



Credit market development and corporate earnings management: Evidence from banking and branching deregulations[☆]

Yichu Huang^a, Frank Hong Liu^{b,*}, Buhui Qiu^c

^a Business School, East China University of Political Science and Law, Shanghai 201620, China

^b School of Economics and Business, Loughborough University, Loughborough LE11 3TU, United Kingdom

^c The University of Sydney Business School, The University of Sydney, NSW 2006, Australia

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ABSTRACT

We investigate how external credit market development affects corporate earnings management, by studying the impact of the U.S. interstate banking and branching deregulations on the intensity of accruals-based and real earnings management. We find that the banking and branching deregulations significantly decrease both accruals-based and real earnings-management intensity among firms in deregulated states. The effect is stronger for those deregulated states that have lower bank branch density before deregulation and states that have greater out-of-state bank entry after deregulation. The impact on corporate earnings management is channelled through increased banking competition and credit supply providing firms with easier access to external financing. The findings are robust to various endogeneity concerns. We further document that interstate banking and branching deregulations reduce the instances of financial results being subsequently affected by accounting restatements and improve firms' information environment.

1. Introduction

The literature suggests that earnings management is used by firms to mislead stakeholders about corporate operating performance and hence distort financial reporting quality (Healy and Wahlen, 1999). However, financially constrained firms can also use earnings management as a means to signal positive prospects and alleviate their financial constraints, as argued by Linck et al. (2013). This argument is consistent with Kedia and Philippon's (2009) model that earnings management is a necessary condition for overinvestment, which is often associated with financial constraints.¹ What remains unclear, however, is how firms' earnings management behavior will change if their financial constraints are relaxed exogenously. Policy makers would also like to know whether firms will engage in less earnings management, and hence corporate information environment will improve, given an improved external credit market environment.

In this paper, we exploit a quasi-natural experiment that allows us to address this research question. Specifically, we investigate how the U.S. banking and branching deregulations through the Interstate Banking

and Branching Efficiency Act of 1994 (the IBBEA), affect corporate earnings management intensity and information environment. Before the 1990s, the U.S. credit market was highly segmented. Regulations prevented banks from interstate banking or opening branches out of state. The IBBEA allowed for interstate banking acquisitions starting in 1995 and out-of-state branching starting in 1997, which significantly facilitates credit market development and relaxes firms' financial constraints. The deregulation process was staggered across states, leading to different levels of openness cross-sectionally and over time. Hence, this staggered deregulation process provides us an ideal setting to study how exogenous credit market development affects firms' earnings management intensity and thus their information environment.

Using a comprehensive panel of around 120,000 firm-year observations from 1989 to 2010 inclusive, we document that the development of an external credit market, proxied by increases in banking competition in a state attributable to the implementation of the IBBEA, robustly and significantly discourages accruals-based and real earnings management among firms in that state. Firms headquartered in states that are fully open to out-of-state branching on average show lower absolute

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* Corresponding author.

E-mail address: h.h.liu@lboro.ac.uk (F.H. Liu).

¹ Empirical evidence also find that earnings management is usually associated with external fund-raising activities such as issuing new equity and debt capital (e.g., Rangan, 1998; Teoh et al., 1998a,b; Shivakumar, 2000; Efendi et al., 2007; Cohen and Zarowin, 2010).

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discretionary accruals (by 0.6 % of total assets) in the years after branching deregulation compared to firms in states with the most restrictions on out-of-state branching. This reduction in accruals-based earnings management is large as it accounts for 11 % of median accruals-based earnings management in the sample.

Similarly, we find that in the years after branching deregulation, firms in states that are fully open to out-of-state branching on average show 2.6 % lower total real earnings management (the sum of abnormal cash flow from operations, abnormal production costs, and abnormal discretionary expenses as a percentage of total assets) than firms in states that retain the most restrictions on out-of-state branching. This reduction in real earnings management accounts for 6 % of the median total real earnings management in the sample. The findings are robust to controlling for firm growth opportunities, firm size, and state-level, time-varying, economic conditions, as well as for state-fixed and year-fixed effects. The findings are also robust to adjusting both accruals-based earnings management and real earnings management by past accounting performance in order to remove the potential impact of firm profitability on earnings management (Kothari et al., 2005).

Our findings are likely causal because the staggered implementation of the IBBEA is arguably exogenous to the firms (Rice and Strahan, 2010). Thus, it is unlikely that an unobservable, and thus uncontrolled, characteristic that is firm-specific drives the results (because such a firm-specific factor is quite unlikely to correlate with the interstate banking and branching deregulations). Further, our findings are robust to controlling for alternative fixed effects, including firm fixed effects. However, a potential concern is that where an unobservable local economic variable is omitted, this might coincide with deregulation, and such an omitted variable might be the true driving force for the reduction in earnings management in deregulated state(s). Nevertheless, such a scenario is fairly improbable because the staggered deregulation of the U.S. credit market across states and over time means multiple deregulation shocks in our setting. It is unlikely that this unobservable (and thus omitted) local economic variable coincides with the shocks each and every time.

To address this concern fully, we follow Gao et al. (2018) and match the treatment firms (i.e., firms headquartered in deregulated states) with industry-peer control firms in neighboring states. The matched control firm's headquarters must be within 100 miles, 50 miles, or 30 miles of the treatment firm's headquarters across the state border. We assume that firms that are geographically close to one another are influenced by the same local economic conditions. Thus, if unobservable local economic factors drive our results, we would find the same level of earnings management in the location-matched control firms as in the treatment firms. However, we continue to find less intense earnings management in the treatment firms, suggesting that unobserved local economic conditions are unlikely to drive our results.

Another concern is reverse causality. Specifically, firms might change their earnings-management policies in anticipation of deregulation. We follow Bertrand and Mullainathan (2003) and Cornaggia et al. (2015) in addressing this concern by examining firms' earnings-management dynamics around deregulation events. We find no differential trends between firms in deregulated states and those in other states prior to deregulation. The results show that corporate earnings-management intensity decreases only after deregulation, which suggests that reserve causality does not drive the findings. Moreover, the persistent negative effect of branching deregulation on earnings management after the deregulation year indicates that the impact of an increase in banking competition and credit supply on corporate earnings management is likely to be permanent rather than transitory.

Consistent with the post-deregulation reduction in corporate earnings management being driven by the entry of out-of-state banks, we further find that the effect of interstate banking and branching deregulations on earnings management is significantly stronger for those deregulated states that have lower bank branch density before

deregulation and those states that have greater out-of-state bank entry after deregulation.

After documenting how external credit market development affects firms' accruals-based and real earnings-management intensity, we next examine the primary channel for this impact. Linck et al. (2013) find a positive correlation between financial constraints and accruals-based earnings management. They suggest that financially constrained firms use earnings management to signal positive prospects for their projects in order to raise external financing. Because the IBBEA significantly enhances banking competition and increases bank credit supply, we conjecture that external credit market development decreases earnings management mainly by providing firms with easier access to external bank financing which helps alleviate their financial constraints.

The U.S. Small Business Administration (SBA) provides significant financial support (e.g., SBA-guaranteed loans) to firms up to a certain size, with the cut-off level varying with firms' industry affiliation as measured by the North American Industry Classification System (NAICS) (Krishnan et al., 2014). Firms above the SBA's size cut-off level in an industry are ineligible for SBA support.² Thus, the financial constraints in these two groups differ substantially — the group ineligible for SBA support faces significantly tighter financial constraints than the eligible group, but the two groups are unlikely to differ substantially in other firm characteristics. Thus, we apply a sharp regression discontinuity (RD) approach following Krishnan et al. (2014) to investigate how the IBBEA affects earnings management among SBA-eligible and SBA-ineligible firms.

RD is a powerful identification strategy. Its premise is that except for the assignment of treatment, which is discontinuous at the SBA's size cut-off threshold, the impact of other observable/unobservable factors on firms' accruals-based and real earnings-management intensity is similar near the threshold (e.g., Lee and Lemieux, 2010). Hence, we can cleanly rule out the influence of other omitted variables by estimating the local average treatment effect around the threshold. If providing easier access to external bank financing is indeed a primary channel through which development of an external credit market reduces corporate earnings management, we expect the impact to be greater among SBA-ineligible firms.

The results from our sharp RD analysis clearly confirm the conjecture. When we restrict the sample to firms within 10 % of the firm-size cut-off, we find that from the year before to the year after the IBBEA deregulation year in a state, the reduction in earnings management is significantly larger among SBA-ineligible firms than among SBA-eligible firms. The sharp-RD results are also robust to using a 20 % bandwidth around the SBA firm-size cut-off. These findings strongly suggest that external credit market development reduces accruals-based and real earnings management via providing firms with easier access to external bank financing which helps alleviate their financial constraints.

We further conduct subsample analyses using different financial-constraint proxies (e.g., the White-Wu index, the Kaplan-Zingales index, and dependence on industry-external financing) to partition the sample. We consistently find that the impact of interstate banking and branching deregulations on corporate earnings management is

² We consult the SBA Office of Size Standards on the conditions for obtaining SBA loans. A small business is one organized for profit; with a place of business in the United States; that operates primarily in the United States or makes a significant contribution to the U.S. economy through payment of taxes or use of American products, materials, or labor; and is not dominant in its field on a national basis. See 13 CFR 121.105(a)(1). Additionally, the U.S. company and all of its domestic and foreign affiliates must be no larger than a size standard set by the SBA for its industry. The industry-dependent size cut-off levels are specified by either number of employees or average annual revenue. See <https://www.sba.gov/document/support-table-size-standards>. Importantly, in accordance with 13 CFR 121.105(b), a firm may be *in almost any legal form and still qualify as small* if it meets these requirements.

significantly greater for financially constrained firms than for unconstrained firms. In addition, evidence from our mediation analysis confirms that financial constraints play an important mediating role on the effect of banking deregulations in decreasing corporate earnings management.³

Furthermore, we explore an alternative bank monitoring mechanism that may also help explain why banking deregulation negatively affects corporate earnings management.⁴ Specifically, banking deregulation enables better-performing banks to expand across state borders, and outperforming banks can monitor borrowing firms more effectively. In addition, the consolidation wave in banking following deregulation prompts local banks to enhance their monitoring on borrowing firms. Strengthened bank monitoring then leads to a reduction in corporate earnings management. Consistent with this alternative channel, we find that the dampening effects of banking deregulations on treatment firms' accruals-based earnings management and real earnings management are both stronger for those treatment firms with weaker governance strength.

Finally, we examine how interstate banking and branching deregulations impact the likelihood that accounting restatements affect a firm's financial results as well as the firm's information environment. Because development of an external credit market reduces corporate earnings management and hence improves reporting quality, we expect it to reduce the likelihood that accounting restatements will subsequently affect a firm's financial results and also expect it to improve the firm's information environment. Our findings are consistent with this expectation. We document that firms in states that are fully open to interstate branching on average show a 1.6 % lower likelihood of accounting restatements that subsequently affect financial results for the years after branching deregulation than do firms in states that are most restrictive about out-of-state branching. This reduction in the likelihood of accounting restatements is economically important and accounts for 15 % of the average likelihood in the sample.

