (Floyd, Li, and Skinner 2015). Finally, the literature on bank dividend policy has also examined the role of CEO risk incentives (Srivastav, Armitage, and Hagendorff 2014), and CEO entrenchment (Onali et al. 2016). Unlike these studies, we focus on the role of banking competition on dividend policy, and we test hypotheses related to risk-shifting, agency costs, and signaling.

2. INSTITUTIONAL BACKGROUND AND HYPOTHESIS DEVELOPMENT

2.1 The Riegle–Neal Interstate Banking and Branching Efficiency Act

The IBBEA, introduced in 1994, removed limits to interstate bank expansion and boosted competition by allowing out-of-state banks to own both in-state banks (interstate banking) and, more importantly, branches in other states (interstate branching).[5]

The implications of the IBBEA were far-reaching with respect to interstate branching: according to Johnson and Rice (2008), the number of out-of-state branches grew from 62 to 24,728 between 1994 and 2005. However, individual states could still impose restrictions on interstate banking and branching. Such heterogeneity across states in the implementation of the IBBEA restrictions is used by Rice and Strahan (2010) to construct the BRI at the state level: the index ranges between zero and four, depending on whether a specific type of entry barrier was in force or not in a state. In particular, for the period before deregulation, the BRI takes the value of four and decreases if a state eliminates one or more entry barriers. Rice and Strahan (2010) provide a comprehensive description of the provisions adopted by the different states over the period 1994–2005 to limit interstate branching.

Prior literature documents the significant impact of the IBBEA interstate branching deregulation on bank strategies, credit supply, and corporate financial policies. For instance, interstate branching reforms lead to an increase in the concentration of deposits (Aguirregabiria, Clark, and Wang 2016), bank risk (Bushman, Hendricks, and Williams 2016), the cost of equity capital of banks (Berger et al. 2018), and bank capital (Berger, Öztekin, and Roman 2022). They also boost credit supply (Rice and Strahan 2010, Favara and Imbs 2015) and firm productivity (Krishnan, Nandy, and Puri 2015), and reduce corporate innovation (Cornaggia et al. 2015).

2.2 Competition and Bank Dividend Policy: the Risk-Shifting and Alternative Channels

Shocks to charter values due to changes in competition can affect payout ratios because of the role of charter values in shaping risk-taking incentives for banks (Keeley 1990) and because dividends in banks can be a way for bank shareholders to shift default risk to creditors (Acharya et al. 2011, Acharya, Le, and Shin 2017).

Keeley (1990) predicts that banks with a low charter value are more inclined to take excessive risks because, in the event of bank liquidation, the loss is smaller than for banks with high charter values. Moreover, for banks with low charter values, actions that might deplete the value of their assets (such as dividend payments) can be a way to shift risk to creditors. This happens because dividends decrease the value of both equity and debt, but only the shareholders receive the dividend, while the bondholders do not (Ronn and Verma 1986). Government bailout guarantees (implicit or explicit)

5. While interstate banking was already permitted in most states before these reforms, interstate branches were uncommon (Rice and Strahan 2010).

exacerbate this problem because paying dividends reduces the value of bank assets and increases the value of the government guarantee (Merton 1977).

Acharya, Le, and Shin (2017) highlight the role played by banks' charter values in determining the equilibrium level of dividend payout ratios. In their model, when default risk is nontrivial, the optimal dividend policy depends on charter value: if the charter value is low, the dividend payout ratio should be high, all other things being equal, because banks with a high charter value attempt to minimize the probability that the charter value will be lost. Risk-shifting via dividends is also consistent with a model by Juelsrud and Nenov (2020).

The IBBEA provides a unique opportunity to test the impact of exogenous shocks in competition because when individual states decide to allow banks *from other states* to enter the local market, current and future profitability for the incumbent banks is likely to decrease. As Keeley (1990) predicts, competition depresses profits because the new entrants decrease the market power of incumbent banks. For this reason, the state-level implementation of the IBBEA constitutes an exogenous shock to banks' charter values. It is plausible that sudden increases in competitive pressure from banks in other states (as a result of the IBBEA) reduce charter values and increase the incentive to shift risk to creditors by increasing payout ratios.

In our empirical analysis, we proxy for competition using a BRI measured at the bank level (*Bank BRI*). For banks operating only in one state, the value of *Bank BRI* is the state-level BRI provided by Rice and Strahan (2010). For banks with branches in more than one state, the state-level BRIs are weighted using branch-level data on deposits (*Bank BRI*). A high BRI indicates that the bank operates in states where competition is low. We also use a dummy equal to one for quarters where there is a deregulation event in the state where a bank holds the majority of its deposits (and thereafter), and zero otherwise (*BRI dummy*). Therefore, a value of one for the *BRI dummy* indicates a higher degree of competition relative to a value of zero.

Since the charter value channel suggests a negative relationship between the BRI and banks' payout ratios, the hypothesis tested in this paper is as follows:

"Competition" hypothesis: Competition has a positive impact on banks' payout ratios.

This hypothesis is consistent with a negative impact of *Bank BRI* on bank payout ratios. Moreover, it predicts a positive impact of the *BRI dummy* on payout ratios. The dependent variables in our regressions are proxies for payout ratios (see Section 3.2).

Our main tests of the *competition hypothesis* are based on shocks to competition due to the IBBEA interstate branching deregulation, which should affect bank payout ratios according to the charter value channel, which affects risk-shifting incentives. However, alternative channels could also be at play. For example, one may argue that banks may distribute a larger percentage of earnings to their shareholders when the market is more competitive to signal their strength to the stock market (Bhattacharya 1979, Floyd, Li, and Skinner 2015). In fact, there is evidence that dividend payments are associated with earnings persistence (Skinner and Soltes 2011). Agency costs might also play a role (Easterbrook 1984, Jensen 1986) because dividends help reduce excessive cash flows that managers can waste in projects with negative net present value. Evidence shows that banks respond to higher competition by decreasing their operating costs and increasing the quality of their lending portfolio (Jayaratne and Strahan 1996, 1997), leading to higher levels of free cash flows. Thus, banks might have increased their payout ratios to offset the increase in agency costs resulting from the IBBEA.

To test whether risk-shifting incentives are indeed at the root of our findings, we develop three mutually exclusive hypotheses. As is common in the banking literature (e.g., Keeley 1990), we proxy for bank charter value using the market-to-book ratio (*MTB*). If risk-shifting incentives are driving our results, then the positive impact of competition on bank payout ratios should operate through banks with low *MTB*. Overall, a more positive impact of competition on payout ratios in low-*MTB* banks would also be consistent with an agency cost mechanism because the *MTB* ratio can also be interpreted as a measure of growth opportunities. According to agency cost explanations, higher levels of payouts should be observed in low-growth corporations that may tend to use undistributed cash in wasteful ventures (Leary and Michaely 2011). Conversely, if the increase in payout ratios is due to signaling incentives, then the increase in payout ratios should be related to banks with high *MTB*. In line with this argument, Ham, Kaplan, and Leary (2020) find that dividend changes are associated with future earnings growth.

Proxies for market power and profitability can also help us identify the mechanism through which competition affects bank payout ratios. Market power and profitability are inversely related to risk-shifting incentives (Forssbæck and Shehzad 2015) because they should correlate positively with bank charter values (future profitability). Thus, if the IBBEA affects bank payout ratios via risk-shifting incentives, banks with low market power and profitability should be more likely to increase payout ratios. On the other hand, if competition affects bank payout ratios via a signaling channel, then banks with more market power and higher profits should respond more strongly to higher competition. Such a result would be consistent even with theories based on agency costs because profitable banks tend to generate more cash and should, therefore, be more subject to the disciplining effect of competition (Leary and Michaely 2011). Grullon, Larkin, and Michaely (2019) show that the disciplining effect of an exogenous increase in competition among nonfinancial firms leads to higher payout ratios. As proxies for market power and profitability, we employ the Lerner index (*Lerner*)[6] and the *ROA*, respectively.

Since the variables so far mentioned are related to all three channels, we also examine the impact of two additional variables. In particular, the agency cost channel would also be consistent with a more positive effect of competition on cash-rich banks, since these banks are more likely to have high agency costs. For this reason, we investigate whether banks with higher levels of cash holdings respond more strongly to the regulation relative to banks with low cash holdings. Moreover, to further inves-

6. A definition of *Lerner* is provided in the Online Supplementary Appendix, Section A.

tigate the risk-shifting and the signaling channels, we employ a variable commonly used to proxy for banks' distance to default: the Z-score (Boyd and Graham 1988). The Z-score is calculated as the sum of the *ROA* and the equity to total assets divided by the standard deviation of the *ROA*, and recent studies have employed the variable as a proxy for bank soundness (among others, Danisewicz et al. 2018): a higher Z-score means that a bank is less likely to default. Thus, banks with low Z-scores have higher risk-shifting incentives but lower signaling incentives. This is also consistent with the expected sign for the ROA because it appears in the numerator of the Z-score.

In line with these arguments, we put forward three additional hypotheses:

"Risk-shifting" hypothesis: Competition has a positive impact on banks' payout ratios, especially for banks with a low market-to-book ratio, a low Lerner index, a low ROA, and a low Z-score.

"Signaling" hypothesis: Competition has a positive impact on banks' payout ratios, especially for banks with a high market-to-book ratio, a high Lerner index, a high ROA, and a high Z-score.

"Agency" hypothesis: Competition has a positive impact on banks' payout ratios, especially for banks with a low market-to-book ratio, a high Lerner index, a high ROA, and a high cash holdings ratio.

The risk-shifting hypothesis can be thought of as a corollary of the competition hypothesis since it is based on a drop in charter values resulting from higher competition.

3. DATA AND METHODOLOGY

3.1 Sample Construction

Since we do not have data at the branch level for deposits before 1994, which prevents us from calculating the bank-level BRI, our sample period starts from 1994. We choose 2006 as the end of our sample period, to avoid the potential effects on banking competition of the 2007–09 financial crisis (Cornaggia et al. 2015). Our sample period is the same as that used by Nguyen, Hagendorff, and Eshraghi (2018).

We start with all U.S. banks listed on the NYSE, Amex, and NASDAQ during 1994Q1 to 2006Q4, available on the Compustat Bank Fundamentals Quarterly database. We obtain stock data from CRSP and bank deposit information from the Summary of Deposits data supplied by the Federal Deposit Insurance Corporation. The Summary of Deposits data provides information on the value of deposits held by individual bank branches and the states in which the branches are located. We use this information to build a bank-level BRI. We exclude banks located in the states of Delaware and South Dakota because of their special tax incentives for banks (Dick and Lehnert 2010), as well as those with a negative book value of equity (Celerier, Kick, and Ongena 2017).

After excluding observations without available financial and stock data, our final sample consists of 14,173 bank-quarter observations for 684 banks. Table 1 shows the main steps of our sample construction.

TABLE 1

STEPS OF SAMPLE CONSTRUCTION

	Search criterion	No. of banks	Obs.
Step 1	Listed banks from Compustat Bank (Quarterly) with primary securities in NYSE/AMEX or NASDAQ	1,266	31,172
Step 2	Excluding: banks without common stock data in CRSP	1,252	30,746
Step 3	Excluding: states Delaware and South Dakota	1,245	30,446
Step 4	Excluding: negative book value of equity	1,245	30,444
Step 5	Information availability: bank-level BRI	750	19,113
Step 6	Information availability: market capitalization	750	19,097
Step 7	Information availability: payout ratio	745	17,123
Step 8	Information availability: control variables (including cash holdings, cash flow, retain earnings, and leverage)	701	15,017
Step 9	Information availability: systematic risk	684	14,173

Note: Sample period: 1994Q1–2006Q4.

