Who Wins and Loses from Bank Deregulation? Analysis of Financially Constrained and Unconstrained Firms

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Abstract

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JEL Classification: G28, G32, D92

Keywords: Bank deregulation; Economic growth; Financial constraints; Large firms; Small firms

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A key issue in the finance-growth nexus literature is endogeneity – economic growth may drive finance as well as finance driving growth. Some research addresses this issue using relatively exogenous bank geographic deregulation by U.S. states, usually finding that deregulation has favorable economic effects. We explore a channel behind this connection, namely, *how* deregulation influences economic growth by examining the link between deregulation and individual firm growth. Our evidence suggests that deregulation is associated with greater access to external financing to fund firm growth overall and for relatively financially unconstrained firms, but constrained firms suffer reduced access, raising significant policy concerns.

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1. Introduction

Abundant research evidence supports the finance-growth nexus – the theory that well-functioning financial systems foster economic growth. However, a key endogeneity concern in this literature is reverse causality – real economic growth may create additional demand for financial services, making it difficult to determine the direction of causation. Most of this research focuses on international comparisons (e.g., Demirgüç-Kunt and Maksimovic, 1998; 2002; Bekaert, Harvey, and Lundblad, 2005). Some recent literature tries to resolve this issue using the relatively exogeneous shocks of the geographic deregulation of the U.S. banking industry, which significantly affect the output of the banking industry, but have little to no direct connection with economic growth. We follow this path, but use a very different approach that investigates *how* deregulation affects the real economy. We find that the benefits of deregulation and more bank output accrue to some firms, while other firms lose.

By way of background, individual U.S. state governments engaged in a staggered reform of intrastate and interstate geographic regulations from 1970 to 1994. Intrastate deregulation allows banks to have branches statewide, while interstate deregulation allows merger and acquisition (M&A) activity across state lines through bank holding companies (BHCs). As discussed below, these two types of deregulation may have very different economic impacts. Since the Riegle-Neal Act of 1994, virtually all states have intrastate and interstate banking, as well as interstate branching.

Prior studies investigate the relations between state bank deregulation and income growth (Jayaratne and Strahan, 1996; Huang, 2008), entrepreneurship (Black and Strahan, 2002; Kerr and Nanda, 2009), income distribution (Beck, Levine, and Levkov, 2010), and trade (Michalski and Ors, 2012) and generally find favorable economic effects.

However, prior evidence on the channel(s) through which these benefits accrue or *how* bank deregulation affects individual firms' performance is relatively scarce and no consensus has been reached. Rice and Strahan (2010) find that bank deregulation reduces the cost of borrowing for small businesses, but

does not affect the amount they borrow. Amore, Schneider, and Žaldokas (2013) find that interstate deregulation leads to greater firm innovation, while intrastate deregulation does not. Other evidence on the effect of bank deregulation on innovation is also mixed (e.g., Chava, Oettl, Subramanian, and Subramanian, 2013; Cornaggia, Mao, Tian, and Wolfe, 2015; Hombert and Matray, 2017). Thus, the channel(s) through which deregulation improves the economy and the implications of bank deregulation for firm growth remain unclear. Also important, how the effects of deregulation differ between relatively financially unconstrained firms with more sources of external funding and relatively constrained firms with fewer options remain uninvestigated until now.

We provide direct evidence on how deregulation impacts firm growth and how it varies across different types of firms. We focus on the effects of deregulation on firms' ability to gain access to external sources of finance, a key channel through which deregulation may result in positive real economic outcomes. Importantly, we find that the benefits of deregulation in terms of greater access to external financing to fund firm growth are confined to relatively unconstrained firms. In contrast, deregulation appears to result in reduced credit access and unfavorable consequences for financially constrained firms, raising key policy concerns.

In theory, bank deregulation may result in either increased or decreased bank commercial credit supply, yielding either higher or lower firm growth. The effects of deregulation on credit supply could come from changes in competition, changes in bank size, or both. Starting with competition, both intrastate and interstate deregulation may reduce local barriers to entry and increase competition. However, intrastate deregulation could alternatively decrease competition to the extent that it results in M&As of banks with significant local market overlap.

The effects of these changes in bank competition on credit supply are ambiguous. We couch this discussion in terms of increased competition, but the effects of decreased competition yield exactly opposing effects. Under the traditional structure-conduct-performance hypothesis (Bain, 1959), increased competition raises the supply of bank credit. Alternatively, greater competition in banking may reduce the

supply of relationship-based credit. More competition may make it harder for banks to enforce implicit contracts that allow relationship borrowers to receive subsidized rates early in their relationships in exchange for higher rates in later periods (Petersen and Rajan, 1995). Relationship credit – which usually has a significant soft-information component – may have a particularly strong effect on financially constrained businesses. These firms tend to rely more on relationship-based credit because they have less hard information available. Empirical evidence on the effects of competition on the supply of small business credit is mixed (see Berger, 2015, for a summary).

As noted, deregulation may also affect the supply of credit through increases in bank size from the resulting M&As. Large banks typically allocate smaller proportions of their assets to loans to small firms (Berger, Kashyap, and Scalise, 1995; Strahan and Weston, 1996). Research also suggests that large banks have comparative disadvantages in serving small business loan customers through relationship lending (e.g., Cole, Goldberg, and White, 2004; Berger, Miller, Petersen, Rajan, and Stein, 2005; Berger, Bouwman, and Kim, 2017). Although large, relatively informationally transparent borrowers that tend to be less financially constrained could benefit, there may be adverse consequences for small, financially constrained firms, which more often rely on relationship-based credit from banks.

There may also be interaction effects between the changes in bank size and competition. The larger banking organizations created by deregulation could also reduce competition by creating banking organizations with greater market shares. Under the relative market power hypothesis, banks with large market shares and well-differentiated products may be able to exercise market power (e.g., Shepherd, 1982; Berger, 1995).

The effects of deregulation on merging banks' credit supplies may be offset in part or in full by the reactions of competitors. When large banks merge and their small business lending declines, there is increased small business lending by both incumbent banks (e.g., Berger, Saunders, Scalise, and Udell, 1998; Avery and Samolyk, 2004) and new or *de novo* bank entrants (e.g., Berger, Bonime, Goldberg, and White, 2004). The effects of deregulation we measure in this paper incorporate the credit supplies of both the

merging banks and their competitors.

Thus, both interstate and intrastate deregulation could increase or decrease the supply of commercial credit, and the effects may differ for firms with relatively easy access to other sources of external finance versus relatively financially constrained firms. We test the effects of both types of deregulation on firm growth, and how these effects differ for the two types of firms.

Our sample includes all 9,845 U.S. publicly listed firms with complete information in Compustat over the period 1970–1994, the period of relatively intense deregulation that differed across states. We stop in 1994 because the Riegle-Neal Act relatively quickly opened almost all the states to widespread interstate branch banking, a very different regime.

Following Demirgüç-Kunt and Maksimovic (1998), we use a financial planning model to predict how fast a firm could grow based on access to external finance. We construct three maximum growth rates a firm could achieve. The extent to which the firm's actual growth rate exceeds these predicted maximum growth rates gives three measures of a firm's incremental growth due to additional external financing: 1) excess growth over internal financing, 2) excess growth over internal financing and short-term debt, and 3) excess growth over internal financing and short- and long-term debt.

Using a difference-in-difference approach, we first find that when all firms are considered together, bank deregulation is positively associated with firms' externally financed growth using all three measures. This relation is stronger for interstate deregulation than intrastate deregulation and is progressively weaker across the three measures of a firm's growth, as expected. Importantly, when we consider firms with different degrees of financial constraint, the results are dramatically different. Deregulation has favorable effects on externally financed growth for relatively unconstrained firms, but adverse effects on the growth of financially constrained firms. These adverse effects on the most vulnerable firms are consistent with the theories reviewed above, which predict that both increased competition and increased bank size may harm access to credit by firms that rely on relationship-based bank financing. These findings have critical policy

implications regarding the ongoing consolidation of the banking industry.

Our results are robust to a battery of sensitivity tests. The main evidence holds when we exclude Delaware and South Dakota firms, which are subject to different tax and legal treatments (Black and Strahan, 2002; Dick and Lehnert, 2010). We also run placebo tests in which we randomly assign states to deregulation years and find that the falsely assigned deregulation events have no impact on firm growth, making it less likely that other concurrent events drive our results. In addition, the main results continue to hold when we use instrumental variables to address the potential endogeneity of the state deregulation itself. Finally, we examine dynamic firm growth before and after bank deregulation and find no significant evidence of firms growing faster prior to deregulation, reaffirming that the results are explained by deregulation, rather than other causes.

The remainder of the paper is organized as follows. Section 2 provides testable hypotheses. Section 3 gives a brief history of geographical deregulation in the U.S. Section 4 describes the data and methodology. Section 5 presents the empirical results on the relations between bank deregulation and firm growth. Section 6 gives our findings from robustness tests, and Section 7 shows our dynamic analysis. Section 8 concludes.

2. Hypotheses

The discussion in the introduction suggests the following competing hypotheses for the effects of geographical deregulation on firm growth through access to external finance:

> ***H_{1a}: Intrastate and interstate bank deregulation increase firms' access to external finance, resulting in higher firm growth rates relative to the predicted growth rates.***

> ***H_{1b}: Intrastate and interstate bank deregulation decrease firms' access to external finance, resulting in lower firm growth rates relative to the predicted growth rates.***

The discussion above also suggests that the results of deregulation may be more favorable for relatively financially unconstrained firms than for more constrained firms:

H_2: The effects of intrastate and interstate bank deregulation on predicted growth rates are more favorable for relatively financially unconstrained firms than for more financially constrained firms.

Hypothesis ***H_2*** is about the relative effects of deregulation on the two groups. The effects of deregulation may be more positive for relatively financially unconstrained firms than for more constrained firms, less negative for the former than the latter, or positive for the former and negative for the latter.

3. Brief History of U.S. Geographic Deregulation

Historically, U.S. banks faced multiple geographical restrictions on operations within and across states. Prior to 1970, most states had stringent rules governing the conduct of intrastate branch banking. Some implemented unit banking, limiting each bank to a single office, others allowed limited local branching (e.g., within a county or a set of contiguous counties), while still others allowed statewide branching. Some states also permitted BHCs to own separately capitalized and chartered banks throughout a state. In the early 1970s, states started to relax these restrictions. The ability to expand within states led to significant local market entry (e.g., Amel and Liang, 1992), increased competition in local banking markets (e.g., Kerr and Nanda, 2009), and facilitated banking industry consolidation within states (e.g., Savage, 1993).