Moreover, we find that banking and branching deregulations significantly improve corporate information environment. In the years after deregulation, firms headquartered in states that are fully open to out-of-state branching on average have idiosyncratic volatility that are lower by 2.1 % points, effective spread that are narrower by 0.08 % point, and stock illiquidity that are lower by 0.24 % point than firms in states that restrict out-of-state branching the most. These reductions in idiosyncratic volatility, effective spread, and stock illiquidity account for 56.30 %, 7.04 % and 20.82 % of the median idiosyncratic volatility, effective spread, and stock illiquidity in the sample, respectively. Our findings further suggest that the effect of branching and banking deregulations on improving firms' information environment is significantly greater for those firms having more intensive earnings manipulation *ex ante*.

This study contributes to the extant literature on finance and earnings management. Extant studies show that the opportunities to raise new external financing can motivate accruals-based and/or real earnings management (e.g., Dye, 1988; Rangan, 1998; Teoh et al., 1998a,b; Shivakumar, 2000; Chen et al., 2007; Efendi et al., 2007; Povel et al., 2007; Kumar and Langberg, 2009; Cohen and Zarowin, 2010; Dechow et al., 2011; Linck et al., 2013). However, little is known on how external credit market development affects earnings management. We provide fresh empirical evidence that the exogenous development of an external credit market, proxied by the staggered implementation of interstate banking and branching deregulations, discourages both actuals-based and real earnings management among firms headquartered in deregulated states. Moreover, our evidence strongly suggests that external

credit market development affects earnings management via increased banking competition and credit supply providing firms with easier access to external bank financing.

The study also contributes to the literature that studies how financial development affects firm policies and productivity, entrepreneurial activities, and economic growth. Financial development promotes entrepreneurial activities and economic growth (e.g., Rajan and Zingales, 1998; Levine et al., 2000; Guiso et al., 2004). The U.S. interstate banking and branching deregulations also increase access to bank credit (Cetorelli and Strahan, 2006), decrease borrowing costs (Rice and Strahan, 2010), alter credit allocation across loan types (Keil and Müller, 2019) promote economic growth (Jayaratne and Strahan, 1996) and entrepreneurial activities (Black and Strahan, 2002; Kerr and Nanda, 2009), increase total factor productivity (Krishnan et al., 2014), and affect firm innovation (Amore et al., 2013; Chava et al., 2013; Cornaggia et al., 2015; Hombert and Matray, 2017). We show that the exogenous development of an external credit market, attributable to the staggered implementation of the IBBEA across states and over time, significantly reduces earnings management and thus improves earnings disclosure quality by providing firms with easier access to external bank financing. Our findings suggest that credit market development also helps improve corporate information environment.

Finally, our study is related to the literature on credit market development and accounting conservatism. The literature shows that the entry of foreign banks is associated with more timely loss recognition and this increase is positively related to a firm's subsequent debt levels and concentrated among firms more dependent on external financing (Gormley et al., 2012). By contrast, recent work contemporaneous to our study shows that accounting conservatism decreases after the implementation of IBBEA, likely because the increased banking competition decreases banks' bargaining power in demanding accounting conservatism from borrowers (Huang, 2021; Hou et al., 2022).⁵ Different from this literature, we show that the staggered implementation of IBBEA decreases both accruals-based and real earnings management among firms headquartered in deregulated states and the effect is driven by increased banking competition (and thus increased credit supply) providing firms with easier access to external bank financing, thereby reducing their need to conduct costly earnings management to obtain external bank finance.

2. Literature review and hypothesis development

The potential effect of credit market development through the IBBEA implementation on corporate earnings management intensity is unclear *ex ante*. On the one hand, one natural expectation is that firms will reduce their earnings management intensity after the IBBEA

³ We thank an anonymous referee for suggesting this mediation analysis to us.

⁴ We thank an anonymous referee for suggesting this alternative mechanism to us.

⁵ Similarly, Khan and Lo (2019) find that bank tightening lending standards leads to an increase in the accounting conservatism of borrower firms. It is known that increasing conditional conservatism can help constrain managers' means and opportunities in managing earnings as it makes the recognitions of losses and expenses timelier (e.g., Ball, 2001; Watts, 2003; García Lara et al., 2020). Nevertheless, our finding of a reduction in earnings management after interstate banking deregulations does not necessarily contradict the finding of declined conditional conservatism after the passage of the IBBEA in the literature (e.g., Huang, 2021; Hou et al., 2022). While the decreased conditional conservatism after the passage of the IBBEA may offer managers of firms in the deregulated states more opportunities and means to manage earnings, their incentives to conduct costly earnings management decrease significantly after interstate banking deregulations because the IBBEA increases banking competition and bank credit supply and thus makes it easier for firms in deregulated states to have access to external bank financing. That is, managers may not need to resort to costly earnings management to obtain financing after external financing now becomes more available. Thus, our finding of a reduction in earnings management complements the finding of a reduction in conditional accounting conservatism in the literature.

implementation if having access to external financing is one of the key purposes of earnings management in the first place. The literature suggests that earnings management can be very costly to firms and their managers. For example, firms engaging in aggressive earnings management can face high litigation costs (DuCharme et al., 2004), higher financing costs (Graham, Li, and Qiu, 2008), greater tax expenses (Trueman and Titman, 1988; Chaney and Lewis, 1995), legal penalties, and reputational losses (Karpoff, Lee, and Martin, 2008a). In addition, managers who get caught cooking the books typically lose their jobs and face heavy penalties (Karpoff et al., 2008b). Because the IBBEA significantly enhances competition among banks in deregulated states and increases bank loan supply (e.g., Rice and Strahan, 2010; Amore et al., 2013), it can reduce the need for firms in those states to engage in costly earnings management in order to obtain external bank financing. In particular, Rice and Strahan (2010) show that firms operating in states more open to cross-state branching are more likely to borrow from banks, and also borrow at significantly lower interest rates, than firms operating in states less open to cross-state branching, suggesting that the IBBEA expands bank credit supply. Furthermore, Amore et al. (2013) suggest that “Using state-level data on commercial bank loans provided by the Federal Deposit Insurance Corporation (FDIC) for the period of 1976–1995, we find that, after controlling for year and state fixed effects, interstate banking deregulation was associated with an 8 % increase in total net loan supply”. Thus, it is possible that the implementation of the IBBEA discourages earnings management in deregulated states.

On the other hand, external credit market development may encourage firms to engage in even more earnings management. Disclosure theories suggest that greater financing opportunities can incentivize firm managers to manipulate earnings in order to impress new financiers who are uncertain about project quality (e.g., Dye, 1988; Povel et al., 2007; Kumar and Langberg, 2009; Chen et al., 2007). The implementation of the IBBEA greatly deregulated the U.S. credit market and provided new financing opportunities to firms seeking external financing. Moreover, banks crossing state borders usually do not have much information about the project quality of firms in other states and thus may rely more than local banks on borrowers’ earnings disclosures in lending decision making. Thus, it is possible that, in states with deregulated local credit markets, local firms can exploit new funding opportunities by actively managing earnings to impress new lenders and obtain new financing for their investment projects. Moreover, the increased banking competition due to the IBBEA may result in lax bank monitoring on borrower firms, which can further encourage borrower firms’ earnings management behavior.

Therefore, whether corporate earnings management intensity will decrease or increase and whether corporate information environment will improve or deteriorate after the implementation of the IBBEA are empirical questions that warrant rigorous empirical investigation. In this paper, in addition to accruals-based earnings management, we also consider real earnings management because the literature suggests that firms can also alter real operational activities to manipulate earnings (e.g., Healy and Wahlen, 1999; Dechow and Skinner, 2000; Graham et al., 2008). For example, Cohen et al. (2008) find that firms substitute accruals-based earnings management with real earnings management after the passage of the 2002 Sarbanes-Oxley Act. Accordingly, we formulate two competing hypotheses as follows.

Hypothesis 1a. : *Development of external credit markets, as proxied by the IBBEA implementation, reduces intensity of corporate accruals-based and real earnings management.*

Hypothesis 1b. : *Development of external credit markets, as proxied by the IBBEA implementation, increases intensity of corporate accruals-based and real earnings management.*

3. Sample formation and summary statistics

3.1. Data and sample formation

We obtain our sample from the Compustat database, covering 1989–2010 inclusive (i.e., from five years before the first year of the IBBEA deregulation to five years after the final year of its staggered implementation).⁶ We restrict the sample to nonfinancial firms and require at least 10 observations per year in each two-digit SIC industry group. Further, we require each firm-year to have sufficient Compustat data to compute the accruals metrics and real earnings-management proxies, as described below. Our final sample consists of about 120,000 firm-year observations.

3.2. Measuring interstate banking and branching deregulations

By 1994, although most states allow banks to conduct interstate banking in some form, only eight allow any form of out-of-state branching, giving very few banking organizations the opportunity to expand across the country. This situation changes dramatically with the passage of the Interstate Banking and Branching Efficiency Act of 1994, which allows interstate banking acquisitions starting in 1995 and out-of-state branching starting on June 1, 1997. However, the IBBEA also allows states a range of approaches to establish entry barriers for out-of-state banks. The law regulates four areas: (1) minimum age for a target institution, (2) *de novo* out-of-state branching, (3) acquiring individual branches, and (4) a state wide deposit cap. The deregulation process is implemented in stages across different states; by 2004, almost half of all bank branches in the United States are owned by banks with branch operations in more than one state (Rice and Strahan, 2010).

Rice and Strahan (2010) construct a banking restriction index (*RS Index*) to capture the extent to which each state sets barriers to restrict out-of-state bank entry. Their index ranges from zero (most open) to four (most restrictive). To better reflect the level of banking and branching deregulation, our main independent variable, *Bank Deregulation Index*, is 4 minus *RS Index*. Accordingly, a higher *Bank Deregulation Index* indicates lower entry barriers and thus a higher level of bank competition.

3.3. Measuring corporate earnings management

The literature generally uses discretionary accruals to proxy for corporate earnings management. Following Dechow et al. (2011) and Linck et al. (2013), we calculate discretionary accruals using a modified Jones model. Specifically, in each year, we estimate the following regression model for each industry classified by two-digit SIC code:

$$\frac{TA_{i,t}}{Asset_{i,t-1}} = \beta_0 \frac{1}{Asset_{i,t-1}} + \beta_1 \frac{\Delta Sales_{i,t} - \Delta AR_{i,t}}{Asset_{i,t-1}} + \beta_2 \frac{PPE_{i,t}}{Asset_{i,t-1}} + \varepsilon_{i,t} \quad (1)$$

where $TA_{i,t}$ is total annual accruals for firm i in year t , defined as change in noncash current assets. The change in noncash current assets is the change in current assets (ACT) minus change in cash held (CHE), minus change in current liability (LCT) plus change in debt in current liability (DLC) minus depreciation (DP). $\Delta Sales_{i,t}$ is the change in revenue ($SALE$) from the preceding year. $\Delta AR_{i,t}$ is the change in accounts receivable ($RECT$) from the preceding year. $PPE_{i,t}$ is the change in property, plant, and equipment ($PPENT$). Discretionary accruals are the difference between $TA_{i,t}$ (scaled by lagged total assets) and the fitted value of the model.

Besides using discretionary accruals, firms can also manage earnings by altering real activities. We measure this real earnings management

⁶ The first interstate banking deregulation change is on January 1st, 1994 (Alaska) and the last deregulation change is on May 9th, 2005 (Washington). See Table 1 of Rice and Strahan (2010).