3.2 Construction of Dependent and Independent Variables

We use dividends and total payouts to examine the payout decision of banks in response to the introduction of the IBBEA. Specifically, we scale cash dividends (Compustat item *dvcq*) and total payouts (the sum of dividends and repurchases)[7] by total assets (*atq*), market capitalization (*prcc_f*cshoq*), and book common equity (*ceqq*), respectively. This gives us six proxies for the payout ratio as our dependent variable: dividends by assets (*DTA*), dividends by market capitalization (*DMV*), dividends by book common equity (*DCE*), total payouts by assets (*TTA*), total payouts by market capitalization (*TMV*), and total payouts by book common equity (*TCE*).

Our main variable of interest is the weighted-average BRI, as developed by Rice and Strahan (2010). The default setting for a bank in a given quarter is a value of 4. We first assign each state-quarter BRI to bank-quarter observations using the state BRI and the related effective date given in Table 1 of Rice and Strahan (2010). Then, we calculate the bank-level BRI (*Bank BRI*) in a given quarter, which takes into consideration the fact that a bank may have branches in several states. Therefore, we construct the bank-level BRI to be a weighted average of the BRI values for each state in which a bank has deposits, where the weight applied is the proportion of total deposits held in any given state.[8]

7. We employ the Compustat data item *prstkcy*, which is measured on a year-to-date basis. Thus, the number reported for each quarter, apart from the first quarter, is the cumulative total of all purchases of common and preferred stock within the same fiscal year. We thus take the difference of *prstkcy* between quarters to obtain the quarterly purchases of common and preferred stock for each quarter, and deduct the reduction in the book value of preferred stock (*pstkq*) to obtain the quarterly purchases. The value of share repurchases is set to 0 if missing or negative.

8. Similar to Goetz, Laeven, and Levine (2016), we link CRSP/Compustat data with data from the Summary of Deposits database using the CRSP–FRB link from the New York Federal Reserve Bank (FRB) website (http://www.newyorkfed.org/research/banking_research/datasets.html).

Our regression models control for other variables that in the corporate finance literature or in the banking literature have been found to affect dividend policy: the market-to-book ratio, bank size, cash flow to assets, cash holdings, retained earnings, leverage, bank age, and systematic risk (Fama and French 2001, Fenn and Liang 2001, Grullon and Michaely 2002, Hoberg and Prabhala 2009, Hoberg, Phillips, and Prabhala 2014).

We calculate the market-to-book ratio (*MTB*) as the bank's market value (total assets (*atq*) minus the book value of equity[9] plus market capitalization (*prcc_f*cshoq*)) over total assets. Bank size (*Size*) is defined as the log of market capitalization (inflation-adjusted). Cash flow to assets (*Cash flow*) is computed as the current operating earnings before income tax (*coeitq*) plus all other current operating expenses (*ocoeq*) minus nonrecurring income (*nriq*), divided by total assets. *Cash holdings* are computed as cash and due from banks (*cdbtq*) plus federal funds sold and securities purchased under agreement to resell (*ffsspq*), divided by total assets. *Retained earnings* are equal to the value of retained earnings (*req*) divided by total assets. *Leverage* is computed as long-term debt (*dlttq*) plus debt in current liabilities (*dlcq*), divided by the bank's market value. *Bank age* (in years)[10] is computed as the difference between a given quarterly date and the bank's beginning date recorded in CRSP. *Systematic risk* is defined as the standard deviation of the predicted value retrieved by regressing the daily stock returns in excess of the risk-free rate on the market risk premium computed using the value-weighted market return. We winsorize all dependent and independent variables at the 1st and 99th percentiles. Table 2 presents the descriptive statistics of all the variables included in our regression models. The average payout ratios (which are shown in percentages) tend to be significantly different for banks that enter other states (nonsingle-state banks, or NSS) and banks that do not have branches in other states (single-state banks, or SS). In particular, SS banks tend to have significantly lower values for all our payout ratio proxies (*DTA*, *DMV*, *DCE*, *TTA*, *TMV*, and *TCE*). NSS banks are also larger, older, and on average have a higher value of *Retained earnings*. A positive correlation between these variables and payout ratios is consistent with the life-cycle theory of dividends (DeAngelo, DeAngelo, and Stulz 2006). Therefore, the summary statistics suggest that NSS banks tend to have higher payout ratios than SS banks because they are at a later stage of the life cycle relative to SS banks.

Figure 1 shows that the ratio of NSS banks to total banks changes over time. It is clear that in 1998 the importance of NSS banks increased dramatically, jumping from around 17% of our sample in 1997 to around 26% in 1998. This is most likely

9. Book value of equity is the stockholders' equity (*seqq*) minus preferred stock (*prefsk*, which is equal to the liquidation value of preferred stock, *pstklq*, or the book value of preferred stock, *pstkq*, if missing). If data on *seqq* are missing, we consider the total of shareholders' common equity (*ceqq*) plus purchase of common and preferred stock (*pstkq*) minus *prefsk*. If data on *ceqq* minus *pstkq* are also missing, book value of equity is computed from total assets (*atq*) minus total liabilities (*ltq*) minus *prefsk*.

10. Since we use quarterly data, *Bank age* is not necessarily an integer value.

TABLE 2

SUMMARY STATISTICS

	Mean	Min	Median	Max	S.D.	Obs.	Mean NSS	Mean SS	Difference
DTA	0.104	0	0.093	0.52	0.086	14,173	0.127	0.099	0.028***
DMV	0.641	0	0.612	2.929	0.485	14,173	0.734	0.622	0.112***
DCE	1.170	0	1.077	5.588	0.937	14,173	1.463	1.109	0.354***
TTA	0.118	0	0.097	0.638	0.11	14,173	0.143	0.113	0.031***
TMV	0.716	0	0.642	3.475	0.593	14,173	0.814	0.696	0.118***
TCE	1.322	0	1.118	7.001	1.192	14,173	1.636	1.255	0.381***
Bank BRI	1.869	0	2	4	1.534	14,173	1.969	1.849	0.120***
BRI dummy	0.870	0	1	1	0.336	14,173	0.877	0.869	0.008
MTB	1.074	0.972	1.066	1.264	0.058	14,173	1.089	1.070	0.019***
Size	5.365	2.751	5.025	10.776	1.635	14,173	7.077	5.006	2.071***
Cash flow	0.007	0.001	0.007	0.015	0.002	14,173	0.007	0.007	0.001***
Cash holdings	0.059	0.011	0.047	0.233	0.042	14,173	0.059	0.059	−0.001
Retained earnings	0.044	−0.026	0.042	0.118	0.029	14,173	0.048	0.043	0.005***
Leverage	0.116	0	0.1	0.378	0.086	14,173	0.149	0.109	0.040***
Bank age	10.424	1	8.25	33.5	8.008	14,173	16.545	9.139	7.406***
Systematic risk	0.004	0	0.003	0.016	0.004	14,173	0.007	0.004	0.003***

Note: This table reports the mean (*Mean*), minimum (*Min*), median (*Median*), maximum (*Max*), standard deviation (*S.D.*), and number of observations (*Obs.*) for the main variables included in the analysis. The last three columns of this table report the average for each variable separately for nonsingle state (*Mean NSS*) and for single-state (*Mean SS*) banks, as well as the difference (*Difference*) between *Mean NSS* and *Mean SS*. The payout ratios proxies are expressed in percentages. Variable definitions are summarized in Table S.1 in the Online Supplementary Appendix. Two-sided *t*-tests are conducted on *Difference*. *** denotes $p<0.01$, ** denotes $p<0.05$, and * denotes $p<0.1$.

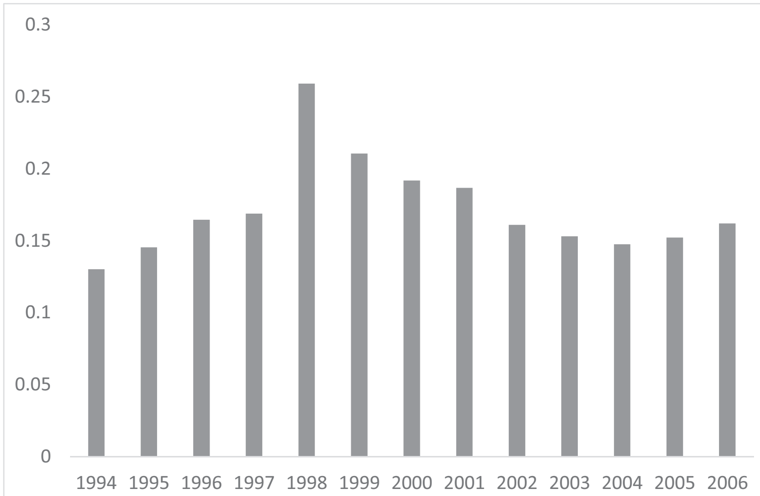

Fig 1. Ratio of Nonsingle-State Banks to Total Banks. Note: The figure presents the ratio of the number of banks which operate branches in multiple states (nonsingle-state banks) to the total number of banks for each year in our sample.

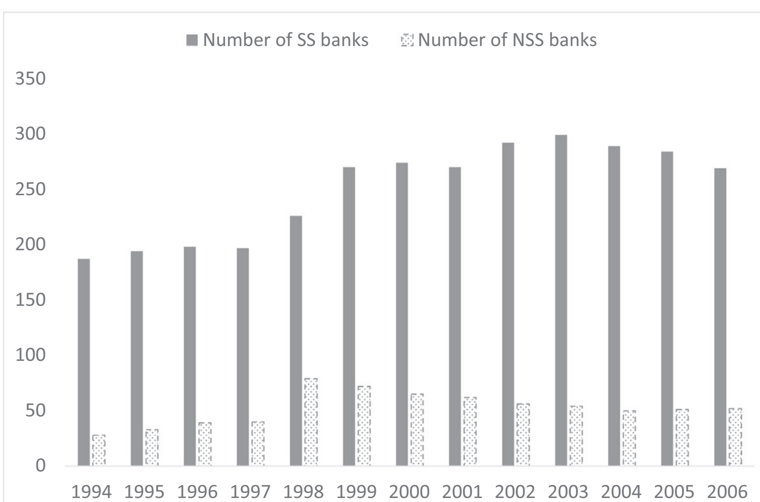

Fig 2. Number of Nonsingle-State Banks and Single-State Banks. Note: The figure presents the number of banks which operate branches in multiple states (nonsingle-state banks) and the number of banks which operate branches in a single state (single-state banks) for each year in our sample.

due to the fact that states had the option to opt out of or opt in to the IBBEA any time between September 1994 and June 1, 1997 (Johnson and Rice 2008). Notably, it seems that after the initial increase in the proportion of NSS banks, SS banks become more common in our sample.

Figure 2 shows a fall in the proportion of NSS banks from 1999 to 2004. This decrease in NSS banks reflects that a total of 43 SS banks enter and 16 NSS banks exit our sample during this period.[11] Another explanation for the rise in the proportion of SS banks could be the conversion of NSS banks to SS banks. During the 1999–2004 period, a net total of 11 banks converted from NSS to SS banks.[12] Therefore, although less important, the net conversion of NSS banks to SS banks also contributes to the increase in the proportion of SS banks. It should be noted, though, that the relatively small number of net conversions is not necessarily indicative of NSS banks being unable to compete with SS banks.