Regarding interstate restrictions, the McFadden Act of 1927 prohibited interstate branching, and remained in effect until the 1994 Riegle-Neal Act overturned it. Prior to 1994, interstate banking could only occur through establishing subsidiaries of BHCs. The Douglas Amendment to the 1956 Bank Holding Company Act gave states the power to control whether and under what circumstances out-of-state BHCs could own and operate banks within their jurisdiction. No state gave such permission for 22 years, except in unusual circumstances (e.g., to rescue failing banks). In the period 1978–1994, states started allowing BHCs to own commercial banks across state lines. The interstate bank deregulation during this period allowed BHC acquisitions, often through regional compacts that allowed for reciprocal entry among a group

of states, leading to an active market for corporate control among BHCs (e.g., Berger, Kashyap, and Scalise, 1995). The Riegle-Neal Act of 1994 allowed BHCs to cross state lines and consolidate their commercial banks in different states into branches of a single national bank.[1] However, some restrictions – such as the minimum age of target institutions that could be acquired from out of state – were left up to states and remain to this day (e.g., Rice and Strahan, 2010).[2]

4. Data and Methodology

4.1. Data

We start with all U.S. firms in Compustat over the intense deregulation period 1970–1994. We exclude financial institutions (SIC codes between 6000 and 6999) and firms with incomplete information. The final sample comprises 88,996 firm-year observations on 9,845 firms.

4.2. Variables

4.2.1. Dependent variables: Measures of externally financed growth

Firm growth often depends on access to external finance. To model external financing needs, we follow Demirgüç-Kunt and Maksimovic (1998) and use a financial planning model to calculate three progressively less constrained measures of a firm's maximum attained growth rate. In particular, we compute the maximum attainable growth rate a firm could achieve: 1) if it relied only on internal funds, 2) if it also relied on short-term borrowing, and 3) if it further relied on long-term borrowing. For each firm, we calculate three measures of a firm's incremental growth, the extent to which the firm's actual growth rate exceeds these predicted maximum growth rates.

Specifically, we estimate a firm's predicted growth rates based on the "percentage of sales" approach. This requires three assumptions: 1) the assets used in production remain constant, so that the

[1] For a more complete description of state banking regulations through 1994, see Berger, Kashyap, and Scalise (1995, Appendix B, Table B6, pp. 188–189).
[2] The 2010 Dodd–Frank Act, Section 613, reversed one of the key restrictions of some states that previously prohibited *de novo* branching by out-of-state banks.

required increase in investment is positively associated with firm sales growth, 2) the ratio of profit to sales is constant, and 3) the asset depreciation in firms' financial statements reflects the true value of the economic depreciation of existing assets. Given these assumptions, we can express the external financing needs of firm *i* with actual sales growth of g_{it} percent in year *t* as:

$$EFN_{it} = g_t \cdot Assets_{it} - (1 + g_{it}) \cdot Earnings_{it} \cdot b_{it} \quad (1)$$

where EFN_{it} is external financing needs, $Assets_{it}$ is book value of assets, $Earnings_{it}$ is earnings after interest and taxes, and b_{it} is the proportion of earnings retained for reinvestment in year *t*.

Using (1), we calculate a firm's internally financed growth rate *(IG)*, short-term financed growth rate *(SFG)*, and sustainable growth rate *(SG)*. To estimate *IG*, the maximum growth rate a firm can achieve if it relies only on its internal cash flow, we set EFN_{it} to zero and b_{it} to one. Solving equation (1) for g_{it} then yields:

$$IG_{it} = \frac{ROA_{it}}{1 - ROA_{it}} \quad (2)$$

where ROA_{it} is return on assets.

Similarly, to estimate *SFG*, the maximum growth rate a firm can achieve through both internal cash flows and short-term debt, we assume that the firm maintains a constant ratio of short-term borrowing to assets, set b_{it} to one, and replace total assets with assets not financed by short-term debt. Solving (1) then yields:

$$SFG_{it} = \frac{ROLTC_{it}}{1 - ROLTC_{it}} \quad (3)$$

where $ROLTC_{it}$ is the ratio of earnings to long-term capital.[3]

[3] We follow Demirgüç-Kunt and Maksimovic (1998) and define long-term capital as firm assets not financed by short-term debt, which is equal to total assets multiplied by one minus the ratio of short-term debt to total assets.

The third measure is the sustainable growth rate, *SG*, the maximum growth rate a firm can achieve if it can borrow both short-term and long-term debt to fund investment. To obtain this, we set EFN_{it} to zero and b_{it} to one, and we replace total assets with the book value of equity. The implied SG_{it} is given by:

$$SG_{it} = \frac{ROE_{it}}{1 - ROE_{it}} \tag{4}$$

where ROE_{it} is the ratio of net income to equity.

Next, we subtract IG_{it}, SFG_{it}, and SG_{it} from firm *i*'s actual sales growth (*SGR*) to obtain three measures of excess growth: *Excess Growth 1*, *Excess Growth 2*, and *Excess Growth 3*. The three measures reflect progressively fewer sources of external financing. *Excess Growth 1* measures firms' excess growth over internal financing, which requires firms to have access to any source of external financing such as short-term debt, long-term debt, or equity financing. Deregulation-induced bank competition may directly increase firm's access to short- and long-term debt, and, according to bank specialness literature, may also indirectly provide more access to equity markets by certifying the quality of the firms (Fama, 1985; James, 1987; Slovin, Johnson, and Glascock, 1992; Bailey, Huang, and Yang, 2012; Maskara and Mullineaux, 2011; Saheruddin, 2017). *Excess Growth 2* is the excess growth over internal financing and short-term debt, which requires firms to gain long-term debt and/or equity financing. *Excess Growth 3* is the excess growth over internal financing, and short- and long-term debt, which requires firms to gain equity financing. These three measures are expected to reflect progressively smaller effects of bank deregulation because each incorporates fewer sources of external financing than the prior one.

4.2.2. Key explanatory variables: Proxies for bank deregulation

Our key explanatory variables are intrastate and interstate bank deregulation dummies, *INTRA* and *INTER*. *INTRA* equals one after a state allows statewide branching, while *INTER* equals one after a state allows interstate banking.[4] These measures are commonly used in the deregulation literature (e.g., Kroszner

[4] In most cases, interstate deregulation was on a reciprocal basis: a state allows an out-of-state acquirer to purchase an in-state target bank only if the acquirer's state also allows BHCs from the target's state to enter by acquisition.

and Strahan, 1999; Black and Strahan, 2002; Beck, Levine, and Levkov, 2010; Kerr and Nanda, 2009; Chava, Oettl, Subramanian, and Subramanian, 2013).

4.2.3. Control variables

Following the literature (e.g., Demirgüç-Kunt and Maksimovic, 1998; Khurana, Martin, and Periera, 2008), we control for several factors related to firm growth: firm asset size (*SIZE*), leverage (*LEVERAGE*), market-to-book (*MTB*), net fixed assets (*NET FIXED ASSETS*), dividends (*DIVIDEND*), earnings (*NET INCOME*), and net sales (*NET SALES)*. We also control for state business combination legislation (*BUSINESS COMBINATION*) to disentangle the effects of bank deregulation from other state policies, all lagged one year to mitigate potential simultaneity issues. We also control for macroeconomic conditions in each state measured using personal income growth rate over the past five years (*PERSONAL INCOME GROWTH*). Finally, we include firm and year fixed effects. Definitions of all variables other than the fixed effects are in Table 1.

Table 2 provides summary statistics for all of the variables, but in the interest of brevity, we focus our discussion on the key variables of interest. The mean value of *Excess Growth 1* is 0.125 in the pooled sample, suggesting that on average firms grew 12.5% faster than the maximum growth rate attainable by their internal funds (*IG*) alone. The mean value of *Excess Growth 2* is 0.129 in the pooled sample and that of *Excess Growth 3* is 0.116. Since these three measures progressively require more access to external financing, it is expected that the mean values are decreasing. The mean values of *INTRA* and *INTER* are 0.584 and 0.435. It is not surprising that *INTER* has a lower mean than *INTRA*, since most states implemented intrastate deregulation first.

Table 3 presents correlations among the key variables. *INTRA* and *INTER* are both positively correlated with *Excess Growth 1*, *Excess Growth 2*, and *Excess Growth 3* at the 1% level, suggesting that bank deregulation is positively associated with externally financed growth. Of course, no control variables are included here – these are added in the regressions analyses below.

4.3. Methodology

We use a difference-in-difference approach to examine the relations between bank deregulation and externally financed growth. We estimate the following regression model:

$$Excess\ Growth_{ist} = \alpha_i + \alpha_t + \beta_1 INTRA_{st} + \beta_2 INTER_{st} + \beta_3 Controls_{it-1} + \varepsilon_{ist} \quad (5)$$

where *i*, *s*, and *t* index firm, state, and year, respectively, *Excess Growth*$_{ist}$ is either *Excess Growth 1*, *Excess Growth 2*, or *Excess Growth 3*; *INTRA*$_{st}$, *INTER*$_{st}$ and *Controls*$_{it-1}$ are described in Section 4.2.3; α_i denotes firm fixed effects, α_t denotes year fixed effects, and ε_{ist} is an error term. The coefficients on *INTRA* and *INTER* in equation (5) capture the effects of bank deregulation by comparing firm growth before and after each deregulation year, controlling for all firm and local market characteristics as well as firm and year fixed effects. Under Hypothesis $\boldsymbol{H_{1a}}$, β_1 and β_2 are positive, while under Hypothesis $\boldsymbol{H_{1b}}$, β_1 and β_2 are negative.

To investigate how the effects of bank deregulation vary across firms with different financial constraints, we include interaction terms between one of the dummies for financial constraints (*FINCON*) and *INTRA* and *INTER* and adjust the regression model as follows:

$$\begin{aligned} Excess\ Growth_{ist} &= \delta_i + \delta_t + \theta_1 INTRA_{st} + \theta_2 INTER_{st} + \theta_3\, INTRA_{st} \times FINCON_i \\ &+ \theta_4 INTER_{st} \times FINCON_i + \theta_5 Controls_{it-1} + \mathrm{u}_{ist} \end{aligned} \quad (6)$$

The coefficients on *INTRA* and *INTER* in equation (6) reflect the effects of bank deregulation on firm growth for financially unconstrained firms (i.e., those with *FINCON* = 0), and the interaction term coefficients reflect the differential effects of deregulation on firm growth between financially constrained and unconstrained firms. As will become clear in Section 5.2, the variables representing *FINCON* are time-invariant for each firm, so we do not include a stand-alone *FINCON* indicator in equation (6), which would

be absorbed by the firm fixed effects. Under Hypothesis $\boldsymbol{H_2}$, θ_3 and θ_4 are negative because they reflect the differential effects between financially constrained and unconstrained firms.