Table 1

Summary Statistics. This table summarizes the variables in our study. The sample period is 1989–2010. The variables are defined in Table A1 in the Appendix. *, **, and *** denote significance at the 10 %, 5 %, and 1 % levels.

Panel A						
Variable	N	Mean	SD	p25	p50	p75
AEM	119,816	0.1155	0.1899	0.0225	0.0544	0.1209
ABS_DCFO	124,638	0.2059	0.3619	0.0412	0.0927	0.2009
ABS_DPROD	109,307	0.2087	0.2611	0.0506	0.1237	0.2595
ABS_DEXP	95,734	0.2646	0.4133	0.0685	0.1547	0.2937
REM	94,249	0.6491	0.8175	0.2656	0.4301	0.6920
D_AEM	614	-0.0661	0.2957	-0.1115	-0.0451	0.1079
D_REM	452	-0.1238	1.1376	-0.3816	-0.0671	0.3228
RESTATEMENT	152,372	0.0784	0.2688	0	0	0
IVOL	94,130	0.3331	0.8505	0.0195	0.0336	0.0645
SPREAD	86,563	2.6732	3.2675	0.4321	1.4151	3.6172
AMIHUD	94,130	8.2339	27.0133	0.1421	1.3685	2.4496
Bank Deregulation Index	152,372	1.8083	1.7429	0	2	3
SIZE	110,655	4.6522	2.5487	2.9627	4.6756	6.4367
MARKET_TO_BOOK	110,655	2.6355	7.8417	0.9169	1.7859	3.3895
SALES_GROWTH	110,655	0.1690	0.5757	-0.0241	0.0602	0.2425
GDP	110,655	0.0558	0.0609	0.0288	0.0532	0.0859
UNEMPLOYMENT	110,655	5.7271	1.7112	4.6003	5.4212	6.5232
FINANCE	110,655	0.0833	0.0637	0.0436	0.0657	0.1098

Panel B		Low Bank Deregulation Index		High Bank Deregulation Index			
Variable	Mean	Median	Mean	Median	Mean Diff.	Median Diff.	
AEM	0.1211	0.0572	0.1032	0.0495	0.0179 ***	0.0077 ***	
ABS_DCFO	0.2102	0.0945	0.2030	0.0922	0.0072 ***	0.0023 *	
ABS_DPROD	0.2109	0.1251	0.2072	0.1183	0.0037 *	0.0068 ***	
ABS_DEXP	0.2673	0.1514	0.2673	0.1672	0.0000	-0.0158 ***	
REM	0.6812	0.4301	0.6661	0.4353	0.0151 **	-0.0052	

following Cohen et al. (2008) and others. We first identify whether cash flow from operations (CFO) is unusual. Acceleration of sales by dropping prices or offering longer credit terms can temporarily boost earnings but may reduce cash flow. We estimate normal CFO using the following regression model for each year and each two-digit SIC industry:

$$\frac{CFO_{i,t}}{Asset_{i,t-1}} = \beta_0 \frac{1}{Asset_{i,t-1}} + \beta_1 \frac{Sales_{i,t}}{Asset_{i,t-1}} + \beta_2 \frac{\Delta Sales_{i,t}}{Asset_{i,t-1}} + \varepsilon_{i,t} \quad (2)$$

Abnormal CFO is actual CFO ($CFO_{i,t}$, scaled by lagged total assets) minus assumed normal CFO from Eq. (2).

Another approach to managing real earnings is by decreasing per-unit production costs. Managers may increase production more than necessary in order to spread fixed overhead costs among a larger number of units, thereby lowering fixed cost per unit and increasing earnings. Reducing fixed cost per unit can reduce cost of goods sold. We estimate the normal level of production cost using the following model for each year and each two-digit SIC industry:

$$\frac{Prod_{i,t}}{Asset_{i,t-1}} = \beta_0 \frac{1}{Asset_{i,t-1}} + \beta_1 \frac{Sales_{i,t}}{Asset_{i,t-1}} + \beta_2 \frac{\Delta Sales_{i,t}}{Asset_{i,t-1}} + \beta_3 \frac{\Delta Sales_{i,t-1}}{Asset_{i,t-1}} + \varepsilon_{i,t} \quad (3)$$

Actual production cost ($Prod_{i,t}$) equals cost of goods sold plus the change in inventory. Abnormal production cost is actual production cost (scaled by lagged total assets) minus the assumed normal level of production cost from Eq. (3).

Managers can also use discretionary expenses such as advertising expense, research and development expenses, and selling, general, and administrative (SG&A) expenses to manage earnings.⁷ Reducing discretionary expenses boosts current reported earnings. Following Cohen et al. (2008), we estimate normal discretionary expenses using the following model for each year and each two-digit SIC industry:

⁷ Because SG&A usually includes R&D and advertising expenses, we set advertising and R&D expenses to zero when SG&A is reported to avoid double counting.

$$\frac{Disc\ Exp_{i,t}}{Asset_{i,t-1}} = \beta_0 \frac{1}{Asset_{i,t-1}} + \beta_1 \frac{Sales_{i,t-1}}{Asset_{i,t-1}} + \varepsilon_{i,t} \quad (4)$$

Abnormal discretionary expenses are actual discretionary expenses ($Disc\ Exp_{i,t}$, scaled by lagged total assets) minus the assumed normal level of discretionary expenses from Eq. (4).

We study how development of external credit markets attributable to the staggered implementation of IBBEA affects the intensity of earnings management. Consequently, we compute the absolute terms of abnormal values estimated from the four models described earlier as our proxies for accruals-based earnings management and real earnings management. Specifically, our measure of accruals-based earnings management (AEM) is the absolute value of discretionary accruals, but total real earnings management (REM) is the sum of the absolute values of abnormal CFO (ABS_DCFO), abnormal production cost (ABS_DPROD), and abnormal discretionary expenses (ABS_DEXP).

3.4. Summary statistics

Panel A of Table 1 provides summary statistics of the sample. The variable definitions are in Table A1 in the Appendix. We winsorize all continuous variables at the 1 % level to limit the influence of potential outliers. The mean value of accruals-based earnings management (AEM) is 0.1155 and its median value is 0.0544. The mean value of total real earnings management (REM) is 0.6491 and its median value is 0.4301. The mean value of Bank Deregulation Index is 1.808, which indicates that on average each state sets two barriers to out-of-state bank entry. The average size (natural logarithm of total assets) is 4.65, average market-to-book-equity ratio is around 2.64, and average annual sales growth is 17 %.

In Panel B of Table 1, we test the mean and median differences in earnings-management intensity between firms headquartered in states with high and low Bank Deregulation Index values (i.e., above and below the sample median, respectively). The results indicate that both the average accruals-based earnings management and average real earnings management are more intense among firms headquartered in states with low Bank Deregulation Index values.

Table 2
 Baseline Regression Results. This table reports ordinary least-squares (OLS) regression estimates for the baseline regressions. The dependent variables in columns (1)–(5) are proxies for accruals-based and real earnings management without any controls, and we include several firm-internal and state-level economic variables as control variables in columns (6)–(10). The variables are defined in Table A1 in the appendix. Heteroskedasticity-robust standard errors are in parentheses and clustered at the firm level. *, **, and *** denote significance at the 10 %, 5 %, and 1 % levels.

	AEM (1)	ABS_DCFO (2)	ABS_DPROD (3)	ABS_DEXP (4)	REM (5)	AEM (6)	ABS_DCFO (7)	ABS_DPROD (8)	ABS_DEXP (9)	REM (10)
<i>Bank Deregulation Index</i>	-0.0019*** (0.001)	-0.0022** (0.001)	-0.0015 (0.001)	-0.0051*** (0.002)	-0.0057*** (0.002)	-0.0015*** (0.001)	-0.0020** (0.001)	-0.0022** (0.001)	-0.0045*** (0.001)	-0.0065*** (0.002)
MARKET_TO_BOOK						-0.0008** (0.000)	0.0022*** (0.000)	0.0009*** (0.000)	0.0001 (0.003)	0.0023*** (0.000)
SALES_GROWTH						0.0764*** (0.002)	0.0986*** (0.003)	0.1429*** (0.004)	0.1594*** (0.005)	0.3975** (0.010)
SIZE						-0.0319*** (0.000)	-0.0561*** (0.001)	-0.0390*** (0.007)	-0.0615*** (0.001)	-0.1373*** (0.002)
GDP						0.0631** (0.028)	0.0964** (0.036)	0.0998** (0.050)	0.0380 (0.061)	0.1919* (0.115)
UNEMPLOYMENT						0.0011 (0.001)	0.0035*** (0.001)	-0.0023 (0.002)	0.0002 (0.002)	0.0012 (0.004)
FINANCE						0.0296 (0.022)	-0.0665** (0.034)	-0.0202 (0.042)	-0.0153 (0.052)	0.0367 (0.099)
State FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
N	119,816	124,638	109,307	95,734	94,249	106,289	110,655	99,774	89,520	88,265
R-squared	0.026	0.040	0.020	0.029	0.041	0.218	0.206	0.163	0.201	0.259

4. Empirical results

4.1. Baseline results

In this section, we examine how interstate banking and branching deregulation affect the intensity of earnings management. Following the earnings-management literature (e.g., Cohen et al., 2008; Linck et al., 2013; Gao et al., 2018), we control for some common firm-specific variables that may affect earnings-management behavior. Such factors, however, are unlikely to correlate with the exogenous and staggered interstate banking and branching deregulations:

Our firm-specific time-varying control variables include market-to-book-equity ratio (*MARKET_TO_BOOK*), sales growth (*SALES_GROWTH*), and the natural logarithm of the book value of total assets (*SIZE*). The first two variables reflect the firm’s growth potential and investment opportunities. Firm size reflects a firm’s information environment. To mitigate potential concern that omitted time-varying economic conditions at the state level might coincide with the banking deregulations, we control for several such variables: annual growth rate in state GDP (*GDP*), annual average unemployment rate in the state (*UNEMPLOYMENT*), and the percentage of companies in the state during the year that were financial companies (*FINANCE*). The first two variables capture local economic conditions that vary with time, but the third is likely related to a state’s decision to implement interstate banking deregulations; this is because states with high percentages of local financial firms may be less likely to deregulate. We also include state-fixed effects to control for time-invariant state heterogeneity, as well as year-fixed effects to control for nationwide macroeconomic trends.

To assess how interstate banking and branching deregulation affect the intensity of earnings management, we estimate the following firm-year panel regression model:

$$\begin{aligned}
 \text{Earnings Management}_{i,t} = & \beta_0 + \beta_1 \text{Bank Deregulation Index}_{i,t} \\
 & + \beta_2 \text{MARKET_TO_BOOK}_{i,t} + \beta_3 \text{SALES_GROWTH}_{i,t} + \beta_4 \text{SIZE}_{i,t} + \beta_5 \text{GDP}_{s,t} \\
 & + \beta_6 \text{UNEMPLOYMENT}_{s,t} + \beta_7 \text{FINANCE}_{s,t} + \text{State FE} + \text{Year FE} + \varepsilon_{i,t}
 \end{aligned}
 \tag{5}$$

where *i* denotes the individual firm, *t* denotes time, and *s* denotes the firm’s headquarters state. The dependent variables in Eq. (5) are accruals-based earnings management (*AEM*), total real earnings management (*REM*), and various components of *REM* (*ABS_DCFO*, *ABS_DPROD*, and *ABS_DEXP*). We cluster standard errors at the firm level. Table 2 reports the results.