3.3 Baseline Regressions

Following previous literature on the determinants of payout policy (Fenn and Liang 2001), we employ tobit regressions to allow for the censored nature of the payout ratio. The econometric model we employ is as follows:

$$Y_{isq} = \alpha + \beta_1 BankBRI_{isq} + \delta Controls_{isq} + \gamma_{sy} + \varepsilon_{isq} \tag{1}$$

where i denotes bank, s state, y year, and q quarter, and Y_{isq} is a proxy for the payout ratio (*DTA, DMV, DCE, TTA, TMV*, and *TCE*). To assign banks to a state, we choose the state where the bank held a majority of deposits.[13] *Bank BRI* is the bank-level weighted-average BRI (Rice and Strahan 2010), where the weight is based on the fraction of deposits for bank i in a certain state. *Controls* is a vector of bank-specific control variables borrowed from the literature on payout policy (and described above), δ is a vector of coefficients, one for each variable included in *Controls*, and γ_{sy} denotes state-year fixed effects (FE), which can be included because the data and measurement of regulatory changes occur at a quarterly level. In our main regressions, we cluster the standard errors at the bank level.[14]

In addition to (1), we also employ a specification where we replace *Bank BRI* with *BRI dummy*:

$$Y_{isq} = \alpha + \beta_1 BRIdummy_{sq} + \delta Controls_{isq} + \gamma_{sy} + \varepsilon_{isq} \tag{2}$$

11. It should be noted that a number of our control variables require data from multiple databases (Compustat and CRSP) and over historical time periods. Such data coverage issues, that is, missing values either across databases or over time, affect the entry time of some banks into our sample. More precisely, during the 1999–2004 period, IPOs and data coverage account for 94 and 102 SS banks, respectively, entering our sample. In contrast, delisting and data coverage result in 144 and nine SS banks, respectively, exiting the sample. Similarly, during the 1999–2004 period, IPOs and data coverage account for two and nine NSS banks, respectively, entering our sample. A total of 24 and three NSS banks exit the sample during this period due to delisting and data coverage, respectively. Therefore, the net increase in SS banks during 1999–2004 can largely be attributed to data coverage issues and SS bank IPOs rather than the delisting, that is, failure, of NSS banks.

12. In total, 47 banks converted from being NSS banks to SS banks, while 36 banks converted from being SS banks to NSS banks.

13. Using the state where the headquarters are located, as indicated by Compustat, produces virtually the same results.

14. Robustness tests using state-level clustering produce virtually the same results.

BRI dummy is equal to one for quarters where there is a deregulation event in the state in which bank *i* holds the largest proportion of deposits (and thereafter), and zero otherwise. This setup is similar to that used by Chava et al. (2013) and Nguyen, Hagendorff, and Eshraghi (2018), although the latter study employs a slightly different definition for *BRI dummy*.[15]

Importantly, for both (1) and (2), we include in our tobit regressions state-year FE, similar to Nguyen, Hagendorff, and Eshraghi (2018).[16] In so doing, we allow for time-varying unobservable characteristics that are idiosyncratic to that state. In particular, the inclusion of state-year FE enables us to rule out that our results are due to state-level events (such as new state-level regulations) concomitant to events related to the implementation of the IBBEA. Moreover, they rule out that trends in investor preferences for dividends (e.g., catering theory, Baker and Wurgler 2004) drive our results.

To improve the robustness of our results, however, we also use specifications where we include bank FE (denoted λ_i), which allow for bank-specific time-invariant unobservable characteristics.[17]

$$Y_{isq} = \alpha + \beta_1 BankBRI_{isq} + \delta Controls_{isq} + \lambda_i + \varepsilon_{isq} \quad (3)$$

$$Y_{isq} = \alpha + \beta_1 BRIdummy_{sq} + \delta Controls_{isq} + \lambda_i + \varepsilon_{isq} \quad (4)$$

4. RESULTS

4.1 Main Results

Tables 3 and 4 report the results of our baseline regression models: Table 3 considers *Bank BRI* as the main explanatory variable, while in Table 4, we employ *BRI dummy* as the main explanatory variable. In both tables, Panel A considers only state-year FE, while Panel B considers bank FE.

Overall, the results suggest that the deregulation increases both dividend ratios and total payout ratios (which include share repurchases), supporting the view that

15. In Table 11, we report results based on the definition employed in Nguyen, Hagendorff, and Eshraghi (2018).

16. Using state-quarter FE would result in almost perfect collinearity with the main explanatory variables *Bank BRI* and *BRI dummy*.

17. It is generally understood that the maximum likelihood estimator of a standard panel tobit model with FE produces coefficients that are biased and inconsistent. However, Greene (2004) shows that the "incidental parameters problem" does not affect substantially the coefficient estimates when the number of observations for each cluster is larger than 20. In our dataset, there are on average 20 observations per bank. In our robustness tests, we consider Honorè's estimator as an alternative to the standard tobit model with FE.

TABLE 3

BASELINE REGRESSIONS OF DIVIDEND AND PAYOUT RATIOS ON *Bank BRI* AND A SET OF CONTROL VARIABLES

Panel A: With state-year FE	(1) *DTA*	(2) *DMV*	(3) *DCE*	(4) *TTA*	(5) *TMV*	(6) *TCE*
Bank BRI	−0.004**	−0.028**	−0.043*	−0.005**	−0.038***	−0.057**
	(−1.966)	(−2.286)	(−1.929)	(−2.245)	(−2.759)	(−2.166)
MTB	0.307***	−1.373***	4.048***	0.299***	−1.745***	4.151***
	(5.247)	(−4.565)	(6.089)	(4.139)	(−4.857)	(5.220)
Size	0.006**	0.031**	0.059**	0.009***	0.052***	0.085***
	(2.463)	(2.029)	(2.191)	(2.969)	(2.854)	(2.580)
Cash flow	9.420***	45.437***	79.515***	11.096***	52.660***	96.115***
	(7.856)	(7.379)	(6.969)	(9.093)	(7.933)	(7.629)
Cash holdings	−0.270***	−1.835***	−3.172***	−0.312***	−2.038***	−3.651***
	(−3.943)	(−4.818)	(−4.277)	(−4.111)	(−4.905)	(−4.460)
Retained earnings	0.612***	3.198***	3.686***	0.866***	4.427***	5.917***
	(6.188)	(5.593)	(3.516)	(7.535)	(6.948)	(4.989)
Leverage	−0.044	0.097	0.448	−0.033	0.213	0.657*
	(−1.379)	(0.493)	(1.262)	(−0.925)	(0.979)	(1.671)
Bank age	0.001***	0.009***	0.019***	0.002***	0.011***	0.028***
	(3.126)	(3.704)	(4.063)	(3.533)	(4.021)	(4.806)
Systematic risk	−0.942*	−6.217**	−10.590*	−1.804***	−11.928***	−21.145***
	(−1.799)	(−2.040)	(−1.760)	(−2.702)	(−3.231)	(−2.839)
Standard errors	Bank	Bank	Bank	Bank	Bank	Bank
Bank FE	NO	NO	NO	NO	NO	NO
State-year FE	YES	YES	YES	YES	YES	YES
Banks	684	684	684	684	684	684
Observations	14,173	14,173	14,173	14,173	14,173	14,173

Panel B: With bank FE	*DTA*	*DMV*	*DCE*	*TTA*	*TMV*	*TCE*
Bank BRI	−0.007***	−0.039***	−0.079***	−0.003*	−0.016	−0.033*
	(−5.441)	(−4.735)	(−5.418)	(−1.676)	(−1.628)	(−1.783)
Controls	YES	YES	YES	YES	YES	YES
Standard errors	Bank	Bank	Bank	Bank	Bank	Bank
Bank FE	YES	YES	YES	YES	YES	YES
State-year FE	NO	NO	NO	NO	NO	NO
Banks	684	684	684	684	684	684
Observations	14,173	14,173	14,173	14,173	14,173	14,173

Note: This table reports parameter estimates for the panel tobit models, with fixed effects, described in equations (1) and (3). The dependent variables are: in column 1, total cash dividends divided by total assets (*DTA*); in column 2, total cash dividends divided by market capitalization (*DMV*); in column 3, total cash dividends divided by book common equity (*DCE*); in column 4, total payouts (total dividends plus share repurchases) divided by total assets (*TTA*); in column 5, total payouts divided by market capitalization (*TMV*); and in column 6, total payouts divided by book common equity (*TCE*). *Bank BRI* is constructed as follows. The default setting for a bank in a given year is a value of 4. We first assign each state-quarter BRI to bank-quarter observations using the state branching restrictions index and the related effective date given in Table 1 of Rice and Strahan (2010). Then, we calculate the bank-level BRI (*Bank BRI*) in a given quarter, which takes into consideration the fact that a bank may have branches in several states. Therefore, we construct the bank-level BRI to be a weighted-average of the BRI values for each state in which a bank has deposits, where the weight applied is the proportion of total deposits held in any given state. Definitions of control variables can be found in Table S.1 in the Online Supplementary Appendix. All variables are winsorized at the 1st and 99th percentiles. Panel A reports estimates for panel tobit models with state-year fixed effects. Panel B reports estimates for panel tobit models with bank fixed effects only. The sample includes 684 banks from the universe of banks in Compustat Bank (SIC codes 6020–6163). Standard errors are clustered at the bank level and *t*-statistics are reported in parentheses. *** denotes $p<0.01$, ** denotes $p<0.05$, and * denotes $p<0.1$.

competition has a positive impact on payout ratios, consistent with the *competition hypothesis*.[18]

18. Tables S.2 and S.3 in the Online Supplementary Appendix report results for regressions with both bank FE and state-year FE. The magnitude of the coefficients on *Bank BRI* and *BRI dummy* does not change substantially. To further support the robustness of our results, Table S.4 shows the results of regressions where we include *Primary State BRI* instead of *Bank BRI* or *BRI dummy*. The *Primary State BRI* corresponds to the BRI value for the state in which a bank holds the majority of its deposits, that is,

TABLE 4

Baseline regressions of dividend and payout ratios on BRI dummy and a set of control variables

Panel A: With state-year FE	(1) *DTA*	(2) *DMV*	(3) *DCE*	(4) *TTA*	(5) *TMV*	(6) *TCE*
BRI dummy	0.024***	0.127***	0.237***	0.025***	0.142***	0.251***
	(4.708)	(4.109)	(4.480)	(4.712)	(4.252)	(4.428)
MTB	0.305***	−1.385***	4.024***	0.296***	−1.756***	4.130***
	(5.193)	(−4.591)	(6.042)	(4.097)	(−4.876)	(5.184)
Size	0.006**	0.031**	0.059**	0.009***	0.052***	0.085***
	(2.465)	(2.029)	(2.192)	(2.971)	(2.855)	(2.581)
Cash flow	9.415***	45.374***	79.457***	11.086***	52.546***	95.981***
	(7.851)	(7.363)	(6.956)	(9.092)	(7.914)	(7.621)
Cash holdings	−0.271***	−1.841***	−3.182***	−0.313***	−2.046***	−3.663***
	(−3.954)	(−4.828)	(−4.287)	(−4.124)	(−4.916)	(−4.471)
Retained earnings	0.612***	3.195***	3.681***	0.865***	4.422***	5.910***
	(6.187)	(5.590)	(3.513)	(7.536)	(6.946)	(4.987)
Leverage	−0.045	0.095	0.446	−0.033	0.212	0.655*
	(−1.387)	(0.487)	(1.255)	(−0.932)	(0.974)	(1.666)
Bank age	0.001***	0.009***	0.019***	0.002***	0.011***	0.028***
	(3.114)	(3.688)	(4.050)	(3.519)	(4.002)	(4.792)
Systematic risk	−0.942*	−6.227**	−10.596*	−1.806***	−11.946***	−21.164***
	(−1.801)	(−2.044)	(−1.763)	(−2.705)	(−3.236)	(−2.842)
Standard errors	Bank	Bank	Bank	Bank	Bank	Bank
Bank FE	NO	NO	NO	NO	NO	NO
State-year FE	YES	YES	YES	YES	YES	YES
Banks	684	684	684	684	684	684
Observations	14,173	14,173	14,173	14,173	14,173	14,173