5. Empirical Results

5.1. Main results

Table 4 Panel A presents results from regressing *Excess Growth 1,* excess growth over internal financing, on *INTRA* and/or *INTER*, as well as different sets of controls. The coefficient of *INTRA* is positive and statistically significant in Columns (1) and (3), which exclude controls other than firm and year fixed effects. However, when other controls are included in Columns (4) and (5), the *INTRA* coefficient becomes very small and far from statistically significant. Thus, the evidence does not suggest a strong effect of intrastate deregulation. In contrast, the coefficient of *INTER* remains consistently positive, statistically significant, approximately the same magnitude in all four specifications in which it is included, and much larger than the coefficients of *INTRA*. The results are also economically significant. Based on the full specification in Column (5), a firm's excess growth over internal financing (*Excess Growth 1*) increases 17.6% (=0.022/0.125) following interstate deregulation, strongly suggesting that interstate deregulation improves firms' access to external finance. The larger and more significant effect of *INTER* relative to *INTRA* is in line with prior research, which seldom finds consistent and material effects associated with intrastate deregulation (e.g., Black and Strahan, 2002; Levine, Levkov, and Rubinstein, 2008; Kerr and Nanda, 2009). The control variables are also generally strongly associated with firm growth in the predicted directions, but are not discussed in the interest of brevity. The results in Panel A are consistent with Hypothesis $\boldsymbol{H_{1a}}$ that bank deregulation, in particular interstate deregulation, increases firms' access to external finance so that firms are able to grow faster than their predicted internal growth rates.

Table 4 Panel B presents regression results for *Excess Growth 2*. We continue to find no consistent effect of *INTRA* and a consistent positive and statistically significant effect of *INTER* across specifications. As expected, these effects are slightly smaller in magnitude than those for *Excess Growth 1*. On an

economic basis, a firm's excess growth over internal financing and short-term debt (*Excess Growth 2*) increases 15.5% (=0.020/0.129) after interstate deregulation based on the full specification. These results support Hypothesis $\boldsymbol{H_{1a}}$ and suggest that bank deregulation may help firms gain access to long-term debt and/or equity financing.

Table 4 Panel C uses *Excess Growth 3* as the dependent variable. The *INTRA* coefficients are all small and statistically insignificant. The *INTER* coefficients are statistically significant only when we include controls in Columns (4) and (5). As expected, the coefficients are slightly smaller in magnitude as well than those in Panels A and B. The full specification suggests that a firm's excess growth over internal financing, short-term and long-term debt (*Excess Growth 3*) increases 15.5% (=0.018/0.116) after interstate deregulation. These results are consistent with Hypothesis $\boldsymbol{H_{1a}}$ and suggest that deregulation-induced competition may help firms gain access to equity market.

Taken together, we find that interstate deregulation has a strong and materially positive effect on firms' access to external financing, consistent with Hypothesis $\boldsymbol{H_{1a.}}$ Interstate bank deregulation appears to allow firms to have more access to external finance, and thus grow much faster than firms in other states, *ceteris paribus*. However, intrastate deregulation does not show a consistent material effect. For the remainder of the paper, we use only the full specifications with all the control variables.

5.2. How the results vary with firm financial constraints

As discussed regarding $\boldsymbol{H_2}$, the effects of deregulation may be less favorable or even unfavorable for more financially constrained firms because the increased competition and larger banks may reduce the supply of relationship-based credit upon which these firms depend.

We consider four indicators of financial constraints (*FINCON*): firm size (total assets), dividend payouts, the *KZ* index (Kaplan and Zingales, 1997; Lamont, Polk, and Saaá-Requejo, 2001), and the *SA* index (Hadlock and Pierce, 2010). Size is one of the most common measures of financial constraints, with

small firms considered more likely to be financially constrained (e.g., Hubbard, 1998; Livdan, Sapriza, and Zhang, 2009). As discussed above, small firms are also considered to be more dependent on relationship lending, which may be strongly affected by the changes in both bank size and competition brought about by geographical deregulation. Dividends are used in prior studies to identify financially constrained firms, with non-payers considered as more constrained (e.g., Fazzarri, Hubbard, and Petersen, 1988; Hubbard, Kashyap, and Whited, 1995; Calomiris and Hubbard, 1995). The *KZ* index is based on five accounting variables: cash flow, market value, debt, dividends, and cash holdings. The *SA* index is based on size and age. Higher values of *KZ* index and *SA* index indicate more financially constrained firms. The financial constraints measures are based on data as of the year prior to deregulation to mitigate any potential endogeneity concerns (Duchin, Ozbas, and Sensoy, 2010).[5]

Table 5 Panel A reports findings for equation (6) using *SMALL DUMMY*, indicating firms with below-state-median assets. The *INTRA* and *INTER* coefficients are all positive and all but the *INTER* coefficient for *Excess Growth 3* in Column (3) are statistically significant. The results suggest that both intrastate and interstate bank deregulation have strong favorable effects on growth for large firms. In contrast, the coefficients of all of the interaction terms are negative and statistically significant, and of greater magnitude than the corresponding uninteracted deregulation variable coefficients. These results suggest negative effects of both types of deregulation on small-firm growth, given that overall effects on these firms are sums of the coefficients on the deregulation variables and their interactions with *SMALL DUMMY*. The bottom of Panel A shows tests of these sums, which are all statistically and economically significant except for the effects of *INTER* on *Excess Growth 3* in the last row of Column (3). Thus, deregulation appears to benefit large firms, but adversely affect small firms' access to external finance and growth. These results are consistent with Hypothesis $\boldsymbol{H_2}$ that the effects of bank deregulation on firm growth

[5] We construct *FINCON* based on the year before interstate deregulation as opposed to intrastate deregulation because our findings and those in the literature discussed above generally find that *INTER* is a more important explanatory variable than *INTRA*.

are more favorable for relatively financially unconstrained firms than for financially constrained firms.

Panels B, C, and D of Table 5 use non-dividend payers, *NONPAYER*, and high values of the KZ and SA indices, *KZ HIGH* and *SA HIGH*, respectively, as alternative indicators of financially constrained firms. The findings for *INTER* are quite robust statistically and economically: interstate banking significantly helps the growth of unconstrained firms and significantly hurts growth for constrained firms, consistent with Hypothesis $\boldsymbol{H_2}$.

6. Robustness Checks

6.1. Excluding Delaware and South Dakota

Table 6 Panel A presents regression results after excluding firms headquartered in Delaware and South Dakota, which are subject to significantly different tax and legal treatment than firms in other states (Black and Strahan, 2002; Dick and Lehnert, 2010). The results confirm our main findings that bank deregulation allows firms to have more access to external finance, and thus experience higher growth. In Table 6 Panel B, we re-estimate how the effects of bank deregulation vary across firms with different degrees of financial constraints. We find consistent results that interstate deregulation favors relatively financially unconstrained firms, but negatively affects more financially constrained firms.

6.2. Placebo tests

Another potential concern is that our results could be driven by other unobserved variables that are correlated with bank deregulation. To address this concern, in Table 7 Panel A, we present placebo tests in which we randomize the deregulation years and reassign each state a deregulation year that is different from the proper assignment and re-estimate equation (5).[6] We find that the coefficients on both *INTRA* and *INTER* are statistically insignificant, suggesting that unobserved variables do not drive our main results.

[6] To do so, we first draw years at random from a uniform distribution between 1970 and 1994 and then randomly assign these years to each state as placebo deregulation years.

In Table 7 Panel B, we re-run the placebo tests for firms with different degrees of financial constraints. We again find consistent results that the heterogeneous effects of bank deregulation on firms are not driven by unobserved factors.

6.3. Instrumental variable regressions

Although intrastate and interstate deregulation is relatively exogenous to firm growth, it is sometimes argued that state-level factors could drive the timing of deregulation (e.g., Kroszner and Strahan, 1999). For instance, states with better firm growth opportunities may deregulate faster, or small bank lobbies in some states may have delayed deregulation. Our main analysis mitigates this concern using firm and year fixed effects. Nevertheless, we use instrumental variable regressions to further address the issue.

We use the share of state government controlled by Democrats (*DEMOCRATS*) and the small bank asset share of all banking assets in the state (*SMALL BANK SHARE*) as instruments for intrastate and interstate deregulation. *DEMOCRATS* is the fraction of the three bodies of state government (i.e. the assembly, senate, and governorship) controlled by Democrats.[7] Prior literature (e.g., Poole and Rosenthal, 1997; Irwin and Kroszner, 1999; Kroszner and Strahan, 1999) argues that Democrats are typically less likely to favor deregulation than Republicans. Therefore, we expect *DEMOCRATS* to be negatively related to our deregulation variables. *SMALL BANK SHARE* represents the percentage of banking assets in the state held by small banks, where small banks are those with assets below the median size in each state. Kroszner and Strahan (1999) find that deregulation reform occurs later in states where the small banks have larger shares.

In Table 8, Columns (1) and (2) show results of the first-stage IV regressions. Consistent with expectations, *DEMOCRATS* and *SMALL BANK SHARE* are negatively related to intrastate and interstate deregulation. We use three tests to check the validity of our instruments. We conduct an *F*-test of the

[7] For example, if the Democrats control the state assembly, and the Republicans control the senate and governorship, *DEMOCRATS* would be 1/3.

excluded exogenous variable. The results reject the null hypothesis that the instruments do not explain bank deregulation. We conduct a Kleibergen-Paap *rk* LM test and reject the null hypothesis that the model is under-identified at the 1% level. Lastly, the Kleibergen-Paap *rk* Wald F value is 67.9, which suggests that the model is not weakly identified. In Model 2, although the *DEMOCRATS* coefficient is not significant, the *F*-statistic for the joint significance of the two instruments is 268.79, suggesting that we do not have a weak instruments problem.

In Table 8, Columns (3), (4), and (5) present the second-stage results. Consistent with our main findings, the effect of intrastate deregulation on firm growth is insignificant, while interstate deregulation is statistically positively associated with externally financed firm growth as measured by *Excess Growth 1* and *Excess Growth 2*, but not with *Excess Growth 3*.

The instrumental variable regressions confirm the main results that interstate deregulation allows firms more access to external finance, leading to higher growth rates. We do not replicate the instrumental variable regressions across firms with different degrees of financial constraints because we do not have enough instruments to cover all potentially endogenous variables: *INTRA*, *INTER*, *FINCON*, and their interaction terms.

7. Dynamic Effects

We next examine the dynamics of the relationship between deregulation and externally financed firm growth. Following Kerr and Nanda (2009), Beck, Levine, and Levkov (2010), and Amore, Schneider, and Žaldokas (2013), we use a dynamic difference-in-difference model, as shown in Table 9 Panel A. Specifically, we decompose the bank deregulation variables into four dummies that take a value of one in years (-2, 0), (1, 3), (4, 7), and (8 and higher), using the period of three years or earlier before deregulation as the reference group. The coefficients on *INTRA (-2, 0)* and *INTER (-2, 0)* capture pre-deregulation trend, if any, on firm growth.

Table 9 Panel A presents the dynamic effects of deregulation on externally financed firm growth.