To mitigate possible concern for the “endogenous control” problem (see Angrist and Pischke, 2009; Gormley and Matsa, 2016), we report the regression results both without control variables (columns 1–5) and with control variables (columns 6–10). We find that the coefficient of our variable of interest, *Bank Deregulation Index*, is negative across all models and significantly so in nine out of 10 models. In particular, it is significantly negative at the 1 % level when accruals-based earnings management (*AEM*) or total real earnings management (*REM*) is the dependent variable, regardless of whether we include control variables in the regressions.

The results are economically significant. For example, in the years after branching deregulation, firms headquartered in states that are fully open to out-of-state branching on average show absolute discretionary accruals that are lower (as a percentage of total assets) by 0.6 % points (i.e., 4×0.0015 in column 6) than firms in states that restrict out-of-state branching the most. This reduction in accruals-based earnings management accounts for 11 % of the median accruals-based earnings management in the sample. Comparable figures for real earnings management are 2.6 % points and 6 %, respectively.

Among the control variables, sales growth is positively related to both accruals-based and real earnings management, consistent with the expectation that firms have a greater scope to manage earnings given

Table 3

Performance-Adjusted Earnings-Management Results. This table reports OLS regression estimates for performance-adjusted earnings management. Following Kothari et al. (2005), we adjust the earnings-management proxies for past accounting performance. Each year we divide firms within a two-digit SIC industry into quartiles measured by return on assets (ROA) in the previous financial year. We then assume abnormal earnings management for each firm-year is the firm's earnings management minus the average earnings management of other firms in the benchmark quartile. The dependent variables in columns (1)–(5) are proxies for performance-adjusted accruals-based earnings management and real earnings management. The variables are defined in Table A1 in the Appendix. Heteroskedasticity-robust standard errors are reported in parentheses and clustered at the firm level. *, **, and *** denote significance at the 10 %, 5 %, and 1 % levels.

	AEM (1)	ABS_DCFO (2)	ABS_DPROD (3)	ABS_DEXP (4)	REM (5)
Bank Deregulation Index	−0.0013** (0.001)	−0.0012 (0.001)	−0.0020** (0.001)	−0.0041*** (0.001)	−0.0055*** (0.002)
MARKET_TO_BOOK	−0.0005*** (0.000)	0.1033 * ** (0.003)	0.0012 * ** (0.000)	0.0004 (0.000)	0.0032 * ** (0.001)
SALES_GROWTH	0.0774*** (0.002)	0.1033 * ** (0.003)	0.1407 * ** (0.003)	0.1583 * ** (0.005)	0.3916 * ** (0.010)
SIZE	−0.0262*** (0.000)	− 0.0475 * ** (0.001)	− 0.0351 * ** (0.000)	− 0.0554 * ** (0.001)	− 0.1233 * ** (0.002)
GDP	0.0446 (0.027)	0.0691 (0.045)	0.0711 (0.051)	0.0012 (0.060)	0.0986 (0.113)
UNEMPLOYMENT	0.0012 (0.001)	0.0036 * ** (0.001)	− 0.0019 (0.002)	0.0005 (0.002)	0.0021 (0.003)
FINANCE	0.0174 (0.022)	− 0.084 * ** (0.035)	− 0.0410 (0.042)	− 0.0454 (0.052)	− 0.0495 (0.099)
State FE	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES
N	105,341	109,598	98,893	88,712	87,476
R-squared	0.169	0.160	0.148	0.157	0.215

Table 4

Controlling for Unobservable Local Economic Conditions. This table examines whether unobserved changes in local economic conditions drive the observed effects by comparing treatment firms (i.e., in states that adopt deregulation) with nearby control firms (in states that do not deregulate). We match each treatment firm to a control firm in the same industry, closest in size, and headquartered in a neighboring state that does not adopt deregulation. The distance between the treatment and matched control firms must be within 100, 50, and 30 miles, respectively. The dependent variables in columns (1)–(6) are proxies for accruals-based and real earnings management. *Treatment* equals 1 if the firm's headquarter state adopts banking deregulation; it equals 0 otherwise. *Post* equals 1 if the year is after the deregulation year; it equals 0 otherwise. The other variables are defined in Table A1 in the Appendix. Heteroskedasticity-robust standard errors are reported in parentheses and clustered at the firm level. *, **, and *** denote significance at the 10 %, 5 %, and 1 % levels.

	100 Miles Apart		50 Miles Apart		30 Miles Apart	
	AEM (1)	REM (2)	AEM (3)	REM (4)	AEM (5)	REM (6)
Treatment*Post	−0.0225* (0.013)	−0.0479 (0.053)	−0.0361** (0.016)	−0.0656 (0.051)	−0.0349** (0.015)	−0.0359 (0.081)
<i>Treatment</i>	0.0140 (0.015)	−0.0452 (0.072)	0.0273 (0.018)	0.0563 (0.065)	0.0077 (0.031)	0.0089 (0.113)
<i>Post</i>	0.0086 (0.034)	0.1822 (0.124)	0.0274 (0.035)	−0.0205 (0.127)	0.0982 * ** (0.043)	0.2258 (0.147)
MARKET_TO_BOOK	− 0.0001 (0.000)	0.0063 * ** (0.002)	− 0.0001 (0.001)	0.0070 * ** (0.002)	− 0.0003 (0.000)	0.0045 * ** (0.002)
SALES_GROWTH	0.0846 * ** (0.008)	0.3174 * ** (0.046)	0.0896 * ** (0.008)	0.3612 * ** (0.044)	0.0843 * ** (0.005)	0.3170 * ** (0.018)
SIZE	− 0.0177 * ** (0.001)	− 0.0492 * ** (0.005)	− 0.0178 * ** (0.001)	− 0.0444 * ** (0.006)	− 0.0181 * ** (0.001)	− 0.0512 * ** (0.005)
GDP	0.2716 * (0.144)	− 0.3952 (0.519)	0.2169 (0.144)	0.4039 (0.580)	0.1688 (0.199)	− 0.1776 (0.799)
UNEMPLOYMENT	0.0126 (0.012)	− 0.0019 (0.038)	0.0074 (0.012)	− 0.0193 (0.040)	0.0161 (0.130)	− 0.0051 (0.049)
FINANCE	− 0.5484 * ** (0.274)	0.2258 (0.981)	− 0.4814 * (0.277)	− 0.2968 (1.016)	− 0.4489 (0.385)	0.2549 (1.561)
State FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
N	1938	1534	1330	1172	1140	1066
R-squared	0.291	0.287	0.275	0.301	0.253	0.278

higher sales growth. As expected, firm size is negatively associated with the intensity of both accruals-based and real earnings management, probably because larger firms are more transparent; GDP growth is positively related to both accruals-based and real earnings management. The other variables have either mixed or no significant impact on firms' earnings-management behavior.

For robustness concern, we alternatively cluster the standard errors

at both the state and year levels or at the state level. The results, shown in Table A2 in the Appendix, suggest that using these alternative clustering structures does not alter our inference. Furthermore, we follow the literature to adjust accruals-based and real earnings management for

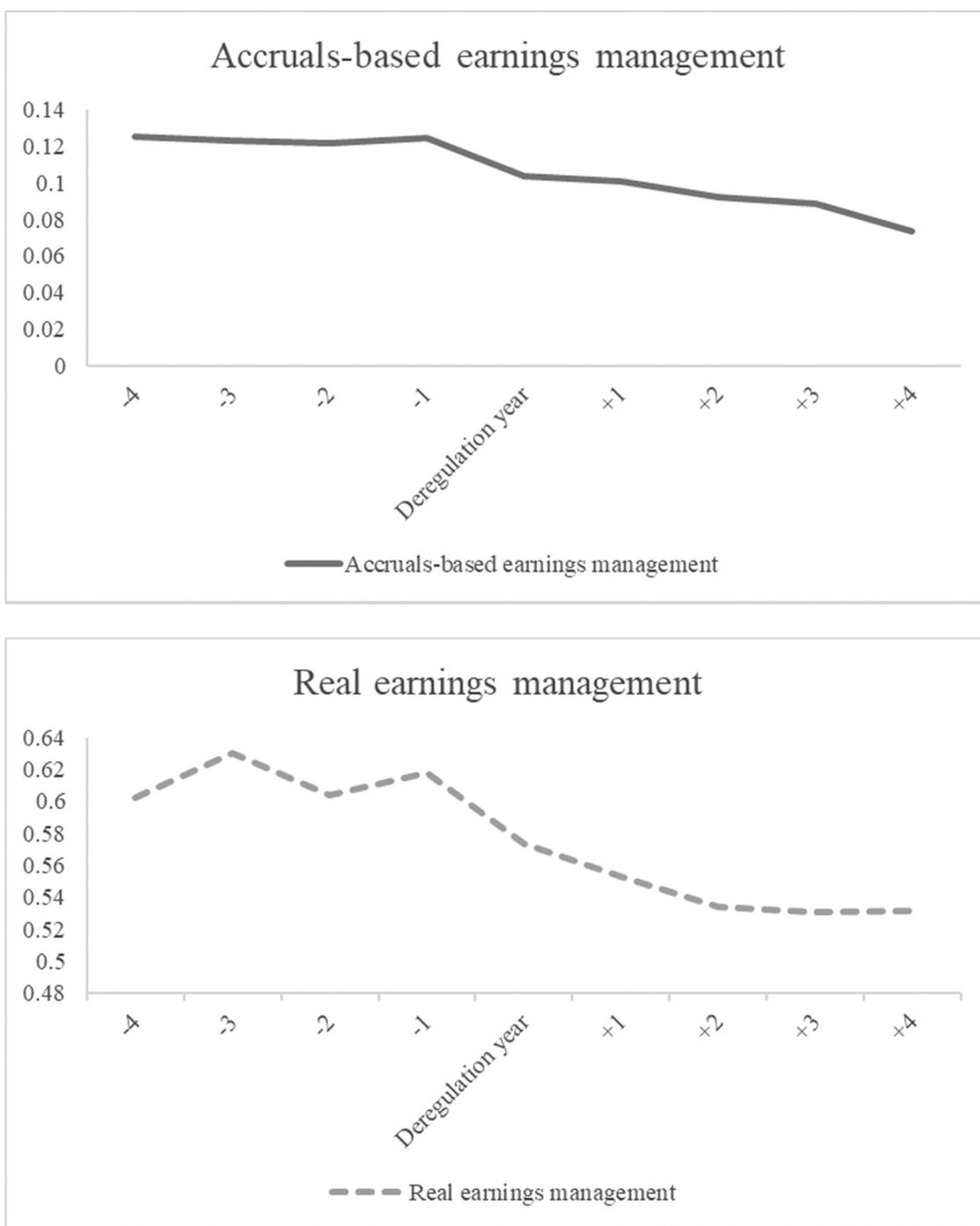


Fig. 1. Dynamics of Annual Accruals-Based and Real Earnings Management around IBBEA Deregulation. This figure shows the dynamics of annual accruals-based earnings management and real earnings management before and after the IBBEA deregulation.

the firm’s past financial performance (e.g., Kothari et al., 2005).⁸ We then use these performance-adjusted measures of earnings management as dependent variables in robustness tests, and we report the results in Table 3. The results are qualitatively similar to those in Table 2, again suggesting that banking and branching deregulation prompt significant

reduction in the intensity of both accruals-based and real earnings management.