Panel B: With bank FE	*DTA*	*DMV*	*DCE*	*TTA*	*TMV*	*TCE*
BRI dummy	0.033***	0.195***	0.374***	0.012**	0.085***	0.150***
	(7.925)	(6.986)	(7.964)	(2.347)	(2.647)	(2.600)
Controls	YES	YES	YES	YES	YES	YES
Standard errors	Bank	Bank	Bank	Bank	Bank	Bank
Bank FE	YES	YES	YES	YES	YES	YES
State-year FE	NO	NO	NO	NO	NO	NO
Banks	684	684	684	684	684	684
Observations	14,173	14,173	14,173	14,173	14,173	14,173

Note: This table reports parameter estimates for the panel tobit models described in equations (2) and (4). The dependent variables are: in column 1, total cash dividends divided by total assets (*DTA*); in column 2, total cash dividends divided by market capitalization (*DMV*); in column 3, total cash dividends divided by book common equity (*DCE*); in column 4, total payouts (total dividends plus share repurchases) divided by total assets (*TTA*); in column 5, total payouts divided by market capitalization (*TMV*); and in column 6, total payouts divided by book common equity (*TCE*). The *BRI dummy* variable equals one for quarters where there is a deregulation event in the state in which a bank primarily operates (and thereafter), and zero otherwise. The state where a bank primarily operates corresponds to the state in which the largest proportion of deposits are held. Deregulation events refer to the date on which a state began to permit interstate branching, as per the IBBEA of 1994. These dates can be found in Table 1 of Rice and Strahan (2010). Definitions of control variables can be found in Table S.1 in the Online Supplementary Appendix. The dependent variables and all control variables are winsorized at the 1st and 99th percentiles. Panel A reports estimates for panel tobit models with state-year fixed effects. Panel B reports estimates for panel tobit models with bank fixed effects only. The sample includes 684 banks from the universe of banks in Compustat Bank (SIC codes 6020–6163). Standard errors are clustered at the bank level and t-statistics are reported in parentheses. *** denotes $p<0.01$, ** denotes $p<0.05$, and * denotes $p<0.1$.

In addition to having a statistically significant relationship between changes in *Bank BRI* and payout ratios, the magnitude of the impact of changes in *Bank BRI* is moderate but not economically negligible. For example, the marginal effect (untabulated) for *Bank BRI* in the first column of Table 3, Panel A, is −0.00342, meaning that a decrease (increase) in *Bank BRI* by one standard deviation (1.534, as reported in Table 2) leads to an increase (decrease) in *DTA* by 0.005 percentage points (−0.00342 *1.534). Given that the average for *DTA* is 0.1 percentage points, a decrease (increase) by one standard deviation in *Bank BRI* increases (decreases) *DTA* by around 5% of its sample mean. Similarly, the marginal effect for *Bank BRI* in the second column of Table 3, Panel A, is −0.0239, and a decrease by one standard deviation in *Bank BRI* increases *DMV* by around 5.7% of the sample mean for *DMV*.

A potential criticism of our approach is that our main results might be related to a change in the denominator of our proxies for payout ratios rather than an actual increase in dividends. To test whether this is the case, we run probit regressions to examine the impact of *Bank BRI* on the probability of a dividend increase. The results reported in Table 5 rule out that this is the case: *Bank BRI* is negatively correlated with the probability of dividend increases and, therefore, deregulation increases the probability of a dividend increase. The marginal effects for *Bank BRI* are between −0.026 and −0.029, suggesting that a decrease (increase) in *Bank BRI* by one standard deviation (1.534) increases (decreases) the probability of a dividend increase by more than 4%.

4.2 Threats to Identification

A potential concern for the validity of our approach, based on the exogeneity of the deregulation events relative to bank dividend policy, is that state regulators may have considered bank payout ratios as a factor affecting their decisions regarding the degree to which competition in that state should be restricted. If this were true, there would be reverse causality between the *BRI* and bank payout ratios.

Table 6 reports the results of regressions where *Bank BRI* is regressed against several proxies for payout ratios and macroeconomic variables.

$$BankBRI_{isq} = \alpha + \beta_1 Y_{isq-1} + \gamma_{sq} + \varepsilon_{isq} \tag{5a}$$

$$BankBRI_{isq} = \alpha + \beta_1 Y_{isq-1} + \theta MacroVars_{sy-1} + \gamma_{sq} + \varepsilon_{isq} \tag{5b}$$

where Y_{isq-1} is the lag of any of the proxies for payout ratios used before, and θ is a vector of coefficients for state-level macroeconomic variables: *Political balance*,

the primary state in which the bank operates. The results do not differ materially to those of our baseline regressions based on *Bank BRI*. In Tables S.5 and S.6 (provided in the Online Supplementary Appendix), we run robustness checks using Honorè's estimator as an alternative to the standard tobit model with FE. The results are qualitatively equivalent to those reported in Tables 3 and 4.

TABLE 5

Probit regressions of Dividend increase on Bank BRI

	(1) *Dividend increase*	(2) *Dividend increase*	(4) *Dividend increase*	(5) *Dividend increase*
Bank BRI	−0.078***	−0.087**	−0.078**	−0.087**
	(−2.592)	(−2.480)	(−2.261)	(−2.291)
MTB		0.805*		0.805
		(1.756)		(1.527)
Size		0.055***		0.055**
		(2.677)		(2.509)
Cash flow		37.713***		37.713***
		(3.904)		(3.332)
Cash holdings		−0.905		−0.905
		(−1.380)		(−1.029)
Retained earnings		−2.151***		−2.151**
		(−2.815)		(−2.290)
Leverage		−0.003		−0.003
		(−0.008)		(−0.008)
Bank age		−0.013***		−0.013***
		(−3.947)		(−3.569)
Systematic risk		3.725		3.725
		(0.694)		(0.922)
Constant	−0.530***	−1.696***	−0.530***	−1.696***
	(−3.568)	(−3.557)	(−16.130)	(−3.517)
Observations	12,785	10,874	12,785	10,874
Fixed effects	State-year	State-year	State-year	State-year
Standard errors	Bank	Bank	State	State
Pseudo R^2	0.0344	0.0461	0.0344	0.0461

Note: This table reports parameter estimates for probit regressions where the dependent variable, *Dividend increase*, takes the value of 1 if there is an increase in the dividend per share, and 0 otherwise. *Bank BRI* is constructed as follows. The default setting for a bank in a given year is a value of 4. We first assign each state-quarter BRI to bank-quarter observations using the state branching restrictions index and the related effective date given in Table 1 of Rice and Strahan (2010). Then, we calculate the bank-level BRI (*Bank BRI*) in a given quarter, which takes into consideration the fact that a bank may have branches in several states. Therefore, we construct the bank-level BRI to be a weighted-average of the BRI values for each state in which a bank has deposits, where the weight applied is the proportion of total deposits held in any given state. Additional control variables are included in the model, and their definition can be found in Table S.1 in the Online Supplementary Appendix. All of the independent variables are one-quarter lagged. Standard errors are clustered either at the bank or at the state level. Robust z-statistics in parentheses. *** denotes $p<0.01$, ** denotes $p<0.05$, and * denotes $p<0.1$.

GDP per capita, *GDP percentage change*, and *Unemployment rate* (definitions are provided in the Online Supplementary Appendix, Table S.1).

These regressions are testing for evidence of reverse causality. That is, for the possibility that payout ratios determine the degree of branching restrictiveness in a state. Since all of the coefficients on the proxies for payout ratios are insignificant, our results do not provide support for reverse causality.

Table 7 reports the results of regressions where the dependent variable is a dummy variable equal to one if state s introduces the IBBEA in quarter q, and zero for observations before the deregulation takes place (*State BRI dummy*). Since our aim is to test whether the timing of the introduction depends on the payout ratios of banks in that state, a state is dropped from the analysis for the periods from $q+1$ onward. The branching law dummy is regressed against several proxies for state-level payout ratios, calculated as the weighted-average values of the annual values of payout ra-

TABLE 6

Regressions of Bank BRI on payout ratios

Dependent variable: *Bank BRI*												
DTA_{t-1}	0.026						0.026					
	(1.136)						(1.164)					
DMV_{t-1}		−0.001						0.001				
		(−0.176)						(0.183)				
DCE_{t-1}			0.002						0.002			
			(0.878)						(1.033)			
TTA_{t-1}				0.018						0.017		
				(1.099)						(1.049)		
TMV_{t-1}					−0.001						−0.000	
					(−0.464)						(−0.188)	
TCE_{t-1}						0.001						0.001
						(0.805)						(0.885)
Political balance $_{t-1}$							−0.468	−0.470	−0.470	−0.469	−0.470	−0.470
							(−1.409)	(−1.408)	(−1.412)	(−1.407)	(−1.406)	(−1.411)
GDP per capita $_{t-1}$							0.000	0.000	0.000	0.000	0.000	0.000
							(0.687)	(0.675)	(0.689)	(0.690)	(0.667)	(0.690)

(*Continued*)

TABLE 6
(CONTINUED)

Dependent variable: *Bank BRI*

GDP percentage change $_{t-1}$							0.063***	0.063***	0.063***	0.063***	0.063***	0.063***
							(2.946)	(2.943)	(2.952)	(2.939)	(2.944)	(2.946)
Unemployment rate $_{t-1}$							0.089**	0.088**	0.088**	0.088**	0.088**	0.088**
							(2.539)	(2.525)	(2.538)	(2.527)	(2.523)	(2.527)
Constant	1.986***	2.002***	1.992***	1.990***	2.003***	1.994***	0.827	0.847	0.831	0.831	0.855	0.834
	(160.177)	(206.203)	(221.898)	(227.178)	(291.556)	(290.034)	(1.205)	(1.233)	(1.211)	(1.211)	(1.248)	(1.216)
Standard errors	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank
Banks	649	649	649	649	649	649	642	642	642	642	642	642
Observations	12,067	12,067	12,067	12,067	12,067	12,067	11,946	11,946	11,946	11,946	11,946	11,946
Adjusted R^2	0.987	0.986	0.987	0.987	0.986	0.987	0.987	0.987	0.987	0.987	0.987	0.987

Note: This table reports parameter estimates for the panel regression models described in equations (5a) and (5b), where *Bank BRI* is the dependent variable and dividend and payout ratios are the independent variables for equation (5a). Additional macroeconomic variables are added as independent variables to equation (5b). *Bank BRI* is constructed as follows. The default setting for a bank in a given year is a value of 4. We first assign each state-quarter BRI to bank-quarter observations using the state branching restrictions index and the related effective date given in Table 1 of Rice and Strahan (2010). Then, we calculate the bank-level BRI (*Bank BRI*) in a given quarter, which takes into consideration the fact that a bank may have branches in several states. Therefore, we construct the bank-level BRI to be a weighted-average of the BRI values for each state in which a bank has deposits, where the weight applied is the proportion of total deposits held in any given state. The independent variables are: total cash dividends divided by total assets (*DTA*); total cash dividends divided by the market capitalization (*DMV*); total cash dividends divided by the market value of common equity (*DCE*); total payouts (total dividends plus share repurchases) divided by total assets (*TTA*); total payouts divided by market capitalization (*TMV*); and total payouts divided by common equity (*TCE*). Note, annual values of the payout ratios are used each quarter. More precisely, the sum of each payout ratio over the current and prior three quarters is used as independent variable. Four macroeconomic variables are considered: *Political balance*, *GDP per capita*, *GDP percentage change*, and *Unemployment rate* (definitions are provided in the Online Supplementary Appendix, Table S.1). All variables are winsorized at the 1st and 99th percentiles. All models are estimated using OLS with state-quarter fixed effects. The sample includes 649 banks from the universe of banks in Compustat Bank (SIC codes 6020–6163). Standard errors are clustered at the bank level and *t*-statistics are reported in parentheses. *** denotes $p<0.01$, ** denotes $p<0.05$, and * denotes $p<0.1$.