For intrastate deregulation, the results show small and mostly insignificant effects in the two years prior to reform, and show almost significant difference after intrastate deregulation, with the exception of one small positive effect for *Excess Growth 1* in the (4,7) interval. Turning to the interstate deregulation, the coefficients on *INTER (-2, 0)* are either negative or insignificantly different from zero, with no positive trends in firm growth prior to interstate deregulation. The post-interstate deregulation variables are mostly positive and statistically significant, suggesting that the results of interstate deregulation are strong and long-lasting.

In Table 9 Panel B, we examine the dynamic effects of deregulation on firm growth across firms with different degrees of financial constraints by including the interaction terms between the four deregulation time dummies and *FINCON*. In general, the results suggest that interstate deregulation has a positive and long-lasting effect for relatively financially unconstrained firms, and strong negative effects for more constrained firms.

8. Conclusion

Abundant research examines how functioning financial systems foster economic growth, but there is a significant endogeneity concern – real economic growth may create additional demand for financial services, making it difficult to disentangle the direction of causation. We mitigate this concern using the staggered reform of U.S. intrastate and interstate geographic bank deregulation as relatively exogenous events. We test *how* bank deregulation improves the economy and examine the implications of bank deregulation for firm growth.

Following Demirgüç-Kunt and Maksimovic (1998), we use three measures of firms' externally financed growth that allow us to disentangle the direct effects of bank deregulation. Using a difference-in-difference approach, we find that bank deregulation is positively associated with firms' externally financed growth using all three measures. The results are consistently statistically significant using the first two measures. Following interstate deregulation, a firm's excess growth over internal financing increases 17.6%,

and its excess growth over internal financing and short-term debt increases 15.5%. As expected, the results using the third measure are weaker since it captures indirect effect of bank deregulation on firm's access to equity market.

Importantly, we also find that the effects of deregulation vary across firms with different degrees of financial constraints. Deregulation has a favorable effect on externally financed growth for relatively unconstrained firms, but an adverse effect on the growth of more financially constrained firms. These adverse effects on the most vulnerable firms are consistent with the theories that predict that increased competition and bank size from deregulation may harm access to credit by firms that rely on relationship-based bank financing. Our results are robust to a battery of sensitivity tests, including placebo tests and instrumental variables estimations, and also hold in a dynamic analysis.

This study contributes to the literature on the real effects of financial sector deregulation, as well as the more general literature on the effects of finance on economic growth. In particular, using bank deregulation as an exogenous event, we extend prior work by focusing on a micro-level channel that helps explain how bank deregulation affects firm growth. These results provide evidence that financial sector deregulation increases firm growth for relatively unconstrained firms, but causes harm to financially constrained firms, raising key policy questions about the ongoing consolidation of the banking industry.

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Table 1. Variable Definitions

Variables	Definition
Dependent Variables	
Excess Growth 1	The difference between a firm's actual sales growth rate (*SGR*) and its predicted internally financed growth rate (*IG*). *IG* is defined as *ROA/(1-ROA)*, where *ROA* is the ratio of earnings before extraordinary items to total assets.
Excess Growth 2	The difference between a firm's actual sales growth rate and its predicted short-term financed growth rate (*SFG*). *SFG* is defined as *ROLTC/(1-ROLTC)*, where *ROLTC* is the ratio of earnings before extraordinary items to long-term capital.
Excess Growth 3	The difference between a firm's actual sales growth rate and its predicted short-term and long-term financed growth rate (*SG*). *SG* is defined as *ROE/(1-ROE)*, where *ROE* is the return on equity.
Key Explanatory Variables	
INTRA	A dummy equal to 1 in the years after the focal state implemented intrastate bank deregulation that allows statewide branching via mergers and acquisitions and 0 otherwise. The timing of intrastate branching deregulation is from Amel (1993) and Kroszner and Strahan (1999).
INTER	A dummy equal to 1 in the years after the focal state implemented interstate bank deregulation that allows banks' acquisition by out-of-state banks and 0 otherwise. The timing of interstate branching deregulation is from Amel (1993) and Kroszner and Strahan (1999).
Control Variables	
BUSINESS COMBINATION	A dummy equal to 1 in the year after the focal state implemented business combination legislation, as described in Bertrand and Mullainathan (2003).
SIZE	The lagged natural log of total assets.
LEVERAGE	The lagged ratio of long-term debt to total assets.
MTB	The lagged market value of equity, minus book value of equity, plus book value of assets, all scaled by book value of assets.
NET FIXED ASSETS	The lagged ratio of property, plant, and equipment to total assets.
DIVIDEND	The lagged ratio of dividend to total assets.
NET INCOME	The lagged ratio of earnings before interest and taxes to sales.
NET SALES	The lagged ratio of sales to property, plant, and equipment.
PERSONAL INCOME GROWTH	The average lagged personal income growth rate over the past five years in the focal state.
SMALL DUMMY	A dummy equal to 1 if a firm's total assets are below state-median assets prior to interstate deregulation.
NONPAYER	A dummy equal to 1 if a firm is not a dividend payer prior to interstate deregulation.
KZ HIGH	A dummy equal to 1 if a firm's KZ index is above state-median KZ index in the year prior to interstate deregulation. KZ index is an index of financial constraints developed by Lamont, Polk, and Saaá-Requejo (2001) using the regression coefficients from Kaplan and Zingales (1997) to compute the index as follows:

	−1.001909∗Cash Flow/K + 0.2826389 ∗ Tobin's Q + 3.139193∗Debt/Total Capital −39.3678 ∗ Dividends/K − 1.314759 ∗ Cash/K.
SA HIGH	A dummy equal to 1 if a firm's SA index is above state-median SA index in the year prior to interstate deregulation. SA index is an index of financial constraints developed by Hadlock and Pierce (2010) and calculated as follows: –0.737*Size + 0.043*Size^2 – 0.040*Age. We follow Hadlock and Pierce (2010) and cap Size at (the log of) $4.5 billion and Age at 37 years.
DEMOCRATS	The degree of party control of the state government, defined as the fraction of the three bodies of the state government (the assembly, senate, and governorship) controlled by the Democrats. This variable is equal to 1/3 if the Democrats have a majority in one of the three government entities, 2/3 if the Democrats have majorities in two of the three government entities, and 1 if the Democrats have majorities in all three government entities.
SMALL BANK SHARE	The percentage of banking assets held by small banks, defined as banks with assets below the median size in each state.

Table 2. Summary Statistics

This table reports summary statistics of key variables used in the multivariate analysis. The sample period is 1970 to 1994. All financial variables are winsorized at the 1% and 99% tail of distribution.

	N	Mean	S.D.	*p25*	Median	*p75*
Dependent Variables						
Excess Growth 1	88,996	0.125	0.320	-0.038	0.058	0.189
Excess Growth 2	88,996	0.129	0.374	-0.057	0.043	0.186
Excess Growth 3	88,996	0.116	0.475	-0.107	0.001	0.169
Key Explanatory Variables						
INTRA	88,996	0.584	0.493	0.000	1.000	1.000
INTER	88,996	0.435	0.496	0.000	0.000	1.000
Control Variables						
SIZE	88,996	4.192	1.966	2.755	4.026	5.503
LEVERAGE	88,996	0.197	0.163	0.050	0.174	0.305
MTB	88,996	1.557	1.102	0.932	1.158	1.689
NET FIXED ASSETS	88,996	0.366	0.237	0.181	0.311	0.517
DIVIDEND	88,996	0.011	0.014	0.000	0.000	0.019
NET INCOME	88,996	0.041	0.315	0.038	0.090	0.150
NET SALES	88,996	6.979	8.262	1.914	4.388	8.300
BUSINESS COMBINATION	88,996	0.179	0.383	0.000	0.000	0.000
PERSONAL INCOME GROWTH	88,996	0.089	0.023	0.072	0.087	0.104
SMALL DUMMY	67,274	0.365	0.482	0.000	1.000	1.000
NONPAYER	60,599	0.353	0.478	0.000	0.000	1.000
KZ HIGH	61,356	0.443	0.497	0.000	0.000	1.000
SA HIGH	63,996	0.317	0.465	0.000	0.000	1.000
DEMOCRATS	60,640	0.626	0.484	0.000	1.000	1.000
SMALL BANK SHARE	45,517	0.308	0.208	0.154	0.247	0.453

Table 3. Correlation Matrix of Key Variables

This table presents univariate correlation between dependent variables and key explanatory variables. *, **, *** denote significance at the 10%, 5%, and 1% levels, respectively.

	Excess Growth 1	*Excess Growth 2*	*Excess Growth 3*	*INTRA*	*INTER*
Excess Growth 1	1.00				
Excess Growth 2	0.93***	1.00			
Excess Growth 3	0.80***	0.86***	1.00		
INTRA	0.04***	0.06***	0.07***	1.00	
INTER	0.06***	0.09***	0.11***	0.56***	1.00

Table 4. Bank Deregulation and Externally Financed Firm Growth

This table reports regression results relating bank deregulation to externally financed firm growth. We use three dependent variables in Panels A to C, respectively. *Excess Growth 1* is the excess growth over internal financing, which is the difference between a firm's actual sales growth rate and its predicted internally financed growth rate (*IG*); *Excess Growth 2* is the excess growth over internal financing & short-term debt, which is the difference between a firm's actual sales growth rate and its predicted short-term financed growth rate (*SFG*); *Excess Growth 3* is the excess growth over internal financing, short-, & long-term debt, which is the difference between a firm's actual sales growth rate and its predicted short-term and long-term financed growth rate (*SG*). *INTRA* is a dummy variable equal to 1 in the years after the focal state implemented intrastate bank deregulation, and 0 otherwise. *INTER* is a dummy variable equal to 1 in the years after the focal state implemented interstate bank deregulation, and 0 otherwise. Variable definitions are provided in Table 1. All financial variables are winsorized at the 1% and 99% percentile. Regressions are estimated using panel data with firm and year fixed effects. *t*-statistics based on robust standard errors clustered at the firm level are given in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Panel A. Dependent Variable: *Excess Growth 1* (*Excess Growth over Internal Financing*)

	(1)	(2)	(3)	(4)	(5)
INTRA	0.014***		0.012***	0.002	0.004
	(3.510)		(2.882)	(0.539)	(0.947)
INTER		0.024***	0.022***	0.023***	0.022***
		(3.913)	(3.487)	(3.900)	(3.809)
Firm Characteristics					
SIZE				-0.054***	-0.055***
				(-16.721)	(-16.843)
LEVERAGE				0.086***	0.086***
				(6.279)	(6.221)
MTB				0.053***	0.053***
				(23.224)	(23.140)
NET FIXED ASSETS				-0.262***	-0.261***
				(-12.814)	(-12.767)
DIVIDEND				-2.010***	-2.012***
				(-14.045)	(-14.042)
NET INCOME				-0.311***	-0.311***
				(-25.094)	(-25.112)
NET SALES				-0.011***	-0.011***
				(-22.837)	(-22.768)
Local Market Characteristics					
PERSONAL INCOME GROWTH					0.238*
					(1.942)
BUSINESS COMBINATION					0.011*
					(1.958)
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	88,996	88,996	88,996	88,996	88,996
Adj.R^2	0.034	0.034	0.034	0.132	0.132