Moreover, in Table A3 in the Appendix, we show that our main findings are robust to controlling for alternative fixed effects. Columns (1) and (2) of Table A3 show that the results remain qualitatively unchanged when we control for firm fixed effects and year fixed effects. Columns (3) and (4) of Table A3 further show that the results are qualitatively the same when we control for industry fixed effects, state fixed effects, and year fixed effects. To examine whether the effects of banking and branching deregulation on accruals-based and real earning management are similar for early deregulating states and late deregulating states, we separate the full sample into two subsamples covering the periods before and after 2000, respectively. The results are reported

⁸ Specifically, in each year we divide firms in a two-digit SIC industry into quartiles measured by the previous fiscal year’s return on assets (ROA). We then calculate performance-adjusted accruals-based earnings management and real earnings management as the absolute values of the firm’s discretionary accruals and abnormal real activities minus the average accruals and average abnormal real activities of other industry-peer firms in the benchmark ROA quartile.

Table 5

Earnings-management Dynamics around Deregulation. This table reports the OLS regression estimates for earnings management in the years around the deregulation year. Indicator variables *Before 3*, *Before 2*, *Before 1*, *Deregulate*, *After 1*, *After 2*, *After 3* and *After 4+* indicate the years around the deregulation: *Deregulate* indicates the deregulation year; *Before 3* indicates three years before the deregulation year; *Before 2* indicates two years before the deregulation year, *Before 1* indicates one year before the deregulation year; *After 1* indicates one year after the deregulation year; *After 2* indicates two years after the deregulation year; *After 3* indicates three years after the deregulation year; *After 4+* indicates four or more years after the deregulation year. The dependent variables in columns (1)–(2) are proxies for accruals-based and real earnings management. The variables are defined in Table A1 in the Appendix. Heteroskedasticity-robust standard errors are reported in parentheses and clustered at the firm level. *, **, and *** denote significance at the 10 %, 5 %, and 1 % levels.

	AEM (1)	REM (2)
<i>Before 3</i>	0.0024 (0.003)	0.0232 (0.018)
<i>Before 2</i>	0.0064 (0.004)	0.0202 (0.018)
<i>Before 1</i>	0.0074 (0.006)	-0.0509 (0.036)
<i>Deregulate</i>	-0.0117 (0.008)	-0.0556 * (0.034)
<i>After 1</i>	-0.0157 * (0.009)	-0.0597 * (0.031)
<i>After 2</i>	-0.0200 * (0.011)	-0.0541 ** (0.027)
<i>After 3</i>	-0.0207 ** (0.010)	-0.0547 ** (0.023)
<i>After 4+</i>	-0.0212 ** (0.010)	-0.0486 * (0.026)
MARKET_TO_BOOK	0.0001 (0.000)	0.0071 *** (0.001)
SALES_GROWTH	0.0309 *** (0.002)	0.1655 *** (0.010)
SIZE	-0.0201 *** (0.001)	-0.0841 *** (0.004)
GDP	-0.0186 (0.031)	-0.0258 (0.158)
UNEMPLOYMENT	0.0345 * (0.021)	0.0942 (0.090)
FINANCE	0.0000 (0.001)	0.0018 (0.006)
State FE	YES	YES
Year FE	YES	YES
N	51,663	40,519
R-squared	0.217	0.284

in Table A4 in the Appendix. We find that although the effects of deregulation on accruals-based and real earning management are statistically significant in both subsamples, the magnitudes of the effects are larger in the first subsample, suggesting that the impact of banking and branching deregulation is greater for early deregulating states.

We further consider the possibility that the headquarters locations of firms may change during our sample period. Following Nguyen et al. (2022), we obtain the historical headquarters state information from Bai et al. (2020) for the sample period before 2003. For the sample period after 2003, we extract the headquarter state for each firm-year from the latest SEC 10 K/Q filing using the Augmented 10-X Header Data provided by the Notre Dame Software Repository for Accounting and Finance.⁹ These data sources indicate that cross-state headquarters relocation is a rare event, and accounts for only about 2 % of firm-year observations. As shown in the Table A5 in the Appendix, we reestimate the baseline regressions using *Bank Deregulation Index* defined using a firm’s historical headquarters location; the results are consistent with those from our baseline regressions.

⁹ This dataset is available at <https://sraf.nd.edu/data/augmented-10-x-header-data/>. We thank Prof. Bill McDonald for making the data available.

To alleviate the concern of long sample period that could possibly contaminate the effect of banking deregulations on corporate earnings management, we further use a shorter 1993–1998 sample period around the first passage of the IBBEA and reestimate the baseline regression results. As shown in Table A6 in the Appendix, the results remain qualitatively unchanged. In addition, following Kim et al. (2017), we further include leverage (*LEVERAGE*), cash flow from operations (*CFO*), return on assets (*ROA*), and an indicator for loss firms (*LOSS*) in the regressions. As shown in Table A7 in the Appendix, our findings do not change qualitatively with these additional controls.

4.2. Endogeneity tests

4.2.1. Unobservable local economic conditions

Although we control for observable local economic conditions in the regressions, it remains possible that our results can be explained by some unobserved (and thus uncontrolled) local economic conditions that correlate with both state deregulation and earnings management. We follow Gao et al. (2018) and match treatment firms with nearby control firms in neighboring states to address this concern.

Specifically, we match each treatment firm (i.e., firms headquartered in a deregulating state) to a control firm in the same (two-digit SIC) industry, is in a neighboring state that does not adopt the deregulations, is within a short distance (within 100 miles, 50 miles, or 30 miles) of the treatment firm, and is closest in total assets in the first deregulation year. For each deregulation event, we examine one year before and one year after deregulation (excluding the year it came into effect) to form an event cohort. We then stack all event cohort subsamples together for our difference-in-differences analysis. Table A8 in the Appendix lists the deregulating states and their neighboring (control) states.

Next, we examine whether the treatment firms show less earnings management than the matched control firms after deregulation (i.e., our variable of interest is the difference-in-differences term *Treatment*Post*). If unobservable local economic factors, rather than deregulation, drive our results, treatment firms should not show lower earnings-management intensity than (nearby) control firms after deregulation. The results are in Table 4.

Columns (1) and (2) of Table 4 report the results when the control firms are within 100 miles of the sample firms. The coefficient of the indicator *Treatment*Post* is significantly negative (−0.0225 or −2.25 %) for accruals-based earnings management, and it is negative (−0.0479 or −4.79 %) albeit statistically insignificant for real earnings management. The economic magnitudes are in fact larger than those in the baseline regressions reported in Table 2. In columns (3)–(6), the distances between the treatment and control firms are less than 50 miles and 30 miles, respectively. The results are even stronger, and our inference remains unchanged. Because the treatment and control firms are near each other, it is reasonable to assume they are exposed to the same unobservable local economic conditions. Our findings hence suggest that unobservable local economic conditions do not drive the observed impact that banking and branching deregulations have on earnings-management intensity.¹⁰

¹⁰ Moreover, as a robustness check, we conduct a propensity score matching and select control firms with similar firm-specific characteristics (i.e., firm size, profitability, and leverage, etc.) from neighboring states that do not have the deregulations. Specifically, for each treatment firm, we select a control firm in a non-deregulated neighboring state that operates in the same 2-digit SIC industry as the treatment firm and has the closest propensity score estimated based on observable firm characteristics in the first deregulation year, using a one-to-one nearest-neighbor matching method (without replacement). As shown in Table A9 in the Appendix, the treatment and control firms have very similar firm characteristics post matching. The regression results based on the propensity-score-matched sample continue to show that banking deregulations significantly decrease both accruals-based earnings management and real earnings management of the treatment firms.

Table 6

Bank Density and Entry effects. This table reports OLS regression estimates of the effect of banking and branching deregulations on corporate earnings management conditional on ex-ante bank density and ex-post bank entry. We obtain bank branches data from FDIC Summary of Deposits database, which contains the location information of each bank branch. Ex-ante bank density (*Ex-ante Bank Density*) is calculated as the number of total bank branches divided by the population of the state before deregulation in year 1994. *Low Bank Density* is an indicator variable which equals 1 if ex-ante bank density of the state is lower than the median value. Ex-post bank entry (*Ex-post Bank Entry*) is calculated as the number of out-of-state bank branches opened within the state after deregulation divided by the population of the state. *High Bank Entry* is an indicator variable which equals 1 if ex-post bank entry is higher than the median value of out-of-state bank entry in the year. The sample period is from 1994 to 2004. The variables are defined in Table A1 in the Appendix. Heteroskedasticity-robust standard errors are reported in parentheses and clustered at the firm level. *, **, and *** denote significance at the 10 %, 5 %, and 1 % levels.

	AEM (1)	REM (2)	AEM (3)	REM (4)
Bank Deregul. Index*Low Bank Density	-0.0028 ** (0.001)	-0.0119 ** (0.005)		
Bank Deregul. Index *High Bank Entry			-0.0043 ** (0.002)	-0.0079 * (0.005)
<i>Bank Deregul. Index</i>	-0.0020 (0.001)	-0.0075 (0.006)	-0.0001 (0.001)	-0.0016 ** (0.001)
<i>High Bank Entry</i>			-0.0118 ** (0.005)	0.0254 (0.019)
MARKET_TO_BOOK	-0.0007 *** (0.000)	0.0037 *** (0.000)	-0.0007 *** (0.000)	0.0025 *** (0.000)
SALES_GROWTH	0.0811 *** (0.001)	0.4113 *** (0.005)	0.0802 *** (0.001)	0.4029 *** (0.005)
SIZE	-0.0320 *** (0.000)	-0.1347 *** (0.001)	-0.0313 *** (0.000)	-0.1254 *** (0.001)
GDP	0.0954 *** (0.031)	0.1172 (0.125)	0.0904 *** (0.030)	0.1710 (0.117)
UNEMPLOYMENT	-0.0009 (0.001)	-0.0200 *** (0.006)	-0.0003 (0.001)	-0.0137 ** (0.005)
FINANCE	0.0076 (0.044)	0.2637 (0.178)	0.0133 (0.040)	0.2456 (0.160)
State FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
N	68,806	59,185	64,054	55,381
R-squared	0.198	0.251	0.208	0.286

Table 7

Average Characteristics of Firms around the SBA Size Threshold. This table provides the average characteristics of sample firms around the SBA size threshold. Panel A compares the SBA-eligible firms with SBA-ineligible firms within 10 % of the industry-specific SBA size thresholds. Panel B compares the SBA-eligible firms with the SBA-ineligible firms within 20 % of the SBA size thresholds. The variables are defined in Table A1 in the Appendix. *, **, and *** denote significance at the 10 %, 5 %, and 1 % levels.