TABLE 7

STATE-LEVEL PROBIT REGRESSIONS OF THE STATE INTERSTATE BRANCHING LAWS ON PAYOUT RATIOS

Dependent variable: state BRI dummy												
$WDTA_{t-1}$	4.138						−0.011					
	(1.455)						(−0.011)					
$WDMV_{t-1}$		0.602						0.008				
		(1.149)						(0.051)				
$WDCE_{t-1}$			0.111						−0.060			
			(0.409)						(−0.599)			
$WTTA_{t-1}$				3.369						−0.149		
				(1.233)						(−0.186)		
$WTMV_{t-1}$					0.484						−0.011	
					(1.029)						(−0.075)	
$WTCE_{t-1}$						0.092						−0.061
						(0.346)						(−0.623)
Political balance $_{t-1}$	0.906	0.827	0.718	0.848	0.787	0.719	−0.328	−0.324	−0.359	−0.347	−0.332	−0.358
	(0.570)	(0.607)	(0.466)	(0.534)	(0.560)	(0.462)	(−0.505)	(−0.513)	(−0.555)	(−0.526)	(−0.523)	(−0.554)
GDP per capita $_{t-1}$	0.002***	0.002***	0.002***	0.002***	0.002***	0.002***	0.000*	0.000*	0.000	0.000*	0.000*	0.000
	(5.207)	(4.407)	(4.467)	(5.009)	(4.598)	(4.447)	(1.697)	(1.714)	(1.576)	(1.694)	(1.704)	(1.577)

(*Continued*)

TABLE 7
(CONTINUED)

Dependent variable: state BRI dummy												
GDP percentage change $_{t-1}$	−0.549***	−0.535***	−0.497***	−0.532***	−0.517***	−0.496***	−0.277**	−0.277**	−0.284**	−0.277**	−0.278**	−0.284**
	(−3.601)	(−2.913)	(−3.424)	(−3.646)	(−3.196)	(−3.436)	(−2.184)	(−2.198)	(−2.194)	(−2.170)	(−2.198)	(−2.195)
Unemployment rate $_{t-1}$	−1.445	−1.466	−1.109	−1.345	−1.354	−1.095	−0.048	−0.048	−0.057	−0.050	−0.049	−0.057
	(−1.132)	(−0.920)	(−0.896)	(−1.091)	(−0.919)	(−0.890)	(−0.318)	(−0.312)	(−0.376)	(−0.328)	(−0.323)	(−0.378)
Constant	−48.526***	−48.786***	−44.319***	−47.194***	−47.584***	−44.067***	−1.123	−1.179	−0.537	−1.012	−1.067	−0.524
	(−3.125)	(−3.569)	(−2.860)	(−2.988)	(−3.395)	(−2.829)	(−0.580)	(−0.589)	(−0.269)	(−0.537)	(−0.539)	(−0.264)
Fixed effects	State	State	State	State	State	State	Quarter	Quarter	Quarter	Quarter	Quarter	Quarter
Standard errors	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank	Bank
Observations	279	279	279	279	279	279	153	153	153	153	153	153
Pseudo R^2	0.395	0.393	0.386	0.392	0.391	0.386	0.435	0.435	0.437	0.435	0.435	0.438

Note: This table reports parameter estimates for the panel regression model described in equations (6a) and (6b), where *BRI dummy* is the dependent variable and the independent variables are dividend and payout ratios and macroeconomic variables. *BRI dummy* is a dummy variable equal to one when a state starts implementing the IBBEA ("effective dates" in Rice and Strahan 2010) and zero before that quarter (a state is dropped out of the sample for subsequent quarters). The effective dates of the implementation of IBBEA for each state can be found in Table 1 of Rice and Strahan (2010). The independent variables are one-quarter lagged, including: weighted average values of the annual values of payout ratios, calculated using a four-quarter rolling window (*WDTA*, *WDMV*, *WDCE*, *WTTA*, *WTMV*, and *WTCE*), *Political balance*, *GDP per capita*, *GDP percentage change*, and *Unemployment rate* (definitions are provided in the Online Supplementary Appendix, Table S.1). All variables are winsorized at the 1st and 99th percentiles. All models are estimated using probit models with fixed effects. Standard errors are clustered at the state level and z-statistics are reported in parentheses. *** denotes $p<0.01$, ** denotes $p<0.05$, and * denotes $p<0.1$.

tios (*WDTA*, *WDMV*, *WDCE*, *WTTA*, *WTMV*, and *WTCE*, defined in Table S.1 of the Online Supplementary Appendix), and macroeconomic variables.

$$State\ BRI\ dummy_{sq} = \alpha + \beta_1 Y_{sq-1} + \theta MacroVars_{sy-1} + \lambda_s + \varepsilon_{sq} \tag{6a}$$

$$State\ BRI\ dummy_{sq} = \alpha + \beta_1 Y_{sq-1} + \theta MacroVars_{sy-1} + \gamma_q + \varepsilon_{sq} \tag{6b}$$

The coefficients on the state-level payout ratios are, once again, insignificant, mitigating reverse causality concerns.

We also investigate the possibility that we are capturing events that do not affect only banking institutions but also nonbank financial firms. Table 8 reports the results for a sample of 239 nonbank financial firms (SIC codes 6170–6200, 6300–6411, and 6700–6799). Panel A reports the results where the main explanatory variable is the *BRI dummy*, while Panel B reports the results for the *BRI*, which is the state-level BRI provided by Rice and Strahan (2010). We focus on the results for the *BRI dummy* because for nonbank financial firms, we cannot know whether a firm is operating in multiple states, and therefore, we cannot compute *Bank BRI* for each nonbanking firm. For this reason, we use the state-level BRI. The coefficients on the *BRI dummy* and the *BRI* are insignificant at the 5% level in all specifications except for one, suggesting that the deregulation affected the payout policy of bank financial institutions rather than nonbank institutions. These findings rule out that other concomitant events affecting the whole financial industry (or all firms) might have driven our results.

4.3 Risk-Shifting Versus Alternative Channels

In this section, we report the results of sample-split regressions to test whether the "risk-shifting" channel, the "signaling" channel, or the "agency costs" channel are at the root of our main findings.

The results reported in Table 9 consider the sample splits on the basis of the median value of each of the following variables: the market-to-book ratio (*MTB*), the Lerner index, the ROA, the Z-score, and cash holdings. The results for *MTB* suggest that banks with a lower market-to-book ratio, and thus a lower charter value, are the only ones for which the coefficient on *Bank BRI* is negative and statistically significant, consistent with the risk-shifting channel. However, these results are also consistent with the agency costs channel, if we interpret *MTB* as a proxy for growth opportunities. On the other hand, these results are contrary to the signaling hypothesis.

The results for the sample splits based on the Lerner index and *ROA* suggest that banks with a lower degree of market power and profitability react more strongly to changes in interstate bank branching laws. In fact, the coefficient remains negative and significant for observations for which the Lerner index is below or equal to the sample median (banks with low market power), but it generally becomes insignificant for observations for which the Lerner index is above the sample median (banks with high market power). In line with the results for *Lerner*, the results for *ROA* show that the negative coefficient on *Bank BRI* is significant only for less profitable banks (*ROA*

TABLE 8

BASELINE REGRESSIONS OF DIVIDEND AND PAYOUT RATIOS ON BRI dummy OR STATE-LEVEL BRI AND A SET OF CONTROL VARIABLES FOR NONBANK FINANCIAL FIRMS

Panel A: *BRI dummy*	(1) *DTA*	(2) *DMV*	(3) *DCE*	(4) *TTA*	(5) *TMV*	(6) *TCE*
BRI dummy	−0.043	−0.080	−0.096	0.101	0.134	0.367
	(−0.997)	(−1.577)	(−1.040)	(0.903)	(1.075)	(1.261)
MTB	0.118***	−0.089***	0.151***	0.448***	−0.235***	0.692***
	(4.509)	(−3.044)	(2.654)	(4.062)	(−3.970)	(2.681)
Size	0.039***	0.051***	0.165***	0.068**	0.117***	0.467***
	(2.819)	(2.758)	(4.792)	(2.480)	(3.315)	(5.610)
Cash flow	2.618***	0.346	3.476*	9.563***	3.809*	20.988***
	(2.715)	(0.326)	(1.670)	(3.875)	(1.905)	(3.393)
Cash holdings	−0.131	−0.253	−0.299	0.261	0.503*	0.921
	(−0.796)	(−1.438)	(−0.775)	(0.957)	(1.667)	(1.113)
Retained earnings	0.298**	0.148	0.346	0.736***	0.445**	0.534
	(2.485)	(0.935)	(1.411)	(3.642)	(2.078)	(0.867)
Leverage	−0.060	−0.107	0.063	0.301	0.386	0.853
	(−0.438)	(−0.453)	(0.142)	(1.012)	(0.878)	(0.899)
Bank age	−0.001	0.001	0.003	0.001	−0.001	0.000
	(−0.415)	(0.411)	(0.389)	(0.181)	(−0.184)	(0.029)
Systematic risk	−13.313***	−11.111*	−27.199**	−21.300**	−13.471	−50.895*
	(−3.466)	(−1.849)	(−2.470)	(−2.444)	(−1.198)	(−1.870)
Panel B: *BRI*	(1) *DTA*	(2) *DMV*	(3) *DCE*	(4) *TTA*	(5) *TMV*	(6) *TCE*
BRI	−0.012	0.008	−0.130	0.035	−0.069*	−0.252***
	(−0.237)	(0.095)	(−0.915)	(1.242)	(−1.805)	(−2.639)
MTB	0.118***	−0.089***	0.151***	0.449***	−0.234***	0.693***
	(4.489)	(−3.054)	(2.643)	(4.068)	(−3.964)	(2.688)
Size	0.039***	0.051***	0.165***	0.068**	0.118***	0.468***
	(2.814)	(2.750)	(4.787)	(2.488)	(3.323)	(5.619)
Cash flow	2.624***	0.357	3.489*	9.553***	3.796*	20.952***
	(2.718)	(0.336)	(1.675)	(3.873)	(1.901)	(3.391)
Cash holdings	−0.130	−0.252	−0.297	0.259	0.501*	0.916
	(−0.792)	(−1.433)	(−0.771)	(0.953)	(1.662)	(1.108)
Retained earnings	0.298**	0.148	0.345	0.737***	0.446**	0.536
	(2.482)	(0.931)	(1.408)	(3.644)	(2.082)	(0.871)
Leverage	−0.059	−0.105	0.065	0.299	0.384	0.847
	(−0.433)	(−0.447)	(0.145)	(1.007)	(0.874)	(0.894)
Bank age	−0.001	0.001	0.003	0.001	−0.001	0.000
	(−0.416)	(0.410)	(0.388)	(0.183)	(−0.183)	(0.031)
Systematic risk	−13.298***	−11.085*	−27.165**	−21.335**	−13.515	−51.025*
	(−3.462)	(−1.844)	(−2.467)	(−2.448)	(−1.202)	(−1.875)
Standard errors	Firm	Firm	Firm	Firm	Firm	Firm
State-year FE	YES	YES	YES	YES	YES	YES
Firms	239	239	239	239	239	239
Observations	5,931	5,931	5,931	5,931	5,931	5,931