Panel B. Dependent Variable: *Excess Growth 2* (*Excess Growth over Internal Financing & Short-Term Debt*)					
	(1)	(2)	(3)	(4)	(5)
INTRA	0.011**		0.009*	-0.001	0.001
	(2.379)		(1.918)	(-0.195)	(0.203)
INTER		0.020***	0.018**	0.020***	0.020***
		(2.858)	(2.566)	(3.124)	(2.997)
Firm Characteristics					
SIZE				-0.055***	-0.056***
				(-13.872)	(-13.958)
LEVERAGE				0.129***	0.128***
				(7.526)	(7.480)
MTB				0.049***	0.049***
				(18.186)	(18.108)
NET FIXED ASSETS				-0.274***	-0.272***
				(-11.613)	(-11.573)
DIVIDEND				-2.276***	-2.278***
				(-14.343)	(-14.344)
NET INCOME				-0.387***	-0.387***
				(-26.756)	(-26.770)
NET SALES				-0.012***	-0.012***
				(-21.975)	(-21.899)
Local Market Characteristics					
PERSONAL INCOME GROWTH					0.285**
					(2.061)
BUSINESS COMBINATION					0.010
					(1.602)
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	88,996	88,996	88,996	88,996	88,996
Adj.R^2	0.021	0.021	0.021	0.119	0.119

Panel C. Dependent Variable: ***Excess Growth 3* (*Excess Growth over Internal Financing, Short-, & Long-Term Debt*)**					
	(1)	(2)	(3)	(4)	(5)
INTRA	0.009		0.007	-0.000	0.001
	(1.478)		(1.230)	(-0.082)	(0.104)
INTER		0.014	0.012	0.017**	0.018**
		(1.628)	(1.440)	(2.098)	(2.200)
Firm Characteristics					
SIZE				-0.036***	-0.036***
				(-7.915)	(-7.942)
LEVERAGE				0.196***	0.195***
				(8.456)	(8.424)
MTB				0.044***	0.044***
				(14.003)	(13.957)
NET FIXED ASSETS				-0.311***	-0.310***
				(-10.250)	(-10.219)
DIVIDEND				-2.590***	-2.589***
				(-12.453)	(-12.440)
NET INCOME				-0.495***	-0.495***
				(-27.436)	(-27.434)
NET SALES				-0.013***	-0.013***
				(-20.823)	(-20.780)
Local Market Characteristics					
PERSONAL INCOME GROWTH					0.054
					(0.303)
BUSINESS COMBINATION					0.014*
					(1.806)
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	88,996	88,996	88,996	88,996	88,996
Adj.R^2	0.010	0.010	0.010	0.092	0.092

Table 5. Financial Constraints, Bank Deregulation, and Externally Financed Firm Growth

This table presents estimates from panel regressions relating financial constraint, bank deregulation, and firm growth. We use three dependent variables in Columns (1) to (3). *Excess Growth 1* is the excess growth over internal financing, which is the difference between a firm's actual sales growth rate and its predicted internally financed growth rate (*IG*); *Excess Growth 2* is the excess growth over internal financing & short-term debt, which is the difference between a firm's actual sales growth rate and its predicted short-term financed growth rate (*SFG*); *Excess Growth 3* is the excess growth over internal financing, short-, & long-term debt, which is the difference between a firm's actual sales growth rate and its predicted short-term and long-term financed growth rate (*SG*). *INTRA* is a dummy variable equal to 1 in the years after the focal state implemented intrastate bank deregulation, and 0 otherwise. *INTER* is a dummy variable equal to 1 in the years after the focal state implemented interstate bank deregulation, and 0 otherwise. In Panel A, we define companies with assets below the state median assets as financially constrained (*SMALL DUMMY*). In Panel B, we define companies paying no dividend as financially constrained (*NONPAYER*). In Panel C, we define firms as financially constrained when their KZ index is above state median (*KZ HIGH*). In Panel D, we define firms as financially constrained when their SA index is above state median (*SA HIGH*). All financial constraints variables are measured one year prior to interstate deregulation. All financial variables are winsorized at the 1% and 99% percentile. Regressions are estimated using panel data with firm and year fixed effects. *t*-statistics based on robust standard errors clustered at the firm level are given in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Dependent Variables:	*Excess Growth 1* (1)	*Excess Growth 2* (2)	*Excess Growth 3* (3)
Panel A. Financial Constraints: *SMALL DUMMY* (Below Median Assets)			
INTRA	0.035***	0.028***	0.031**
	(5.439)	(3.105)	(2.500)
INTER	0.060***	0.043***	0.022
	(6.226)	(3.906)	(1.482)
INTRA × *SMALL DUMMY*	-0.061***	-0.056***	-0.057***
	(-7.035)	(-5.610)	(-4.173)
INTER × *SMALL DUMMY*	-0.089***	-0.065***	-0.033**
	(-7.843)	(-5.946)	(-2.221)
Controls	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes
Observations	67,274	67,274	67,274
Adj.R^2	0.173	0.150	0.106
Summing the Coefficients for the Effects of Deregulation on Small Firms			
Overall effect of *INTRA* on small firms	-0.026***	-0.028***	-0.026**
t-statistics	(-3.164)	(-3.262)	(-2.227)
Overall effect of *INTER* on small firms	-0.029**	-0.022**	-0.011
t-statistics	(-2.265)	(-1.970)	(-0.714)
Panel B. Financial Constraints: *NONPAYER* (Non-Dividend Payers)			
INTRA	0.002	-0.003	-0.010
	(0.348)	(-0.402)	(-0.973)
INTER	0.041***	0.031***	0.016
	(4.216)	(2.674)	(1.049)
INTRA × *NONPAYER*	0.003	0.006	0.044*
	(0.185)	(0.315)	(1.833)
INTER × *NONPAYER*	-0.083***	-0.067***	-0.057***
	(-6.552)	(-4.450)	(-2.912)
Controls	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes
Observations	67,630	67,630	67,630
Adj.R^2	0.159	0.137	0.091

Summing the Coefficients for the Effects of Deregulation on Non-Dividend Payers			
Overall effect of *INTRA* on non-dividend payers	0.005	0.003	0.034
t-statistics	(0.332)	(0.173)	(1.500)
Overall effect of *INTER* on non-dividend payers	-0.042***	-0.036**	-0.041**
t-statistics	(-3.051)	(-2.223)	(-1.995)
Panel C. Financial Constraints: *KZ HIGH* (Above Median KZ Index)			
INTRA	0.004	-0.002	-0.010
	(0.520)	(-0.250)	(-0.919)
INTER	0.029***	0.020*	0.005
	(2.867)	(1.678)	(0.342)
INTRA × *KZ HIGH*	0.004	0.005	0.030
	(0.335)	(0.329)	(1.463)
INTER × *KZ HIGH*	-0.079***	-0.059***	-0.043**
	(-6.645)	(-4.121)	(-2.298)
Controls	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes
Observations	61,356	61,356	61,356
Adj.R^2	0.150	0.130	0.084
Summing the Coefficients for the Effects of Deregulation on High KZ Firms			
Overall effect of *INTRA* on high KZ firms	0.008	0.003	0.020
t-statistics	(0.735)	(0.224)	(1.068)
Overall effect of *INTER* on high KZ firms	-0.050***	-0.039**	-0.038*
t-statistics	(-3.825)	(-2.559)	(-1.858)
Panel D. Financial Constraints: *SA HIGH* (Above Median SA Index)			
INTRA	0.005	-0.001	0.002
	(0.808)	(-0.127)	(0.206)
INTER	0.031***	0.022**	0.016
	(3.346)	(2.033)	(1.087)
INTRA × *SA HIGH*	-0.004	0.000	-0.001
	(-0.263)	(0.022)	(-0.019)
INTER × *SA HIGH*	-0.066***	-0.053***	-0.056***
	(-4.778)	(-3.084)	(-2.657)
Controls	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes
Observations	63,996	63,996	63,996
Adj.R^2	0.152	0.132	0.086
Summing the Coefficients for the Effects of Deregulation on High SA Firms			
Overall effect of *INTRA* on high SA firms	0.001	-0.001	0.001
t-statistics	(0.346)	(-0.224)	(0.100)
Overall effect of *INTER* on high SA firms	-0.035**	-0.031**	-0.040*
t-statistics	(-2.980)	(-1.972)	(1.895)

Table 6. Excluding Delaware and South Dakota

This table reports regression results relating banking deregulation to externally financed firm growth excluding Delaware and South Dakota from our sample. The dependent variables are *Excess Growth 1*, *Excess Growth 2*, and *Excess Growth 3*. *Excess Growth 1* is the excess growth over internal financing, which is the difference between a firm's actual sales growth rate and its predicted internally financed growth rate (*IG*); *Excess Growth 2* is the excess growth over internal financing & short-term debt, which is the difference between a firm's actual sales growth rate and its predicted short-term financed growth rate (*SFG*); *Excess Growth 3* is the excess growth over internal financing, short-, & long-term debt, which is the difference between a firm's actual sales growth rate and its predicted short-term and long-term financed growth rate (*SG*). *INTRA* is a dummy variable equal to 1 in the years after the focal state implemented intrastate bank deregulation, and 0 otherwise. *INTER* is a dummy variable equal to 1 in the years after the focal state implemented interstate bank deregulation, and 0 otherwise. Panel A presents overall effects of deregulation on firm growth. Panel B presents regression results for differential effects of deregulation on financially unconstrained firms and financially constrained firms. In Panel B1, we define companies with assets below the state median as financially constrained (*SMALL DUMMY*). In Panel B2, we define companies paying no dividend as financially constrained (*NONPAYER*). In Panel B3, we define firms as financially constrained when their KZ index is above state median (*KZ HIGH*). In Panel B4, we define firms as financially constrained when their SA index is above state median (*SA HIGH*). Variables definitions are provided in Table 1. All financial variables are winsorized at the 1% and 99% percentile. Regressions are estimated using panel data with firm and year fixed effects. *t*-statistics based on robust standard errors clustered at the firm level are given in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Panel A. Overall Effects			
Dependent Variables:	*Excess Growth 1*	*Excess Growth 2*	*Excess Growth 3*
	(1)	(2)	(3)
INTRA	0.004	0.001	0.000
	(0.897)	(0.186)	(0.048)
INTER	0.023***	0.020***	0.018**
	(3.824)	(2.972)	(2.176)
Controls	Yes	Yes	Yes
Firm Fixed Effect	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes
Observations	88,538	88,538	88,538
Adj. R^2	0.132	0.119	0.092
Panel B. Differential Effects for Financially Unconstrained vs. Financially Constrained Firms			
Panel B1. SMALL DUMMY			
INTRA	0.035***	0.028***	0.031**
	(5.372)	(3.058)	(2.474)
INTER	0.060***	0.043***	0.021
	(6.142)	(3.835)	(1.395)
INTRA × *SMALL DUMMY*	-0.061***	-0.056***	-0.058***
	(-6.960)	(-5.548)	(-4.192)
INTER × *SMALL DUMMY*	-0.088***	-0.065***	-0.032**
	(-7.751)	(-5.896)	(-2.116)
Controls	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes
Observations	66,885	66,885	66,885
Adj.R^2	0.173	0.151	0.106
Summing the Coefficients for the Effects of Deregulation on Small Firms			
Overall effect of *INTRA* on small firms	-0.026***	-0.028***	-0.026**
t-statistics	(-3.162)	(-3.251)	(-2.228)
Overall effect of *INTER* on small firms	-0.029**	-0.022**	-0.011
t-statistics	(-2.271)	(-1.989)	(-0.698)