Panel A: 10 % Bandwidth	SBA Eligible Mean	SBA Ineligible Mean	Diff.
MARKET_TO_BOOK	2.4249	2.7641	-0.3392
SALES_GROWTH	0.3266	0.3614	-0.0348
SIZE	3.5032	3.5264	-0.0232
EMPLOYEE	752.7012	839.2133	-86.5121 **
REVENUE	131.5231	180.3942	-48.8711 ***
LOG (EMPLOYEE)	6.3690	6.6991	-0.3300 **
LOG (REVENUE)	4.4479	5.1178	-0.6699 ***
WW index	0.1557	0.2345	-0.0788 **
KZ index	5.8943	9.0976	-3.2033 **
EFD	0.2937	0.3869	-0.0932 *
Panel B: 20 % Bandwidth	SBA Eligible Mean	SBA Ineligible Mean	Diff.
MARKET_TO_BOOK	2.7730	2.9888	-0.2158
SALES_GROWTH	0.3213	0.3129	0.0084
SIZE	3.1568	3.7362	-0.5793 **
EMPLOYEE	687.6759	877.0482	-189.3723 ***
REVENUE	111.8520	228.8187	-116.9667 ***
LOG (EMPLOYEE)	6.1946	6.4256	-0.2310 **
LOG (REVENUE)	4.2009	5.3636	-1.1627 ***
WW index	0.1430	0.2032	-0.0601 ***
KZ index	7.7742	10.9279	-3.1637 **
EFD	0.2879	0.3251	-0.0372

4.2.2. Earnings-management dynamics around deregulation

Another concern is reverse causality. Although the interstate banking and branching deregulations are arguably exogenous to firms' decision-making processes, firms might change their earnings-management

policies in anticipation of deregulation. Following Bertrand and Mullainathan (2003) and Cornaggia et al. (2015), we examine the dynamics of earnings management around the date of deregulation for firms headquartered in the deregulation states. In Fig. 1, we show

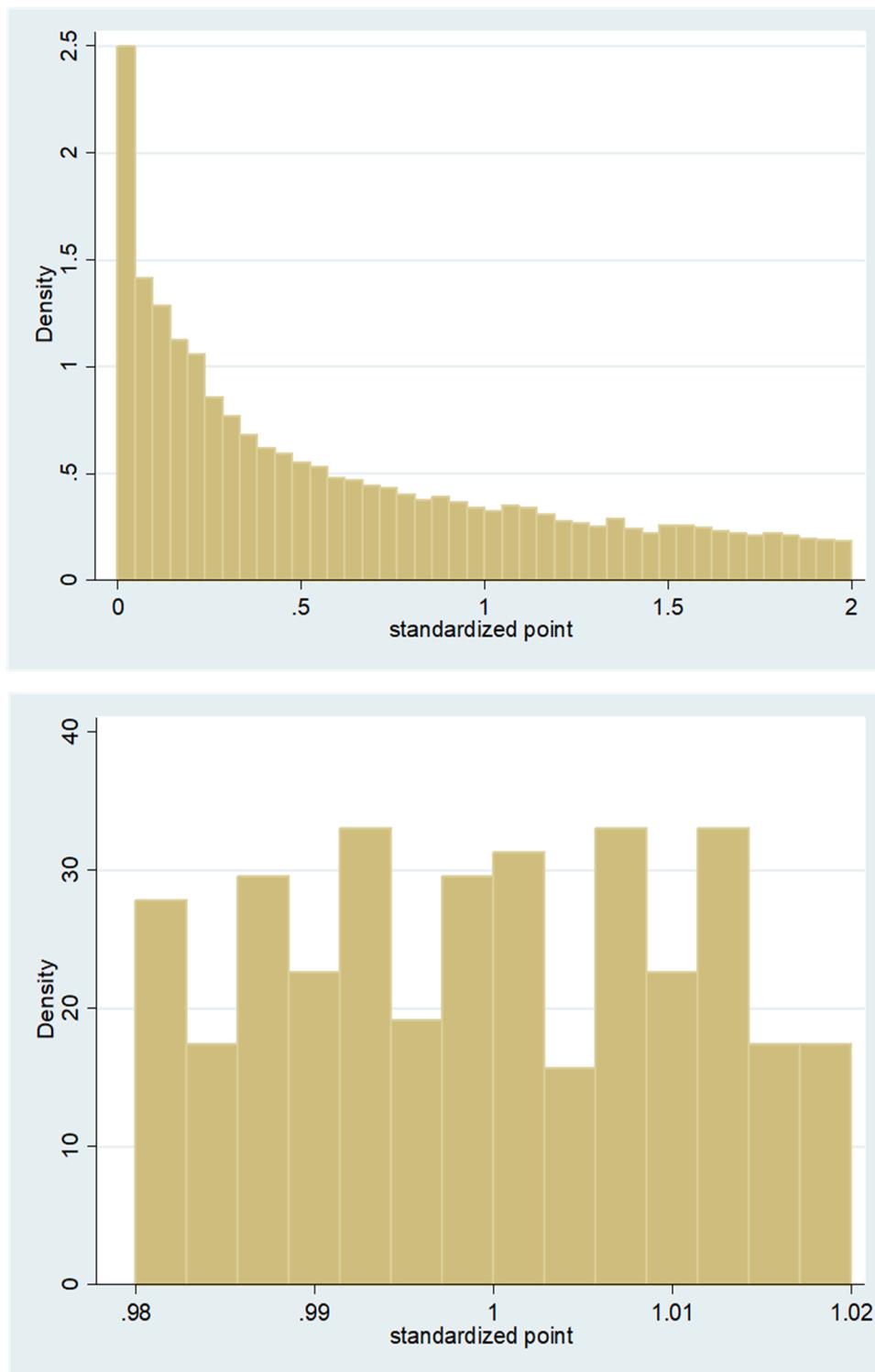


Fig. 2. Density of Standardized Point. This figure examines the density function of *Standardized Point* in a wide value range from 0 to 2 (upper half) and in a narrow value range (lower half) around the threshold value of 1.

accruals-based and real earnings management before and after the deregulation year and find no obvious declining trends prior to deregulation, but we find clear declining trends after deregulation.

We next restrict our sample of firms headquartered in the deregulation states to an 11-year window around the state deregulation year (i.e., five years before, five years after, and the deregulation year) and create eight indicator variables to represent periods around deregulation. *Before 3*, *Before 2*, *Before 1*, *Deregulate*, *After 1*, *After 2*, *After 3* and

After 4⁺ indicate the years around the deregulation: *Deregulate* indicates the deregulation year; *Before 3* indicates three years before the deregulation year; *Before 2* indicates two years before the deregulation year; *Before 1* indicates one year before the deregulation year; *After 1* indicates one year after the deregulation year; *After 2* indicates two years after the deregulation year; *After 3* indicates three years after the deregulation year; *After 4⁺* indicates four or more years after the deregulation year. The first two years are used as reference years. We then estimate the

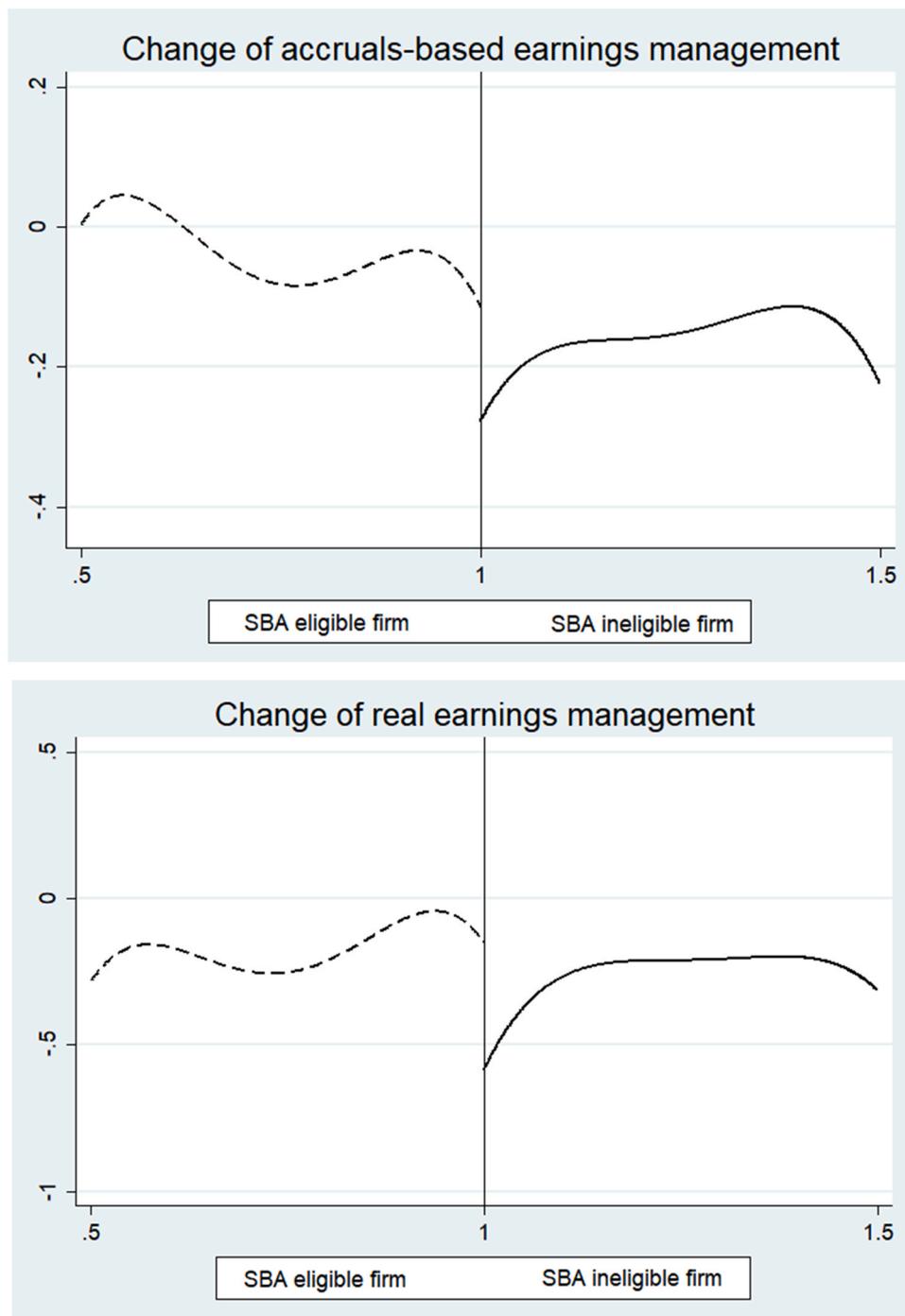


Fig. 3. Changes in annual accruals-based earnings management and real earnings management around the SBA eligibility threshold. This figure shows the changes in annual accruals-based earnings management and real earnings management before and after the IBBEA deregulation around SBA eligibility.

following dynamic regression model:

$$\begin{aligned}
 \text{Earnings Management}_{i,t} = & \beta_0 + \beta_1 \text{Before3} + \beta_2 \text{Before2} + \beta_3 \text{Before1} \\
 & + \beta_4 \text{Deregulate} + \beta_5 \text{After1} + \beta_6 \text{After2} + \beta_7 \text{After3} + \beta_8 \text{After 4}^+ \\
 & + \beta_9 \text{MARKET_TO_BOOK}_{i,t} + \beta_{10} \text{SALES_GROWTH}_{i,t} + \beta_{11} \text{SIZE}_{i,t} \\
 & + \beta_{12} \text{GDP}_{s,t} + \beta_{13} \text{UNEMPLOYMENT}_{s,t} + \beta_{14} \text{FINANCE}_{s,t} + \text{State FE} \\
 & + \text{Year FE} + \varepsilon_{i,t}
 \end{aligned}
 \tag{6}$$

The coefficients of *Before 3*, *Before 2* and *Before 1* are especially important because their significance suggests a trend to change the intensity of earnings management before the deregulation years. The

results are in [Table 5](#).