Note: This table reports parameter estimates for the panel tobit models. The dependent variables from columns 1 to 6 are: total cash dividends divided by total assets (*DTA*); total cash dividends divided by the market capitalization (*DMV*); total cash dividends divided by the book value of common equity (*DCE*); total payouts (total dividends plus share repurchases) divided by total assets (*TTA*); total payouts divided by market capitalization (*TMV*); and total payouts divided by book common equity (*TCE*). The *BRI dummy* variable equals one for quarters where there is a deregulation event in the state in which a bank primarily operates (and thereafter), and zero otherwise. The state where a bank primarily operates corresponds to the state in which the largest proportion of deposits are held. Deregulation events refer to the date on which a state began to permit interstate branching, as per the IBBEA of 1994. These dates can be found in Table 1 of Rice and Strahan (2010). For each institution, the state-level BRI (*BRI*) is based on the branching restrictions index for the state where the institution is headquartered and the related effective date given in Table 1 of Rice and Strahan (2010). Definitions of control variables can be found in Table S.1 in the Online Supplementary Appendix. The dependent variables and all control variables are winsorized at the 1st and 99th percentiles. Panels A and B report estimates for panel tobit models, where the *BRI dummy* and *Bank BRI* are included, respectively, as an independent variable. The sample includes 239 nonbank financial firms, which are publicly listed (SIC codes 6170–6200, 6300–6411, and 6700–6799). Standard errors are clustered at the firm level and *t*-statistics are reported in parentheses. Constant included but not reported. State-year fixed effects included for both Panels A and B. *** denotes $p<0.01$, ** denotes $p<0.05$, and * denotes $p<0.1$.

TABLE 9

SAMPLE SPLIT REGRESSIONS

Sample split variable		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
		DTA	*DTA*	*DMV*	*DMV*	*DCE*	*DCE*	*TTA*	*TTA*	*TMV*	*TMV*	*TCE*	*TCE*
		Below	Above	Below	Above	Below	Above	Below	Above	Below	Above	Below	Above
MTB	Bank BRI	−0.004**	−0.003	−0.024*	−0.013	−0.051***	−0.028	−0.005**	−0.005	−0.029**	−0.027	−0.058***	−0.057
	Control variables	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
	State-year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
	Banks	581	575	581	575	581	575	581	575	581	575	581	575
Lerner	Bank BRI	−0.006**	−0.003	−0.042***	−0.014	−0.076***	−0.012	−0.007**	−0.006*	−0.049***	−0.029	−0.081**	−0.039
	Control variables	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
	State-year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
	Banks	588	538	588	538	588	538	588	538	588	538	588	538
ROA	Bank BRI	−0.007**	−0.004	−0.047**	−0.023	−0.093***	−0.026	−0.010***	−0.004	−0.065***	−0.028	−0.124***	−0.031
	Control variables	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
	State-year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
	Banks	600	533	600	533	600	533	600	533	600	533	600	533

(*Continued*)

TABLE 9

(Continued)

Sample split variable		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
		DTA	*DTA*	*DMV*	*DMV*	*DCE*	*DCE*	*TTA*	*TTA*	*TMV*	*TMV*	*TCE*	*TCE*
		Below	Above	Below	Above	Below	Above	Below	Above	Below	Above	Below	Above
Z-score	Bank BRI	−0.008**	−0.001	−0.055***	−0.008	−0.084**	−0.014	−0.008**	−0.003	−0.063***	−0.017	−0.090**	−0.031
	Control variables	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
	State-year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
	Banks	627	590	627	590	627	590	627	590	627	590	627	590
Cash holdings	Bank BRI	0.001	−0.007**	−0.004	−0.039**	−0.001	−0.064*	−0.001	−0.007**	−0.016	−0.043**	−0.025	−0.062**
	Control variables	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
	State-year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
	Banks	539	596	539	596	539	596	539	596	539	596	539	596

Note: This table reports parameter estimates for the panel tobit models described in equation (1) with state-year fixed effects. We report results for regressions where the sample is split such that banks that had either a value greater than (above) or a value less than or equal to (below) the median value, measured using all observations, for a particular bank characteristic are used. The bank characteristics used to split the samples include: the Lerner Index (*Lerner*); the market-to-book ratio (*MTB*); the return on assets (*ROA*); the Z-score; and cash holdings (*Cash holdings*). The dependent variables are: in columns 1 and 2, total cash dividends divided by total assets (*DTA*); in columns 3 and 4, total cash dividends divided by market capitalization (*DMV*); in columns 5 and 6, total cash dividends divided by the book value of common equity (*DCE*); in columns 7 and 8, total payouts (total dividends plus share repurchases) divided by total assets (*TTA*); in columns 9 and 10, total payouts divided by market capitalization (*TMV*); and in columns 11 and 12, total payouts divided by book common equity (*TCE*). We report parameter estimates for *Bank BRI*. *Bank BRI* is constructed as follows. The default setting for a bank in a given year is a value of 4. We first assign each state-quarter BRI to bank-quarter observations using the state branching restrictions index and the related effective date given in Table 1 of Rice and Strahan (2010). Then, we calculate the bank-level BRI (*Bank BRI*) in a given quarter, which takes into consideration the fact that a bank may have branches in several states. Therefore, we construct the bank-level BRI to be a weighted-average of the BRI values for each state in which a bank has deposits, where the weight applied is the proportion of total deposits held in any given state. Control variables are included in the model and their inclusion is indicated by a "YES" in the row labeled Control variables. The definition of the control variables can be found in Table S.1 in the Online Supplementary Appendix. The control variables *MTB* and *Cash holdings* are excluded in regressions where the sample is split using *MTB* and *Cash holdings*, respectively. State-year fixed effects are included in the model and their inclusion is indicated by a "YES" in the row labeled State-year FE. The dependent variables and all control variables are winsorized at the 1st and 99th percentiles. The sample of banks are from the universe of banks in Compustat Bank (SIC codes 6020–6163). The number of banks included in each regression is given in the row labeled Banks. *** denotes $p<0.01$, ** denotes $p<0.05$, and * denotes $p<0.1$.

is below the sample median).[19] Since banks with less market power are also likely to be less profitable (as competition tends to squeeze bank profits), these results suggest that banks with lower mark-ups, profits, and charter values tend to increase payout ratios when the degree of competition increases. Thus, these results are consistent with the risk-shifting hypothesis, but they are inconsistent with the other two channels under investigation. Similarly, the results based on the Z-score suggest that banks that are closer to default (with below-median Z-score) are those that tend to have higher payout ratios when competition increases.

So far, these results are consistent with the risk-shifting channel, partially consistent with the agency costs channel, and inconsistent with the signaling incentives channel. The regressions using cash holdings to split the sample enable us to provide further evidence regarding the agency costs hypothesis. The coefficients on *Bank BRI* are significant only for a value of cash holdings above the sample median, consistent with the "agency costs" channel.

Overall, these findings support the view that an increase in banking competition, and a resulting decrease in market power and charter value (Keeley 1990), leads to an incentive for banks to increase their payout ratios. Thus, these results support the risk-shifting hypothesis, rather than the signaling hypothesis. They also partially support the agency costs hypothesis, if we interpret the market-to-book ratio as a proxy for growth opportunities. Moreover, firms with low levels of cash holdings also fail to respond to an increase in competition, indicating that banks with low levels of agency costs do not increase payout ratios when competition increases.

Since banks with low cash holdings might be considered to be riskier, these findings might also be seen as evidence against the risk-shifting channel. However, cash holdings and default risk might actually be positively correlated, as shown in a theoretical model by Acharya, Davydenko, and Strebulaev (2012), who also highlight that, empirically, there is a positive correlation between cash holdings and credit spreads. If riskier banks tend to accumulate more cash (precautionary savings), then high cash holdings might indicate a higher future probability of default. Thus, these results do not necessarily contradict the risk-shifting hypothesis.

4.4 The Role of Potential Geographic Expansion

When we test the *competition hypothesis* using the BRI as an indicator of competition, we assume implicitly that banks in a certain state respond to a potential threat from banks from other states, which causes a reduction in charter value.

However, one might argue that, if two or more states deregulate at the same time, we might be capturing the positive effect on charter values of potential expansion in other states. In fact, deregulation events tend to cluster over time for many states,

19. We also ran regressions with ROA, ROE, and net interest margins as a dependent variable, to check whether the increase in payout ratios is due to an increase in profitability. If this were the case, it might be argued that our results are driven by an increase in profitability following the enactment of IBBEA. However, the coefficients on *Bank BRI* are insignificant.

suggesting that in some cases, we might have captured the effect of the possibility to establish branches in other states, rather than the threat of new entrants.

For example, the 1st of June 1997 is identified as the effective date of deregulation by Rice and Strahan (2010) for the following states: Arkansas, Colorado, Florida, Georgia, Hawaii, Illinois, Indiana, Kentucky, Louisiana, Minnesota, Mississippi, New Hampshire, New York, and Tennessee. Therefore, a bank located in Tennessee might experience a reduction in charter value, because of the potential entry of other banks in its state, but it might also experience an increase in charter value because it can potentially enter markets in other states. In certain cases, the two effects might offset each other.

For this reason, we also examine whether the results are driven by large banks that exploit the deregulation to enter markets in other states. To isolate the effects of the entry of banks from other states, rather than the effects of entering new states, we split the sample into banks that do not have branches in other states, single-state (*SS*) banks, over our sample period, and banks that enter other states, nonsingle-state (*NSS*) banks.

The results reported in Panel A of Table 10 suggest that *SS* banks tend to increase payout ratios as the *Bank BRI* decreases, while for *NSS* banks, the coefficient on *Bank BRI* is insignificant. This finding rules out that our results are due to banks that exploit the deregulation to enter markets in other states. On the other hand, our findings suggest that banks that are under threat of competition from banks in other states tend to increase their payout ratios.

Finally, another potential concern in the definition of our proxy for the competition is that we are assuming that competition is uniform within each state. In particular, the variable *BRI dummy* does not distinguish between banks with branches in counties that lie next to another state and banks with branches only in counties that are not at the border. Arguably, the former ones should be affected by the deregulation more strongly than the latter. In Panel B of Table 10, we split the sample into banks with branches in a county that borders another state and banks without branches at the border. This allows us to test if banks with branches at the border of a state that deregulated are driving our results. Banks with branches at the border are likely to face stronger competition than banks with branches in “hinterland counties” (Huang 2008). Our results support the hypothesis that only banks with branches in “border counties” increase their payout ratios as a result of deregulation. In Panel C of Table 10, we repeat the analysis using only single-state banks. The results remain robust.