Panel B2. NONPAYER			
Dependent Variables:	*Excess Growth 1*	*Excess Growth 2*	*Excess Growth 3*
	(1)	(2)	(3)
INTRA	0.002	-0.003	-0.010
	(0.295)	(-0.408)	(-1.033)
INTER	0.041***	0.030**	0.015
	(4.156)	(2.577)	(0.977)
INTRA × *NONPAYER*	0.003	0.005	0.044*
	(0.187)	(0.300)	(1.830)
INTER × *NONPAYER*	-0.082***	-0.066***	-0.057***
	(-6.512)	(-4.390)	(-2.877)
Controls	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes
Observations	67,238	67,238	67,238
Adj.R^2	0.160	0.137	0.091
Summing the Coefficients for the Effects of Deregulation on Non-Dividend Payers			
Overall effect of *INTRA* on non-dividend payers	0.005	0.003	0.034
t-statistics	(0.316)	(0.141)	(1.466)
Overall effect of *INTER* on non-dividend payers	-0.042***	-0.036**	-0.041**
t-statistics	(-3.031)	(-2.220)	(-2.004)
Panel B3. KZ HIGH			
INTRA	0.003	-0.003	-0.011
	(0.438)	(-0.334)	(-0.993)
INTER	0.030***	0.020*	0.005
	(2.866)	(1.684)	(0.325)
INTRA × *KZ HIGH*	0.005	0.006	0.031
	(0.386)	(0.404)	(1.494)
INTER × *KZ HIGH*	-0.079***	-0.061***	-0.043**
	(-6.678)	(-4.210)	(-2.331)
Controls	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes
Observations	61,005	61,005	61,005
Adj.R^2	0.151	0.130	0.084
Summing the Coefficients for the Effects of Deregulation on High KZ Firms			
Overall effect of *INTRA* on high KZ firms	0.008	0.003	0.020
t-statistics	(0.742)	(0.244)	(1.058)
Overall effect of *INTER* on high KZ firms	-0.050***	-0.039**	-0.038*
t-statistics	(-3.839)	(-2.625)	(-1.894)
Panel B4. SA HIGH			
INTRA	0.002	-0.003	-0.002
	(0.374)	(-0.450)	(-0.163)
INTER	0.026***	0.019*	0.012
	(2.779)	(1.678)	(0.810)
INTRA × *SA HIGH*	0.004	0.007	0.004
	(0.211)	(0.355)	(0.135)
INTER × *SA HIGH*	-0.071***	-0.055***	-0.056***
	(-5.041)	(-3.160)	(-2.610)
Controls	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes
Observations	63,621	63,621	63,621
Adj.R^2	0.152	0.133	0.086

Summing the Coefficients for the Effects of Deregulation on High SA Firms			
Overall effect of *INTRA* on high SA firms	0.001	-0.001	0.001
t-statistics	(0.346)	(-0.224)	(0.100)
Overall effect of *INTER* on high SA firms	-0.035**	-0.031**	-0.040*
t-statistics	(-2.993)	(-2.007)	(1.949)

Table 7. Placebo Tests

This table reports regression results relating banking deregulation to externally financed firm growth using placebo tests. We use three dependent variables in Columns (1) to (3). *Excess Growth 1* is the excess growth over internal financing, which is the difference between a firm's actual sales growth rate and its predicted internally financed growth rate (*IG*); *Excess Growth 2* is the excess growth over internal financing & short-term debt, which is the difference between a firm's actual sales growth rate and its predicted short-term financed growth rate (*SFG*); *Excess Growth 3* is the excess growth over internal financing, short-, & long-term debt, which is the difference between a firm's actual sales growth rate and its predicted short-term and long-term financed growth rate (*SG*). We first draw years at random from a uniform distribution between 1970 and 1994 and then randomly assign these years to each state as placebo deregulation years. *Placebo (INTRA)* is a dummy variable equal to 1 in the years after the focal state implemented the placebo intrastate bank deregulation, and 0 otherwise. *Placebo (INTER)* is a dummy variable equal to 1 in the years after the focal state implemented the placebo interstate bank deregulation, and 0 otherwise. Panel A presents overall effects of deregulation on firm growth. Panel B presents regression results for differential effects of deregulation on financially unconstrained firms and financially constrained firms. In Panel B1, we define companies with assets below the state median as financially constrained (*SMALL DUMMY*). In Panel B2, we define companies paying no dividend as financially constrained (*NONPAYER*). In Panel B3, we define firms as financially constrained when their KZ index is above state median (*KZ HIGH*). In Panel B4, we define firms as financially constrained when their SA index is above state median (*SA HIGH*). Variables definitions are provided in Table 1. All financial variables are winsorized at the 1% and 99% percentile. Regressions are estimated using panel data with firm and year fixed effects. *t*-statistics based on robust standard errors clustered at the firm level are given in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Dependent Variables:	*Excess Growth 1* *(1)*	*Excess Growth 2* *(2)*	*Excess Growth 3* *(3)*
Panel A: Overall Effects			
Placebo (INTRA)	0.008	0.006	0.003
	(1.366)	(0.834)	(0.349)
Placebo (INTER)	-0.001	-0.007	-0.009
	(-0.176)	(-1.062)	(-0.996)
	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes
Observations	88,996	88,996	88,996
Adj.R^2	0.170	0.149	0.105
Panel B. Differential Effects for Financially Unconstrained vs. Financially Constrained Firms			
Panel B1. SMALL DUMMY			
Placebo (INTRA)	0.016***	0.007	0.010
	(2.652)	(0.972)	(0.995)
Placebo (INTER)	-0.007	-0.014**	-0.022**
	(-1.215)	(-1.977)	(-2.316)
Placebo (INTRA) × *SMALL DUMMY*	-0.028**	-0.004	-0.024
	(-2.274)	(-0.286)	(-1.250)
Placebo (INTER) × *SMALL DUMMY*	0.025*	0.027	0.055**
	(1.836)	(1.644)	(2.502)
	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes
Observations	67,274	67,274	67,274
Adj.R^2	0.170	0.149	0.105
Summing the Coefficients for the Effects of Deregulation on Small Firms			
Overall effect of *INTRA* on small firms	-0.012	0.003	-0.013
t-statistics	(-1.015)	(0.173)	(-0.775)
Overall effect of *INTER* on small firms	0.018	0.013	0.033
t-statistics	(1.374)	(0.843)	(1.578)

Panel B2. NONPAYER			
Dependent Variables:	*Excess Growth 1* (1)	*Excess Growth 2* (2)	*Excess Growth 3* (3)
Placebo (INTRA)	0.023***	0.017**	0.012
	(3.822)	(2.320)	(1.205)
Placebo (INTER)	0.020***	0.010	0.000
	(3.492)	(1.561)	(0.029)
Placebo (INTRA) × *NONPAYER*	-0.061***	-0.049***	-0.048**
	(-4.757)	(-3.127)	(-2.374)
Placebo (INTER) × *NONPAYER*	-0.036***	-0.028*	0.005
	(-2.686)	(-1.799)	(0.230)
	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes
Observations	67,630	67,630	67,630
Adj.R^2	0.159	0.137	0.091
Summing the Coefficients for the Effects of Deregulation on Non-Dividend Payers			
Overall effect of *INTRA* on non-dividend payers	-0.038***	-0.032**	-0.036*
t-statistics	(-3.028)	(-2.116)	(-1.833)
Overall effect of *INTER* on non-dividend payers	-0.016	-0.018	-0.005
t-statistics	(-1.237)	(-1.167)	(-0.265)
Panel B3. KZ HIGH			
Placebo (INTRA)	0.024***	0.018**	0.012
	(3.420)	(2.200)	(1.073)
Placebo (INTER)	0.013**	0.005	-0.004
	(2.010)	(0.734)	(-0.410)
Placebo (INTRA) × *KZ HIGH*	-0.051***	-0.037***	-0.030*
	(-4.765)	(-2.824)	(-1.776)
Placebo (INTER) × *KZ HIGH*	-0.012	-0.004	0.015
	(-1.137)	(-0.293)	(0.828)
	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes
Observations	61,356	61,356	61,356
Adj.R^2	0.149	0.130	0.084
Summing the Coefficients for the Effects of Deregulation on High KZ Firms			
Overall effect of *INTRA* on high KZ firms	-0.027***	-0.019	-0.018
t-statistics	(-2.768)	(-1.568)	(-1.179)
Overall effect of *INTER* on high KZ firms	0.001	0.001	0.013
t-statistics	(0.000)	(0.141)	(0.656)
Panel B4. *SA HIGH*			
Placebo (INTRA)	0.017***	0.013*	0.016
	(2.841)	(1.866)	(1.587)
Placebo (INTER)	0.008	-0.001	-0.006
	(1.508)	(-0.104)	(-0.651)
Placebo (INTRA) × *SA HIGH*	-0.054***	-0.038**	-0.061**
	(-3.411)	(-1.975)	(-2.569)
Placebo (INTER) × *SA HIGH*	-0.007	0.010	0.022
	(-0.437)	(0.545)	(0.875)
	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes
Observations	63,996	63,996	63,996
Adj.R^2	0.152	0.132	0.086

Summing the Coefficients for the Effects of Deregulation on High SA firms			
Overall effect of *INTRA* on high SA firms	-0.037**	-0.025	-0.045**
t-statistics	(-2.389)	(-0.185)	(-1.970)
Overall effect of *INTER* on high SA firms	0.001	0.009	0.016
t-statistics	(0.000)	(0.636)	(0.656)