We find that the coefficient estimates for *Before 3*, *Before 2* and *Before 1* are all insignificant in the regressions, confirming that there is no existing trend in changes in earnings management prior to the deregulation years. The coefficient estimate of *Deregulate* is insignificantly negative when the dependent variable is accruals-based earnings management (AEM) and is negative and significant at the 10 % level when the dependent variable is total real earnings management (REM). Consistent with our baseline findings, the coefficient estimates of *After 1*, *After 2*, *After 3* and *After 4*⁺ are all significantly negative in the regressions. These results clearly suggest that earnings-management intensity decreases only after deregulation. Importantly, the persistent

Table 8

Regression Discontinuity. This table reports the OLS regression estimates for changes in three-year-accumulation of accruals-based and real earnings management before and after the IBBEA deregulation year (excluding the deregulation year itself). In Panel A, we examine the sample firms within 10 % of the SBA size thresholds. In Panel B, we examine the sample firms within 20 % of the thresholds. In each panel, the dependent variable in columns (1)–(4) is the change in accruals-based earnings management; the dependent variable in columns (5)–(8) is the change in real earnings management. The variables are defined in Table A1 in the Appendix. Heteroskedasticity-robust standard errors are reported in parentheses and clustered at the state level. *, **, and *** denote significance at the 10 %, 5 %, and 1 % levels.

Panel A:		D_AEM	D_AEM	D_AEM	D_AEM	D_REM	D_REM	D_REM	D_REM
10 % Bandwidth		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
SBA-Ineligible		-0.1496** (0.071)	-0.1758** (0.076)	-0.1734** (0.084)	-0.1559** (0.075)	-0.6165* (0.343)	-0.5979** (0.287)	-0.5565** (0.256)	-0.4966* (0.255)
MARKET_TO_BOOK			-0.0035 (0.004)	-0.0038 (0.003)	-0.0036 (0.003)		0.0174* (0.009)	0.0173* (0.009)	0.0191** (0.009)
SALES_GROWTH			-0.1692 (0.150)	-0.1620 (0.145)	-0.1833 (0.150)		-1.5224*** (0.343)	-1.5219*** (0.354)	-1.5479*** (0.342)
SIZE			0.0362 (0.032)				0.5221 (0.032)		
LOG (EMPLOYEE)				-0.0650 (0.094)				-0.0450 (0.349)	
LOG (REVENUE)					-0.0457 (0.042)				-0.0236 (0.176)
GDP			5.7639*** (0.327)	5.8205*** (0.782)	5.4766*** (0.386)		-0.6370 (27.186)	-1.9816 (28.821)	-2.9121 (27.076)
UNEMPLOYMENT			0.0491*** (0.016)	0.0401 (0.024)	0.0386 (0.023)		0.1920 (0.243)	0.1805 (0.260)	0.1309 (0.245)
FINANCE			0.8692*** (0.130)	0.5899* (0.289)	0.4348 (0.328)		-2.4265 (8.227)	-2.9751 (9.056)	-3.8837 (8.242)
State FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
N	342	321	321	321	321	253	216	216	216
R-squared	0.051	0.202	0.204	0.204	0.204	0.024	0.147	0.146	0.146
Panel B:		D_AEM	D_AEM	D_AEM	D_AEM	D_REM	D_REM	D_REM	D_REM
20 % Bandwidth		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
SBA-Ineligible		-0.1617*** (0.042)	-0.1185** (0.057)	-0.1123** (0.048)	-0.1050** (0.049)	-0.5652** (0.240)	-0.6688* (0.346)	-0.6048* (0.339)	-0.6125** (0.300)
MARKET_TO_BOOK			0.0003 (0.003)	-0.0002 (0.001)	-0.0002 (0.001)		0.0049 (0.007)	0.0030 (0.007)	0.0037 (0.007)
SALES_GROWTH			0.0330 (0.041)	0.0016 (0.015)	0.0018 (0.015)		-0.5857*** (0.081)	-0.5358*** (0.078)	-0.5316*** (0.077)
SIZE			-0.0280 (0.022)				-0.0158 (0.074)		
LOG (EMPLOYEE)				-0.0105 (0.010)				-0.0742 (0.064)	
LOG (REVENUE)					-0.0126 (0.009)				-0.0467 (0.050)
GDP			1.8937 ** (0.755)	0.9819 (4.506)	1.1829 (4.543)		23.9478 (24.258)	25.8980 (23.781)	27.0726 (23.721)
UNEMPLOYMENT			-0.3792 ** (0.151)	-0.1658 (0.904)	-0.1766 (0.912)		-5.1440 (5.151)	-5.4182 (5.082)	-5.6062 (5.069)
FINANCE			1.9086 * (1.116)	0.9230 (6.571)	1.0360 (6.628)		5.6111 (7.497)	9.9937 (8.878)	1.4625 (6.782)
State FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
N	558	524	524	524	524	418	385	385	385
R-squared	0.049	0.133	0.135	0.136	0.136	0.020	0.145	0.146	0.146

negative effect of branching deregulation on earnings management after the deregulation year suggests that the impact of an increase in banking competition and credit supply on corporate earnings management is likely to be permanent rather than transitory.

4.2.3. Ex-ante bank density and ex-post out-of-state bank entry

If the reduction in earnings management after state banking and branching deregulations is due to the entry of out-of-state banks after deregulation, we expect that the effect of Bank Deregulation Index on earnings management will be stronger for those deregulated states that have lower bank branch density before deregulation and for those states that have greater out-of-state bank entry after deregulation. Thus, we further examine the effect of banking and branching deregulations on corporate earnings management conditional on ex-ante bank density and ex-post bank entry.

To capture ex-ante bank density and ex-post bank entry, we obtain bank branches data from FDIC Summary of Deposits database, which contains information on the locations of bank branches and their parent

banks back to 1994. Ex-ante bank density (*Ex-ante Bank Density*) is calculated as the number of total bank branches of different banks in the focal state divided by the population of the state in year 1994. *Low Bank Density* is an indicator variable which equals 1 if the state's ex-ante bank density is lower than the median value and equals 0 otherwise. Ex-post bank entry (*Ex-post Bank Entry*) is calculated as the number of out-of-state bank branches in year *t* minus the number of out-of-state bank branches in year 1994, divided by the population of the state in year *t*. *High Bank Entry* is an indicator variable which equals 1 if the state's ex-post bank entry is higher than the median value of out-of-state bank entry in year *t* and equals 0 otherwise.

We examine the effect of banking deregulation conditional on ex-ante bank density and ex-post bank entry by interacting *Bank Deregulation Index* with *Low Bank Density* and *High Bank Entry* respectively in Eq. (5). If the impact of banking deregulation on corporate earnings management is indeed due to the entry of out-of-state banks after deregulation, we expect the coefficients of the interaction terms, *Bank Deregulation Index*Low Bank Density* and *Bank Deregulation Index*High*

Table 9
Financial Constraint. This table reports OLS regression estimates of the effect of banking deregulations on corporate earnings management conditional on financial constraints. We regard firms with higher-than-median *WW* indexes in year *t-3* to *t-1* as financially constrained, and we regard firms with *EFD* and *KZ* index values above median in year *t-3* to *t-1* and a two-digit SIC industry as highly dependent on external financing and highly financially constrained. The dependent variables in columns (1)–(8) are proxies for accruals-based and real earnings management. The variables are defined in Table A1 in the Appendix. Heteroskedasticity-robust standard errors are reported in parentheses and clustered at the firm level. *, **, and *** denote significance at the 10 %, 5 %, and 1 % levels.

	Low WW Index		High WW Index		Low KZ		High KZ		Low EFD		High EFD	
	AEM (1)	REM (2)	AEM (3)	REM (4)	AEM (5)	REM (6)	AEM (7)	REM (8)	AEM (9)	REM (10)	AEM (11)	REM (12)
Bank Deregul. Index	-0.0010 (0.001)	-0.0025 (0.003)	-0.0016** (0.001)	-0.0065*** (0.002)	0.0001 (0.001)	-0.0031 (0.004)	-0.0035*** (0.001)	-0.0120*** (0.005)	-0.0006 (0.001)	0.0004 (0.004)	-0.0025** (0.001)	-0.0116** (0.005)
MARKET_TO_BOOK	-0.0001 (0.000)	0.0064** (0.000)	-0.0011** (0.000)	0.0016** (0.000)	-0.0010*** (0.000)	0.0023*** (0.000)	-0.0004*** (0.000)	0.0041*** (0.001)	-0.0003*** (0.000)	0.0065*** (0.000)	-0.0010*** (0.000)	0.0013*** (0.000)
SALES GROWTH	0.0804** (0.001)	0.3701** (0.005)	0.0807** (0.002)	0.4539** (0.007)	0.0693** (0.001)	0.3993*** (0.006)	0.0835** (0.001)	0.3830*** (0.007)	0.0836** (0.001)	0.3926*** (0.006)	0.0704** (0.002)	0.3934*** (0.006)
SIZE	-0.0243** (0.000)	-0.0717*** (0.001)	-0.0499*** (0.001)	-0.2403*** (0.002)	-0.0332*** (0.000)	-0.1443*** (0.001)	-0.0290*** (0.000)	-0.1134*** (0.002)	-0.0261*** (0.000)	-0.0916*** (0.001)	-0.0351*** (0.000)	-0.1553*** (0.001)
GDP	0.0795** (0.027)	0.2602*** (0.098)	0.0540 (0.044)	0.1338 (0.181)	0.0309 (0.032)	0.1136 (0.131)	0.1515*** (0.044)	0.4491*** (0.174)	0.0757** (0.033)	0.1839 (0.129)	0.0503 (0.038)	0.2177 (0.156)
UNEMPLOYMENT	0.0022** (0.001)	0.0089*** (0.003)	-0.0010 (0.002)	-0.0127* (0.007)	0.0002 (0.001)	-0.0064 (0.005)	0.0026* (0.001)	0.0101* (0.006)	0.0026** (0.001)	0.0074* (0.004)	-0.0006 (0.001)	-0.0105* (0.006)
FINANCE	0.0161 (0.025)	0.1201 (0.095)	0.0824 (0.055)	0.0801 (0.232)	0.0408 (0.038)	0.3663** (0.159)	-0.0212 (0.039)	-0.4374** (0.167)	0.0155 (0.031)	-0.1907 (0.132)	0.0506 (0.043)	0.2908 (0.180)
High-low difference			-0.0006*	-0.0040**			-0.0036**	-0.0089***			-0.0018**	-0.0119**
P-value	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
State FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
N	51,747	41,562	51,747	41,562	50,415	42,633	50,416	42,633	50,487	40,465	50,487	40,465
R-squared	0.207	0.289	0.203	0.292	0.203	0.239	0.204	0.240	0.209	0.274	0.211	0.275

Bank Entry, to be significantly negative. The results are reported in Table 6.

Consistent with our expectation, columns 1 and 2 of Table 6 show that the coefficient of the interaction term, *Bank Deregulation Index*Low Bank Density*, is significantly negative at the 5 % level with accruals-based earnings management and total real earnings management as the dependent variable, respectively. Moreover, the interaction term drives out the significance of *Bank Deregulation Index* itself. Thus, these results suggest that the impact of branching deregulation on corporate earnings management is concentrated in those deregulated states that have lower bank branch density before deregulation.