4.5 Alternative Definition for the BRI Dummy

The shocks related to the IBBEA regulation have recently been used in several recent contributions (e.g., Berger et al. 2018 and Nguyen, Hagendorff, and Eshraghi 2018). For this reason, one might argue that our results might be a result of p-hacking (Harvey 2017), although we have used two different proxies for changes in competition (*Bank BRI* and *BRI dummy*).

In Table 11, we report the main results using an alternative definition of *BRI dummy*

TABLE 10

SAMPLE SPLIT REGRESSIONS FOR SINGLE STATE, BORDER COUNTY, AND SINGLE STATE WITH AND WITHOUT BORDER COUNTY

Panel A: Sample split variable		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
		DTA	*DTA*	*DME*	*DME*	*DCE*	*DCE*	*TTA*	*TTA*	*TME*	*TME*	*TCE*	*TCE*
		SS	NSS	SS	NSS	SS	NSS	SS	NSS	SS	NSS	SS	NSS
Single state	Bank BRI	−0.004***	0.000	−0.022**	−0.014	−0.039**	0.001	−0.005***	−0.007	−0.026**	−0.047	−0.044**	−0.064
	Control variables	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
	State-year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
	Banks	620	162	620	162	620	162	620	162	620	162	620	162

(*Continued*)

TABLE 10
(Continued)

Panel B: Sample split variable		*DTA* BC	*DTA* NBC	*DME* BC	*DME* NBC	*DCE* BC	*DCE* NBC	*TTA* BC	*TTA* NBC	*TME* BC	*TME* NBC	*TCE* BC	*TCE* NBC
Border county	BRI dummy	0.028***	0.007	0.152***	0.032	0.283***	0.062	0.031***	0.006	0.168***	0.040	0.308***	0.050
	Control variables	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
	State-year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
	Banks	518	225	518	225	518	225	518	225	518	225	518	225

(*Continued*)

TABLE 10
(CONTINUED)

Panel C: Sample split variable		*DTA* SSBC	*DTA* SSNBC	*DME* SSBC	*DME* SSNBC	*DCE* SSBC	*DCE* SSNBC	*TTA* SSBC	*TTA* SSNBC	*TME* SSBC	*TME* SSNBC	*TCE* SSBC	*TCE* SSNBC
Single state and border county	BRI dummy	0.022***	0.007	0.110***	0.033	0.202***	0.063	0.023***	0.006	0.125***	0.041	0.215***	0.052
	Control variables	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
	State-year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
	Banks	453	223	453	223	453	223	453	223	453	223	453	223

Note: This table reports parameter estimates for the panel tobit models described in equation (1) with state-year fixed effects. In Panel A, we report results for regressions where the sample is split into banks that do not have branches in more than one state, single-state banks (*SS*), and banks with branches in more than one state, nonsingle-state banks (*NSS*). In Panel B, we report results for regressions where the sample is split into banks that have branches in at least one county that borders another state, border county banks (*BC*), and banks with branches exclusively in counties that do not border another state, nonborder county banks (*NBC*). In Panel C, we report results for regressions where the sample consists exclusively of single-state banks which are then split into single-state banks that have branches in at least one county that borders another state, single-state border county banks (*SSBC*), and single-state banks with branches exclusively in counties that do not border another state, single-state nonborder county banks (*SSNBC*). The dependent variables are: in columns 1 and 2, total cash dividends divided by total assets (*DTA*); in columns 3 and 4, total cash dividends divided by market capitalization (*DMV*); in columns 5 and 6, total cash dividends divided by the book value of common equity (*DCE*); in columns 7 and 8, total payouts (total dividends plus share repurchases) divided by total assets (*TTA*); in columns 9 and 10, total payouts divided by market capitalization (*TMV*); and in columns 11 and 12, total payouts divided by book common equity (*TCE*). We report parameter estimates for *Bank BRI* in Panel A and for *BRI dummy* in Panel B. *Bank BRI* is constructed as follows. The default setting for a bank in a given year is a value of 4. We first assign each state-quarter BRI to bank-quarter observations using the state branching restrictions index and the related effective date given in Table 1 of Rice and Strahan (2010). Then, we calculate the bank-level BRI (*Bank BRI*) in a given quarter, which takes into consideration the fact that a bank may have branches in several states. Therefore, we construct the bank-level BRI to be a weighted-average of the BRI values for each state in which a bank has deposits, where the weight applied is the proportion of total deposits held in any given state. The *BRI dummy* variable equals one for quarters where there is a deregulation event in the state in which a bank primarily operates (and thereafter), and zero otherwise. The state where a bank primarily operates corresponds to the state in which the largest proportion of deposits are held. Deregulation events refer to the date on which a state began to permit interstate branching, as per the IBBEA of 1994. These dates can be found in Table 1 of Rice and Strahan (2010). Control variables are included in the model and their inclusion is indicated by a "YES" in the row labeled Control variables. The definition of the control variables can be found in Table S.1 in the Online Supplementary Appendix. State-year fixed effects are included in the model and their inclusion is indicated by a "YES" in the row labeled State-year FE. The dependent variables and all control variables are winsorized at the 1st and 99th percentiles. The sample of banks are from the universe of banks in Compustat Bank (SIC codes 6020–6163). The number of banks included in each regression is given in the row labeled Banks. *** denotes $p<0.01$, ** denotes $p<0.05$, and * denotes $p<0.1$.

TABLE 11

BASELINE REGRESSIONS OF DIVIDEND AND PAYOUT RATIOS ON BRI dummy 2 AND A SET OF CONTROL VARIABLES

Panel A: With state-year FE	(1) *DTA*	(2) *DMV*	(3) *DCE*	(4) *TTA*	(5) *TMV*	(6) *TCE*
BRI dummy 2	0.019***	0.102***	0.187***	0.020***	0.113***	0.196***
	(3.871)	(3.357)	(3.678)	(3.838)	(3.462)	(3.612)
MTB	0.310***	−1.364***	4.030***	0.296***	−1.749***	4.074***
	(5.108)	(−4.386)	(5.855)	(3.983)	(−4.724)	(4.981)
Size	0.006**	0.032**	0.061**	0.010***	0.054***	0.091***
	(2.395)	(1.967)	(2.144)	(2.989)	(2.824)	(2.627)
Cash flow	9.475***	46.621***	80.277***	11.097***	53.924***	96.836***
	(7.606)	(7.254)	(6.795)	(8.663)	(7.742)	(7.360)
Cash holdings	−0.262***	−1.753***	−2.984***	−0.307***	−1.980***	−3.489***
	(−3.630)	(−4.386)	(−3.832)	(−3.860)	(−4.552)	(−4.082)
Retained earnings	0.618***	3.179***	3.701***	0.862***	4.358***	5.820***
	(6.162)	(5.459)	(3.463)	(7.394)	(6.728)	(4.816)
Leverage	−0.042	0.130	0.504	−0.031	0.254	0.719*
	(−1.262)	(0.637)	(1.366)	(−0.839)	(1.130)	(1.772)
Bank age	0.001***	0.009***	0.020***	0.002***	0.012***	0.029***
	(3.164)	(3.790)	(4.079)	(3.413)	(3.980)	(4.692)
Systematic risk	−1.063*	−6.935**	−12.210*	−1.840***	−12.400***	−22.145***
	(−1.959)	(−2.190)	(−1.954)	(−2.674)	(−3.255)	(−2.884)
Standard errors	Bank	Bank	Bank	Bank	Bank	Bank
Bank FE	NO	NO	NO	NO	NO	NO
State-year FE	YES	YES	YES	YES	YES	YES
Banks	667	667	667	667	667	667
Observations	13,604	13,604	13,604	13,604	13,604	13,604

(*Continued*)

TABLE 11

(CONTINUED)

Panel B: With bank FE	*DTA*	*DMV*	*DCE*	*TTA*	*TMV*	*TCE*
BRI dummy 2	0.029***	0.171***	0.323***	0.010*	0.069**	0.119*
	(6.313)	(5.609)	(6.229)	(1.753)	(1.983)	(1.921)
Controls	YES	YES	YES	YES	YES	YES
Standard errors	Bank	Bank	Bank	Bank	Bank	Bank
Bank FE	YES	YES	YES	YES	YES	YES
State-year FE	NO	NO	NO	NO	NO	NO
Banks	667	667	667	667	667	667
Observations	13,604	13,604	13,604	13,604	13,604	13,604

Note: This table reports parameter estimates for the panel tobit models described in equations (2) and (4). The dependent variables are: in column 1, total cash dividends divided by total assets (*DTA*); in column 2, total cash dividends divided by market capitalization (*DMV*); in column 3, total cash dividends divided by book common equity (*DCE*); in column 4, total payouts (total dividends plus share repurchases) divided by total assets (*TTA*); in column 5, total payouts divided by market capitalization (*TMV*); and in column 6, total payouts divided by book common equity (*TCE*). The *BRI dummy 2* variable equals one if a given state at any given time removes barriers to single branch acquisition and/or state-wide deposit cap on branch acquisition. Deregulation events refer to the date on which a state began to permit interstate branching, as per the IBBEA of 1994. These dates can be found in Table 1 of Rice and Strahan (2010). Definitions of control variables can be found in Table S.1 in the Online Supplementary Appendix. The dependent variables and all control variables are winsorized at the 1st and 99th percentiles. Panel A reports estimates for panel tobit models with state-year fixed effects. Panel B reports estimates for panel tobit models with bank fixed effects only. The sample includes 667 banks from the universe of banks in Compustat Bank (SIC codes 6020–6163). Standard errors are clustered at the bank level and t-statistics are reported in parentheses. *** denotes $p<0.01$, ** denotes $p<0.05$, and * denotes $p<0.1$.

TABLE 12

DISTRIBUTION OF THE t-STATISTICS FOR BRI dummy simulated AND BRI dummy 2 simulated BASED ON THE TOBIT MODELS DESCRIBED IN EQUATIONS (2) AND (4) WITH STATE-YEAR FIXED EFFECTS

Bank-level randomization of BRI dummy							
Panel A: BRI dummy simulated							Estimated *t*-statistic
Percentile	**0.005**	**0.025**	**0.050**	**0.950**	**0.975**	**0.995**	(see Table 4)
DTA	−2.770	−2.173	−1.706	1.768	2.105	2.619	4.708***
DMV	−2.586	−2.018	−1.691	1.718	2.030	2.695	4.109***
DCE	−2.707	−2.015	−1.741	1.811	2.152	3.000	4.480***
TTA	−2.479	−2.076	−1.830	1.718	2.059	2.506	4.712***
TMV	−2.429	−2.122	−1.751	1.710	1.819	2.742	4.252***
TCE	−2.477	−2.125	−1.791	1.718	2.006	3.046	4.428***
Panel B: BRI dummy 2 simulated							Estimated *t*-statistic
Percentile	**0.005**	**0.025**	**0.050**	**0.950**	**0.975**	**0.995**	(see Table 11)
DTA	−2.246	−1.939	−1.703	1.822	2.183	2.517	3.871***
DMV	−2.302	−2.035	−1.706	1.601	2.130	2.371	3.357***
DCE	−2.316	−1.893	−1.685	1.683	2.057	2.614	3.678***
TTA	−2.166	−1.926	−1.586	1.743	2.362	2.771	3.838***
TMV	−2.416	−1.944	−1.669	1.670	2.190	2.630	3.462***
TCE	−2.447	−1.846	−1.618	1.675	2.167	2.669	3.612***
Panel C: State-level randomization of deregulation periods							Estimated *t*-statistic
Percentile	**0.005**	**0.025**	**0.050**	**0.950**	**0.975**	**0.995**	(see Table 4)
DTA	0.282	0.335	0.335	2.438	3.238	4.523	4.708***
DMV	0.050	0.411	0.470	2.169	3.094	3.740	4.109***
DCE	−0.006	0.087	0.104	2.035	3.039	4.089	4.480***
TTA	0.139	0.154	0.207	2.214	3.121	4.402	4.712***
TMV	0.063	0.377	0.459	2.090	3.135	3.824	4.252***
TCE	−0.258	−0.174	−0.168	1.700	2.833	3.966	4.428***

Note: Panels A and B of the table report the percentiles of bootstrapped *t*-statistics generated by randomly reshuffling the observations for *BRI dummy* (Panel A) or *BRI dummy 2* (Panel B), and then running the tobit regressions using the simulated variables *BRI dummy simulated* (Panel A) and *BRI dummy 2 simulated* (Panel B). Panel C of the table reports the percentiles of bootstrapped *t*-statistics generated by randomly randomizing assignment of the quarter in which the deregulation occurs to a state. The number of replications is 400 for all panels. *** denotes $p<0.01$, ** denotes $p<0.05$, and * denotes $p<0.1$.

which we borrow from Nguyen, Hagendorff, and Eshraghi (2018). We name this new variable *BRI dummy 2*. As reported in Nguyen, Hagendorff, and Eshraghi (2018), this variable equals one if "[…] a state removes barriers to single branch acquisition and/or state-wide deposit cap on branch acquisition at any given time" (p. 110, *op cit.*). When we use this alternative specification, our results remain virtually unaltered, in terms of both the economic and statistical significance of our coefficients.