Table 8. Instrumental Variable Regression

This table reports regression results relating banking deregulation to externally financed firm growth using instrumental variable regression. Columns (1) and (2) present the first-stage instrumental variable regression results using *DEMOCRATS* and *SMALL BANK SHARE* as instrumental variables. *DEMOCRATS* is a measure of the degree of party control of state government and is defined as the fraction of the three bodies of state government (assembly, senate, and governorship) controlled by Democrats. *SMALL BANK SHARE* is the percentage of banking assets in the state held by banks below the median size in each state in each year. The dependent variable in Column (1) is *INTRA*, while the dependent variable in Column (2) is *INTER*. In Columns (3), (4), and (5), we present the second-stage regression results using three externally financed firm growth measures. *Excess Growth 1* is the excess growth over internal financing, which is the difference between a firm's actual sales growth rate and its predicted internally financed growth rate (*IG*); *Excess Growth 2* is the excess growth over internal financing & short-term debt, which is the difference between a firm's actual sales growth rate and its predicted short-term financed growth rate (*SFG*); *Excess Growth 3* is the excess growth over internal financing, short-, & long-term debt, which is the difference between a firm's actual sales growth rate and its predicted short-term and long-term financed growth rate (*SG*). *INTRA* is a dummy variable equal to 1 in the years after the focal state implemented intrastate bank deregulation, and 0 otherwise. *INTER* is a dummy variable equal to 1 in the years after the focal state implemented interstate bank deregulation, and 0 otherwise. Variables definitions are provided in Table 1. All financial variables are winsorized at the 1% and 99% percentile. Regressions are estimated using panel data with firm and year fixed effects. *t*-statistics based on robust standard errors clustered at the firm level are given in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	Instrumental Variable Regression 1st Stage		Instrumental Variable Regression 2nd Stage		
Dependent Variables	*INTRA*	*INTER*	*Excess Growth 1*	*Excess Growth 2*	*Excess Growth 3*
	(1)	(2)	(3)	(4)	(5)
DEMOCRATS	-0.160***	0.004			
	(-19.783)	(0.943)			
SMALL BANK SHARE	-2.538***	-0.970***			
	(-34.612)	(-23.164)			
INTRA			-0.063	-0.102	-0.038
			(-1.037)	(-1.412)	(-0.383)
INTER			0.335**	0.423**	0.249
			(1.977)	(2.129)	(0.920)
BUSINESS COMBINATION	-0.112***	-0.144***	0.045**	0.055**	0.048
	(-22.263)	(-27.421)	(2.367)	(2.495)	(1.624)
SIZE	-0.013***	-0.006	-0.076***	-0.077***	-0.049***
	(-3.062)	(-1.438)	(-12.604)	(-11.082)	(-5.650)
LEVERAGE	0.001	-0.009	0.093***	0.117***	0.205***
	(0.054)	(-0.638)	(4.527)	(4.544)	(5.718)
MTB	0.007***	0.002	0.050***	0.043***	0.039***
	(3.190)	(1.123)	(14.459)	(10.547)	(7.959)
NET FIXED ASSETS	-0.011	-0.039*	-0.303***	-0.315***	-0.400***
	(-0.543)	(-1.951)	(-8.962)	(-7.944)	(-7.977)
DIVIDEND	-0.062***	0.355	-1.599***	-1.838***	-1.765***
	(-2.292)	(1.483)	(-5.871)	(-5.922)	(-4.304)
NET INCOME	0.013*	0.006	-0.309***	-0.373***	-0.462***
	(1.841)	(0.762)	(-21.111)	(-21.380)	(-21.664)
NET SALES	-0.001**	-0.000	-0.014***	-0.014***	-0.016***
	(-2.131)	(-0.015)	(-19.298)	(-18.112)	(-16.453)
INCOME GROWTH	-3.082***	-1.272***	0.167	0.189	-0.012
	(-12.45)	(-8.344)	(0.808)	(0.798)	(-0.040)
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	44,201	44,201	44,201	44,201	44,201
Adj. R^2			0.089	0.058	0.076

F-statistics of Excluded Instruments	846.17	268.79
Kleibergen-Paap *rk* LM statistic (under-identification test)	1335.11	449.17

Table 9. Dynamic Effects

This table reports dynamic results relating banking deregulation to externally financed firm growth. In Columns (1) to (3), we use alternative dependent variables. *Excess Growth 1* is the excess growth over internal financing, which is the difference between a firm's actual sales growth rate and its predicted internally financed growth rate (*IG*); *Excess Growth 2* is the excess growth over internal financing & short-term debt, which is the difference between a firm's actual sales growth rate and its predicted short-term financed growth rate (*SFG*); *Excess Growth 3* is the excess growth over internal financing, short-, & long-term debt, which is the difference between a firm's actual sales growth rate and its predicted short-term and long-term financed growth rate (*SG*). *INTRA (-2, 0)* is a dummy equal to 1 in the 2 years before the focal state implemented intrastate bank deregulation, 0 otherwise. *INTRA (1, 3)* is a dummy equal to 1 in the first 3 years after the focal state implemented intrastate bank deregulation, 0 otherwise. *INTRA (4, 7)* is a dummy equal to 1 in the 4 to 7 years after the focal state implemented intrastate bank deregulation, 0 otherwise. *INTRA (≥8)* is a dummy equal to 1 in the 8 years and later after the focal state implemented intrastate bank deregulation, 0 otherwise. *INTER (-2, 0)* is a dummy equal to 1 in the 2 years before the focal state implemented interstate bank deregulation, 0 otherwise. *INTER (1, 3)* is a dummy equal to 1 in the first 3 years after the focal state implemented interstate bank deregulation, 0 otherwise. *INTER (4, 7)* is a dummy equal to 1 in the 4 to 7 years after the focal state implemented interstate bank deregulation, 0 otherwise. *INTER (≥8)* is a dummy equal to 1 in the 8 years and more after the focal state implemented interstate bank deregulation, 0 otherwise. Panel A presents overall effects of deregulation on firm growth. Panel B presents regression results for differential effects of deregulation on financially unconstrained firms and financially constrained firms. In Panel B1, we define companies with assets below the state median as financially constrained (*SMALL DUMMY*). In Panel B2, we define companies paying no dividend as financially constrained (*NONPAYER*). In Panel B3, we define firms as financially constrained when their KZ index is above state median (*KZ HIGH*). In Panel B4, we define firms as financially constrained when their SA index is above state median (*SA HIGH*). Variable definitions are provided in Table 1. All financial variables are winsorized at the 1% and 99% percentile. Regressions are estimated using panel data with firm and year fixed effects. *t*-statistics based on robust standard errors clustered at the firm level are given in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels respectively.

Panel A: Overall Effects

Dependent Variables:	*Excess Growth 1* (1)	*Excess Growth 2* (2)	*Excess Growth 3* (3)
INTRA (-2, 0)	-0.010*	-0.008	-0.009
	(-1.821)	(-1.310)	(-1.100)
INTRA (1, 3)	-0.000	-0.003	-0.002
	(-0.110)	(-0.739)	(-0.366)
INTRA (4, 7)	0.010**	0.006	-0.002
	(1.974)	(1.080)	(-0.220)
INTRA (≥8)	0.010	0.004	0.002
	(1.473)	(0.533)	(0.155)
INTER (-2, 0)	-0.010**	-0.008	-0.007
	(-1.969)	(-1.355)	(-0.996)
INTER (1, 3)	0.016**	0.015**	0.014
	(2.309)	(1.960)	(1.399)
INTER (4, 7)	0.024**	0.027**	0.030**
	(2.491)	(2.480)	(2.112)
INTER (⩾8)	0.030**	0.031**	0.017
	(2.388)	(2.183)	(0.915)
Controls	Yes	Yes	Yes
Firm fixed effect	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes
Observations	88,996	88,996	88,996
Adj.R^2	0.133	0.119	0.092

Panel B. Differential Effects for Financially Unconstrained vs. Financially Constrained Firms			
Dependent Variables:	*Excess Growth 1* (1)	*Excess Growth 2* (2)	*Excess Growth 3* (3)
Panel B1. SMALL DUMMY			
INTRA (-2, 0)	0.029***	0.029***	0.015
	(3.645)	(3.082)	(1.319)
INTRA (1, 3)	0.025***	0.023**	0.032***
	(3.292)	(2.536)	(2.605)
INTRA (4, 7)	0.032***	0.024**	0.018
	(3.737)	(2.319)	(1.375)
INTRA (≥8)	0.032***	0.020	0.022
	(2.730)	(1.371)	(1.221)
INTRA (-2, 0) × *SMALL DUMMY*	-0.056***	-0.058***	-0.042**
	(-4.775)	(-4.027)	(-2.191)
INTRA (0, 3) × *SMALL DUMMY*	-0.061***	-0.063***	-0.053***
	(-5.631)	(-4.902)	(-2.986)
INTRA (4, 7) × *SMALL DUMMY*	-0.052***	-0.044***	-0.051***
	(-4.312)	(-3.108)	(-2.828)
INTRA (≥8) × *SMALL DUMMY*	-0.078***	-0.079***	-0.058***
	(-5.286)	(-4.682)	(-2.672)
INTER (-2, 0)	0.026***	0.012	-0.001
	(2.820)	(1.089)	(-0.100)
INTER (1, 3)	0.057***	0.037**	0.023
	(4.416)	(2.411)	(1.139)
INTER (4, 7)	0.077***	0.062***	0.045
	(4.358)	(2.979)	(1.556)
INTER (⩾8)	0.098***	0.082***	0.054
	(4.357)	(3.041)	(1.458)
INTER (-2, 0) × *SMALL DUMMY*	-0.049***	-0.040**	-0.006
	(-3.451)	(-2.337)	(-0.267)
INTER (1, 3) × *SMALL DUMMY*	-0.084***	-0.051***	-0.031
	(-5.720)	(-2.881)	(-1.284)
INTER (4, 7) × *SMALL DUMMY*	-0.096***	-0.062***	-0.040
	(-6.163)	(-3.307)	(-1.572)
INTER (⩾8) × *SMALL DUMMY*	-0.115***	-0.077***	-0.086**
	(-5.494)	(-3.052)	(-2.544)
Controls	Yes	Yes	Yes
Firm fixed effect	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes
Observations	67,274	67,274	67,274
Adj.R^2	0.174	0.151	0.106
Summing the Coefficients for the Effects of Deregulation on Small Firms			
Overall effect of *INTRA (-2, 0)* on small firms	-0.027***	-0.029**	-0.027
t-statistics	(-2.680)	(-2.261)	(-1.552)
Overall effect of *INTRA (1, 3)* on small firms	-0.036***	-0.040***	-0.021
t-statistics	(-3.527)	(-3.230)	(-1.285)
Overall effect of *INTRA (4, 7)* on small firms	-0.020	-0.020	-0.033*
t-statistics	(-1.625)	(-1.374)	(-1.720)
Overall effect of *INTRA (≥8)* on small firms	-0.046***	-0.059***	-0.036
t-statistics	(-2.853)	(-3.137)	(-1.435)