4.6 Bootstrap Simulations

Finally, in Table 12, we report the bootstrapped percentiles for two simulated variables, *BRI dummy simulated* and *BRI dummy 2 simulated*, based on two procedures: a randomized reshuffling procedure of the original variables, *BRI dummy* and *BRI dummy 2*; and a randomized reshuffling of the state related to each deregulation date, in the same vein as Cornaggia et al. (2015). The first procedure leads to a bank-level randomization of the assignment, while the second procedure is at the state level.

In the first case, we reshuffle the observations pertaining to the variable of interest (*BRI dummy* or *BRI dummy 2*), on the basis of pseudo-random numbers, and re-estimate the regressions with state-year fixed effects using these simulated dummies (*BRI dummy simulated* and *BRI dummy 2 simulated*) instead of the original variables. These steps are repeated 400 times, to allow us to obtain the distribution of the *t*-statistics under the null hypothesis (*BRI dummy* or *BRI dummy 2* are uncorrelated with our dependent variables). For each of the 400 replications, we estimate the *t*-statistic with clustered standard errors at the bank level. Then, we compare the distribution of the *t*-statistics for *BRI dummy simulated* and *BRI dummy 2 simulated* with the corresponding estimates for *BRI dummy* (see Table 4) and *BRI dummy 2* (see Table 11). As can be seen from Table 12, Panels A and B, all estimates lie above the upper critical value for the 1% significance level (i.e., for the 0.995 percentile), suggesting that our results are unlikely to be a product of p-hacking.

Cornaggia et al. (2015) randomly assign each of the original IBBEA deregulation events indicated by Rice and Strahan (2010) to a state, without replacement. However, since we are using quarterly data, we randomly assign states to a particular quarter (e.g., 1997–Q2). This approach allows us to keep the distribution of deregulation events as in the original dataset, but the assignment to a state is random. Unless there are shocks unrelated to the IBBEA that occur in the same quarter as the IBBEA events, such randomization should lead to statistically insignificant coefficients for our simulated variable. Since we are randomizing the state, in this case, we only need to generate one simulated variable, which we call *BRI dummy simulated*.[20] Importantly, unlike Cornaggia et al. (2015), we repeat these steps 400 times, not only once, allowing us to obtain an empirical distribution of the *t*-statistics. The results reported in Table 12, Panel C, suggest that the estimated coefficients reported in Table 4 are higher than the critical value at the 1% level (0.995 percentile), indicating that p-hacking and omitted variable biases are unlikely to be the drivers of our results.

4.7 Price Reaction to Dividend Announcements

If banks respond to changes in competition due to the IBBEA by increasing payout ratios because this is beneficial to shareholders, then the price reaction to dividend cuts should be stronger when competition is higher, and weaker (or insignificant) when competition is low.[21] For this reason, banks that avoid dividend cuts should be rewarded by the stock market in periods when the BRI is low.

In Table 13, we examine the price reaction to dividend announcements (Panels A

20. As explained above, *BRI dummy 2* is equal to one if a state removes barriers to single branch acquisition and/or state-wide deposit cap on branch acquisition. However, the deregulation dates are the same as those used for *BRI dummy*.

21. Bessler and Nohel (1996) suggest that in banking the negative price reaction following dividend cuts is even stronger than for nonfinancial firms.

TABLE 13

PRICE REACTION TO ANNOUNCEMENTS OF STABLE OR INCREASING DIVIDENDS PER SHARE (DPS), AND PREDICTABILITY OF BANK PERFORMANCE USING PAYOUT RATIOS

Panel A	*Bank BRI < 1* CAR(−3,3)	*1 < Bank BRI ≤ 2* CAR(−3,3)	*2 < Bank BRI ≤ 3* CAR(−3,3)	*3 < Bank BRI ≤ 4* CAR(−3,3)	*0 < Bank BRI ≤ 2* CAR(−3,3)	*2 < Bank BRI ≤ 4* CAR(−3,3)
No dividend cut	0.012	0.009	0.003	0.000	0.011**	0.002
	(1.555)	(1.135)	(0.451)	(0.104)	(2.061)	(0.470)
Constant	0.036**	0.004	0.010	−0.008	0.001	−0.009
	(2.127)	(0.150)	(0.582)	(−0.349)	(0.056)	(−0.377)
Observations	1,412	856	1,968	1,736	2,268	3,704
State-year FE	YES	YES	YES	YES	YES	YES
Panel B	*Bank BRI < 1* CAR(−5,5)	*1 < Bank BRI ≤ 2* CAR(−5,5)	*2 < Bank BRI ≤ 3* CAR(−5,5)	*3 < Bank BRI ≤ 4* CAR(−5,5)	*0 < Bank BRI ≤ 2* CAR(−5,5)	*2 < Bank BRI ≤ 4* CAR(−5,5)
No dividend cut	0.020**	0.020**	0.007	0.004	0.021***	0.006
	(2.243)	(2.114)	(1.016)	(0.610)	(3.256)	(1.218)
Constant	0.021	−0.024	0.034	−0.013	−0.025	−0.015
	(1.033)	(−0.807)	(1.519)	(−0.474)	(−0.828)	(−0.509)
Observations	1,412	856	1,968	1,736	2,268	3,704
State-year FE	YES	YES	YES	YES	YES	YES

Note: Panels A and B report the results of regressions where CARs are the dependent variable and the independent variable is a dummy equal to one if the DPS is the same as last quarter, or higher, and zero otherwise (*No dividend cut*). The CARs are estimated using the following model: $r_{it} - r_{ft} = \alpha_i + \beta_i \left(r_{mt} - r_{ft}\right) + \beta_{is} SMB_t + \beta_{ih} HML_t + \beta_{io} MOM_t + \varepsilon_{it}$ where r_{it} is the daily return on security i, r_{mt} is the daily return on the market portfolio (proxied by the value-weighted return on all NYSE, AMEX, and NASDAQ stocks [from CRSP]), r_{ft} is the 1-month Treasury bill rate, SMB_t is the Fama−French Small-Minus-Big factor, HML_t is the Fama−French High-Minus-Low factor, and MOM_t is the momentum factor. The CARs are estimated for the windows (−3,+3) and (−5,5), that is, 3 days before and after the date of the announcement of the dividend (including the date of the announcement), and 5 days before and after the date of the announcement of the dividend (including the date of the announcement). We consider an estimation window of 100 days (between −160 and −60 days before the announcement dates) and at least 70 days of valid returns.

and B). In particular, using Fama–French–Carhart regressions, we estimate cumulative abnormal returns for 7-day (−3,+3) and 11-day (−5,+5) windows and we regress them on a dummy equal to one if the dividend per share increases or remains the same as for the previous quarter, and zero otherwise (*No dividend cut*). We report the results separately for different values of *Bank BRI*: in the first column, we report the results for *Bank BRI < 1*, in the second column for *1 < Bank BRI ≤ 2*, in the third column for *2 < Bank BRI ≤ 3*, in the fourth column for *3 < Bank BRI ≤ 4*, in the fifth column for *0 < Bank BRI ≤ 2*, and in the sixth column for *2 < Bank BRI ≤ 4*.

The results for the 11-day window suggest that for low levels of competitive pressure (2 < *Bank BRI* ≤ 3, 3 < *Bank BRI* ≤ 4, and 2 < *Bank BRI* ≤ 4), the coefficient on *No dividend cut* is insignificant. On the other hand, for high levels of competitive pressure (*Bank BRI* < 1, 1 < *Bank BRI* ≤ 2, and 0 < *Bank BRI* ≤ 2), the coefficient on *No dividend cut* is significant. These results suggest that when the competitive pressure from banks in other states is relatively high, banks that do not cut dividends are rewarded by an increase in share prices.[22] The results for the 7-day window are consistent with those for the 11-day window, although the coefficient on *No dividend cut* is significant only for 0 < *Bank BRI* ≤ 2.

It is important to emphasize that these tests do not allow us to understand which channel (risk-shifting, signaling, or agency costs) is driving our results because all three channels are consistent with a positive correlation between bank dividends and competition. However, these tests are helpful as a further check that the driver of the increase in payout ratios is indeed a change in competition.

5. CONCLUSIONS

We investigate changes in payout ratios for a large sample of U.S.-listed banks following exogenous changes in the degree of competition. We provide evidence that, as a result of an increase in competitive pressure due to the IBBEA, banks increase payout ratios. These findings are consistent with those provided by Grullon, Larkin, and Michaely (2019) for nonfinancial firms.

We also run a battery of cross-sectional tests and show that the increase in payout ratios is significant for banks with low charter values (proxied by the market-to-book ratio), low market power, low profitability, and low Z-scores. Banks with low market power and low profitability have stronger risk-shifting incentives, similarly to those with low charter values. Low Z-scores indicate that a bank is close to default, and the incentive to shift default risk to creditors is stronger. Therefore, our results are consistent with the risk-shifting channel: the increase in the competitive pressure resulting from the IBBEA leads to risk-shifting activities for banks with stronger risk-shifting incentives.

22. These results are not due to a correlation between *Bank BRI* and the variable *No dividend cut*. In particular, the percentage of cases for which the variable is equal to zero is: 3.82% for *Bank BRI* ≤ 1; 5.02% for 1 < *Bank BRI* ≤ 2; 4.73% for 2 < *Bank BRI* ≤ 3; and 6.11% for 3 < *Bank BRI* ≤ 4.

In contrast, our cross-sectional tests offer limited or no support to two alternative channels we evaluate: the signaling channel and the agency costs channel. Based on the former channel and at odds with our findings, we would expect a significant effect of competition on payout ratios in banks with high levels of growth opportunities (measured by the market-to-book ratio), market power, profitability, and Z-score. As for the latter channel, the findings for market power and profitability are hard to reconcile with an agency cost explanation. However, consistent with such an explanation, we observe increases in payout ratios following the IBBEA deregulation, mainly in banks with few growth opportunities and high cash holdings.

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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of the article.

Online Supplementary Appendix
Online Supplementary Appendix