Overall effect of *INTER (-2, 0)* on small firms	-0.023*	-0.028*	-0.007
t-statistics	(-1.709)	(-1.700)	(-0.332)
Overall effect of *INTER (1, 3)* on small firms	-0.027*	-0.014**	-0.008
t-statistics	(-1.685)	(-2.221)	(-0.283)
Overall effect of *INTER (4, 7)* on small firms	-0.019	0.000	0.005
t-statistics	(-0.938)	(0.000)	(0.141)
Overall effect of *INTER (≥8)* on small firms	-0.017	0.005	-0.032
t-statistics	(-0.608)	(0.141)	(-0.693)
Panel B2. NONPAYER			
INTRA (-2, 0)	0.008	0.013	0.004
	(1.178)	(1.530)	(0.328)
INTRA (1, 3)	-0.003	-0.004	-0.002
	(-0.485)	(-0.447)	(-0.204)
INTRA (4, 7)	0.008	0.002	-0.018
	(1.016)	(0.251)	(-1.407)
INTRA (≥8)	0.013	0.003	-0.014
	(1.218)	(0.258)	(-0.796)
INTRA (-2, 0) × *NONPAYER*	-0.019	-0.039*	-0.026
	(-1.080)	(-1.867)	(-0.976)
INTRA (0, 3) × *NONPAYER*	-0.000	-0.010	0.036
	(-0.020)	(-0.466)	(1.230)
INTRA (4, 7) × *NONPAYER*	0.016	0.015	0.069**
	(0.801)	(0.589)	(2.110)
INTRA (≥8) × *NONPAYER*	0.022	0.014	0.120***
	(0.816)	(0.436)	(2.755)
INTER (-2, 0)	0.005	-0.006	-0.008
	(0.553)	(-0.554)	(-0.531)
INTER (1, 3)	0.034***	0.024	0.027
	(2.664)	(1.616)	(1.285)
INTER (4, 7)	0.060***	0.045**	0.038
	(3.444)	(2.139)	(1.275)
INTER (⩾8)	0.093***	0.082***	0.051
	(4.158)	(3.009)	(1.358)
INTER (-2, 0) × *NONPAYER*	-0.028*	-0.018	-0.014
	(-1.791)	(-0.968)	(-0.550)
INTER (1, 3) × *NONPAYER*	-0.094***	-0.068***	-0.092***
	(-5.607)	(-3.388)	(-3.446)
INTER (4, 7) × *NONPAYER*	-0.115***	-0.082***	-0.096***
	(-5.992)	(-3.503)	(-3.128)
INTER (⩾8) × *NONPAYER*	-0.120***	-0.095***	-0.110**
	(-4.617)	(-2.964)	(-2.477)
Controls	Yes	Yes	Yes
Firm fixed effect	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes
Observations	67,630	67,630	67,630
Adj.R^2	0.160	0.137	0.092
Summing the Coefficients for the Effects of Deregulation on Non-Dividend Payers			
Overall effect of *INTRA (-2, 0)* on non-dividend payers	-0.011	-0.026	-0.022
t-statistics	(-0.640)	(-1.315)	(-0.900)
Overall effect of *INTRA (1, 3)* on non-dividend payers	-0.003	-0.014	0.034
t-statistics	(-0.200)	(-0.648)	(1.204)
Overall effect of *INTRA (4, 7)* on non-dividend payers	0.024	0.017	0.051
t-statistics	(-1.237)	(0.707)	(1.609)
Overall effect of *INTRA (≥8)* on non-dividend payers	0.035	0.017	0.106**
t-statistics	(1.311)	(0.548)	(2.478)

Overall effect of *INTER (-2, 0)* on non-dividend payers	-0.023	-0.024	-0.022
t-statistics	(-1.520)	(-1.315)	(-0.917)
Overall effect of *INTER (1, 3)* on non-dividend payers	-0.060***	-0.044**	-0.065**
t-statistics	(-3.347)	(-2.012)	(2.309)
Overall effect of *INTER (4, 7)* on non-dividend payers	-0.045**	-0.037	-0.058
t-statistics	(-2.419)	(-1.356)	(-1.581)
Overall effect of *INTER (≥8)* on non-dividend payers	-0.027	-0.013	-0.059
t-statistics	(-0.906)	(-0.346)	(-1.118)
Panel B3. KZ HIGH			
INTRA (-2, 0)	0.004	0.003	-0.010
	(0.482)	(0.265)	(-0.799)
INTRA (1, 3)	0.003	-0.001	0.001
	(0.357)	(-0.101)	(0.047)
INTRA (4, 7)	0.015	0.011	-0.005
	(1.624)	(1.037)	(-0.397)
INTRA (≥8)	0.006	-0.004	-0.023
	(0.511)	(-0.270)	(-1.228)
INTRA (-2, 0) × *KZ HIGH*	-0.007	-0.007	0.009
	(-0.453)	(-0.391)	(0.355)
INTRA (0, 3) × *KZ HIGH*	-0.008	-0.010	0.017
	(-0.520)	(-0.542)	(0.660)
INTRA (4, 7) × *KZ HIGH*	0.014	0.007	0.026
	(0.831)	(0.320)	(0.944)
INTRA (≥8) × *KZ HIGH*	0.045**	0.031	0.108***
	(2.018)	(1.125)	(2.979)
INTER (-2, 0)	-0.016	-0.011	-0.017
	(-1.442)	(-0.925)	(-1.104)
INTER (1, 3)	0.021	0.013	0.010
	(1.548)	(0.780)	(0.487)
INTER (4, 7)	0.041**	0.028	0.020
	(2.268)	(1.318)	(0.659)
INTER (⩾8)	0.080***	0.067**	0.044
	(3.469)	(2.467)	(1.139)
INTER (-2, 0) × *KZ HIGH*	-0.003	-0.017	0.006
	(-0.153)	(-0.988)	(0.270)
INTER (1, 3) × *KZ HIGH*	-0.096***	-0.067***	-0.064**
	(-5.988)	(-3.408)	(-2.478)
INTER (4, 7) × *KZ HIGH*	-0.092***	-0.058***	-0.050*
	(-5.130)	(-2.602)	(-1.684)
INTER (⩾8) × *KZ HIGH*	-0.115***	-0.072**	-0.097**
	(-5.101)	(-2.367)	(-2.386)
Controls	Yes	Yes	Yes
Firm fixed effect	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes
Observations	61,356	61,356	61,356
Adj.R^2	0.151	0.130	0.085
Summing the Coefficients for the Effects of Deregulation on High KZ Firms			
Overall effect of *INTRA (-2, 0)* on high KZ firms	-0.003	-0.004	-0.001
t-statistics	(-0.200)	(-0.283)	(-0.001)
Overall effect of *INTRA (1, 3)* on high KZ firms	-0.005	-0.011	0.018
t-statistics	(-0.361)	(-0.648)	(0.735)
Overall effect of *INTRA (4, 7)* on high KZ firms	0.029*	0.018	0.021
t-statistics	(1.847)	(-0.872)	(0.781)
Overall effect of *INTRA (≥8)* on high KZ firms	0.051**	0.027	0.085**
t-statistics	(2.470)	(1.029)	(2.429)

Overall effect of *INTER (-2, 0)* on high KZ firms	-0.019	-0.028	-0.011
t-statistics	(-1.122)	(-1.629)	(-0.469)
Overall effect of *INTER (1, 3)* on high KZ firms	-0.075***	-0.054***	-0.054*
t-statistics	(-4.431)	(-2.608)	(-1.952)
Overall effect of *INTER (4, 7)* on high KZ firms	-0.051**	-0.030	-0.030
t-statistics	(-2.364)	(-1.131)	(0.806)
Overall effect of *INTER (≥8)* on high KZ firms	-0.035	-0.005	-0.053
t-statistics	(-1.288)	(1.141)	(-1.044)
Panel B4. SA HIGH			
INTRA (-2, 0)	0.008	0.008	0.000
	(1.221)	(1.094)	(0.011)
INTRA (1, 3)	0.002	0.002	0.006
	(0.343)	(0.220)	(0.533)
INTRA (4, 7)	0.008	0.000	-0.018
	(0.969)	(0.054)	(-1.397)
INTRA (≥8)	0.022**	0.015	0.008
	(2.020)	(1.281)	(0.443)
INTRA (-2, 0) × *SA HIGH*	-0.024	-0.026	-0.026
	(-1.149)	(-1.035)	(-0.798)
INTRA (0, 3) × *SA HIGH*	-0.010	-0.015	0.007
	(-0.469)	(-0.558)	(0.189)
INTRA (4, 7) × *SA HIGH*	0.035	0.039	0.068*
	(1.403)	(1.231)	(1.720)
INTRA (≥8) × *SA HIGH*	0.015	-0.011	0.066
	(0.460)	(-0.269)	(1.254)
INTER (-2, 0)	-0.009	-0.006	-0.002
	(-0.992)	(-0.604)	(-0.118)
INTER (1, 3)	0.008	-0.000	0.014
	(0.648)	(-0.020)	(0.692)
INTER (4, 7)	0.040**	0.029	0.048
	(2.232)	(1.370)	(1.620)
INTER (⩾8)	0.062***	0.052*	0.050
	(2.760)	(1.941)	(1.284)
INTER (-2, 0) × *SA HIGH*	-0.022	-0.029	-0.023
	(-1.113)	(-1.449)	(-0.839)
INTER (1, 3) × *SA HIGH*	-0.079***	-0.047**	-0.074**
	(-4.107)	(-1.996)	(-2.505)
INTER (4, 7) × *SA HIGH*	-0.102***	-0.066**	-0.104***
	(-4.711)	(-2.386)	(-2.999)
INTER (⩾8) × *SA HIGH*	-0.085***	-0.042	-0.092*
	(-3.069)	(-1.115)	(-1.947)
Controls	Yes	Yes	Yes
Firm fixed effect	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes
Observations	63,996	63,996	63,996
Adj.R^2	0.153	0.133	0.086
Summing the Coefficients for the Effects of Deregulation on High SA Firms			
Overall effect of *INTRA (-2, 0)* on high SA firms	-0.016	-0.018	-0.026
t-statistics	(-0.794)	(-0.728)	(-0.831)
Overall effect of *INTRA (1, 3)* on high SA firms	-0.008	-0.013	0.013
t-statistics	(-0.374)	(-0.500)	(0.388)
Overall effect of *INTRA (4, 7)* on high SA firms	0.043*	0.039	0.050
t-statistics	(1.764)	(1.261)	(1.288)
Overall effect of *INTRA (≥8)* on high SA firms	0.037	0.004	0.058
t-statistics	(1.158)	(0.100)	(1.428)

Overall effect of *INTER (-2, 0)* on high SA firms	-0.031	-0.034	-0.025
t-statistics	(-1.628)	(-1.512)	(-0.938)
Overall effect of *INTER (1, 3)* on high SA firms	-0.071***	-0.047*	-0.060*
t-statistics	(-3.545)	(-1.942)	(-1.960)
Overall effect of *INTER (4, 7)* on high SA firms	-0.062**	-0.037	-0.056
t-statistics	(-2.573)	(-1.233)	(-1.374)
Overall effect of *INTER (≥8)* on high SA firms	-0.023	0.010	-0.042
t-statistics	(0.721)	(0.224)	(-0.762)