Columns 3 and 4 further show that the coefficient of the interaction term, *Bank Deregulation Index*High Bank Entry*, is significantly negative at the 5 % level and 10 % levels with accruals-based earnings management and total real earnings management as the dependent variable, respectively. Moreover, when the *Bank Deregulation Index*High Bank Entry* is in the regression specification, *Bank Deregulation Index* loses its significance in the regression when accruals-based earnings management is the dependent variable. Although the coefficient of *Bank Deregulation Index* is still significantly negative in the real earnings management regression, the magnitude of the coefficient is much smaller than the magnitude of the coefficient of *Bank Deregulation Index*High Bank Entry*. These results clearly suggest that the effect of branching deregulation on earnings management is significantly stronger for those states that have greater out-of-state bank entry after deregulation.

4.2.4. Potential confounding factors

A potential concern is that confounding shocks or factors that coincided with the state deregulation events may affect our results. To address this concern on confounding factors, we perform placebo tests by randomly assigning deregulation dates to each deregulating state and randomly assigning deregulation states. We repeat this process 1000 times to generate 1000 pseudo samples for each random assignment exercise. The distribution of regression coefficient estimates of *Bank Deregulation Index* using these pseudo samples are reported in Table A10 in the Appendix.

As we can see, the estimates from the actual sample, -0.0015 for the accruals-based earnings management (*AEM*) regression and -0.0065 for the real earnings management (*REM*) regression (shown in columns 6 and 10 of Table 2 of the revised manuscript), are both smaller than the respective 1-percentile values of the coefficient estimates of the pseudo samples. These results clearly suggest that the findings of the paper are unlikely to be driven by chance or confounding factors.

In summary, the empirical evidence in this section consistently suggests that the development of external credit markets, as proxied by interstate banking and branching deregulations, has a potentially causal and dampening effect on the intensity of accruals-based and real earnings management among firms, lending support to Hypothesis 1a.

5. Mechanism

Our previous empirical evidence suggests that external credit market development through the IBBEA implementation reduces the intensity of corporate earnings management. In this section, we provide empirical evidence that credit market development reduces corporate earnings management by providing easier access to external bank financing — that is, increased bank financing as a result of banking deregulation reduces the need for financially constrained firms to conduct costly earnings management in order to obtain external financing.

5.1. Regression discontinuity design

To study the potentially causal influence of financial constraints on the negative relation between banking deregulation and the intensity of earnings management, we take advantage of the U.S. government's

Table 10

Corporate governance. This table reports OLS regression estimates of the effect of banking deregulations on corporate earnings management conditional on corporate governance. We regard firms with higher-than-median Co-option, which is measured as average fraction of the board comprised of directors appointed after the CEO assumed office in year t-3 to t-1, as weak corporate governance. We also regard firms with lower-than-median institutional ownership, which is measured as the average fraction of the ownership held by institutional stockholder in year t-3 to t-1, as weak corporate governance. The dependent variables in columns (1)-(8) are proxies for accruals-based and real earnings management. The variables are defined in Table A1 in the Appendix. Heteroskedasticity-robust standard errors are reported in parentheses and clustered at the firm level. *, **, and *** denote significance at the 10 %, 5 %, and 1 % levels.

	High Co-opt		Low Co-opt		Low institutional		High institutional	
	AEM (1)	REM (2)	AEM (3)	REM (4)	AEM (5)	REM (6)	AEM (7)	REM (8)
Bank Deregulation Index	-0.0015 ** (0.001)	-0.0082 ** (0.003)	-0.0003 (0.002)	-0.0063 (0.009)	-0.0002 * (0.000)	-0.0045 ** (0.002)	0.0007 (0.001)	0.0037 (0.003)
MARKET_TO_BOOK	-0.0007 *** (0.000)	0.0027 *** (0.000)	-0.0002 (0.000)	0.0039 *** (0.001)	-0.0001 (0.000)	0.0049 *** (0.001)	0.0001 (0.000)	0.0068 *** (0.000)
SALES_GROWTH	0.0728 *** (0.001)	0.3985 *** (0.004)	0.0171 ** (0.003)	0.1358 *** (0.017)	0.0443 ** (0.002)	0.3174 *** (0.011)	0.0339 *** (0.002)	0.2407 *** (0.008)
SIZE	-0.0308 *** (0.000)	-0.1404 *** (0.001)	-0.0051 *** (0.001)	-0.0049 * (0.003)	-0.0236 *** (0.001)	-0.1167 *** (0.003)	-0.0072 *** (0.000)	-0.0178 *** (0.001)
GDP	0.0585 ** (0.024)	0.2133 * (0.109)	0.0433 (0.030)	0.1813 (0.167)	-0.0469 (0.043)	0.0967 (0.201)	0.0175 (0.020)	0.2031 ** (0.103)
Unemployment	0.0009 (0.001)	-0.0022 (0.004)	0.0008 (0.001)	0.0031 (0.006)	-0.0006 (0.002)	0.0031 (0.007)	-0.0001 (0.001)	0.0046 (0.003)
Finance	0.0196 (0.024)	0.0136 (0.119)	-0.0179 (0.050)	-0.1677 (0.290)	-0.0220 (0.048)	-0.4904 ** (0.229)	0.0713 *** (0.024)	0.4482 *** (0.123)
Weak-strong governance difference	-0.0012 ** (0.038)	-0.0019 ** (0.014)			-0.0009 (0.113)	-0.0082 ** (0.022)		
P-value								
State FE	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES
N	6890	6058	6890	6058	17,778	15,806	17,778	15,806
R-sq	0.204	0.273	0.203	0.267	0.228	0.283	0.214	0.268

Table 11

Accounting Restatement. This table reports OLS regression estimates of the effect of banking deregulations on firms' likelihood of accounting restatement. The dependent variable is *RESTATEMENT*, which equals 1 if the financial results of a firm-year are affected by accounting restatement; it equals 0 otherwise. The other variables are defined in Table A1 in the Appendix. Heteroskedasticity-robust standard errors are reported in parentheses and clustered at the firm level. *, **, and *** denote significance at the 10 %, 5 %, and 1 % levels.

	RESTATEMENT	
	(1)	(2)
Bank Deregulation Index	-0.0031*** (0.001)	-0.0032*** (0.001)
MARKET_TO_BOOK		-0.0001 (0.000)
SALES_GROWTH		0.0147 ** (0.002)
SIZE		0.0052 ** (0.000)
GDP		0.0569 (0.040)
UNEMPLOYMENT		-0.0013 (0.001)
FINANCE		0.0478 (0.035)
State FE	YES	YES
Year FE	YES	YES
N	152,372	109,795
R-squared	0.076	0.175

financial support for firms below a size threshold and use a sharp regression discontinuity design to examine differences in earnings-management intensity among firms around the size cut-off.

The Small Business Administration (SBA) is a U.S. government agency created by Congress in 1953 that provides financial support to small businesses. We distinguish between financially constrained and unconstrained firms using an exogenous discontinuity in eligibility for SBA financing. To analyze the different effects of banking deregulation on financially constrained and unconstrained firms, we exploit the fact that the SBA sets an industry-dependent size cut-off for financial

support. The thresholds are specified by either number of employees or average annual revenue.¹¹ Firms immediately above the threshold are ineligible for SBA financing and thus are more financially constrained than firms immediately below the threshold, although their other characteristics (e.g., investment opportunities) should be very similar.¹²

We only use firms that do not change their SBA loan eligibility three years before and after banking deregulation for this analysis. We define the indicator variable, *SBA Ineligible*, to be equal to 1 if firms are ineligible for SBA support from three years before to three years after banking deregulation. In Table 7, we compare the characteristics of the SBA-ineligible sample firms immediately above the industry-specific SBA size thresholds with the characteristics of SBA-eligible sample firms immediately below the SBA size thresholds.

Panel A of Table 7 compares SBA-eligible firms with SBA-ineligible

¹¹ The industry-specific size thresholds are on the SBA website (see <https://www.sba.gov/document/support-table-size-standards>). In setting size thresholds, the SBA considers economic characteristics pertaining to the structure of an industry, including degree of competition, average firm size, start-up costs and entry barriers, and distribution of firms by size. It also considers technological changes, competition from other industries, growth trends, historical activity within an industry, unique factors in the industry that may distinguish small firms from other firms, the objectives of its programs, and the impact of different size levels on those programs.

¹² It is possible that SBA-ineligible firms may issue equity or public debt for financing. Nevertheless, in our regression discontinuity (RD) analysis, we focus on a sample of firms with size falling with a narrow neighborhood of SBA's size cut-off threshold; those firms slightly above (slightly below) the SBA's size cut-off level in an industry are ineligible (eligible) for SBA loans. The firms in our RD analysis are very small in size (the average log total assets is 3.5 as reported in Table 7, which translates into US\$ 33 mil). Such small firms typically do not have access to the public debt market. For example, Ortiz-Molina (2006) reports the mean of total assets is US\$ 5711 mil and the minimum of total assets is US\$ 305 mil for a sample of U.S. public debt issuers. Similarly, it is also very costly for such small firms to issue equity due to high underwriting costs (Calomiris and Tsoutsoura, 2013). Thus, SBA-ineligible firms immediately above the SBA's size cut-off threshold are more financially constrained than SBA-eligible firms immediately below the threshold, as shown in Table 7.

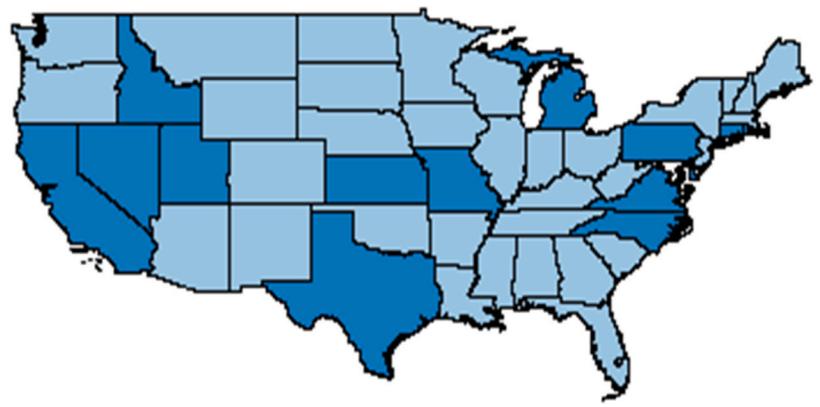
Table 12

Information asymmetry. This table reports OLS regression estimates of the effect of banking deregulations on firms' information environment. The dependent variables are common measures for the level of firm's information asymmetry: idiosyncratic volatility (*IVOL*), effective spread (*SPREAD*), and Amihud's (2002) illiquidity measure (*AMIHUD*). The indicator variable, *High_AEM* (*High_REM*), equals 1 if the average *AEM* (average *REM*) of the firm from year *t*-3 to *t*-1 (the window of three years before the *Bank Deregulation Index* measurement year *t*) is greater than the corresponding sample median of year and equals 0 otherwise. The other variables are defined in Table A1 in the Appendix. Heteroskedasticity-robust standard errors are reported in parentheses and clustered at the firm level. *, **, and *** denote significance at the 10 %, 5 %, and 1 % levels.

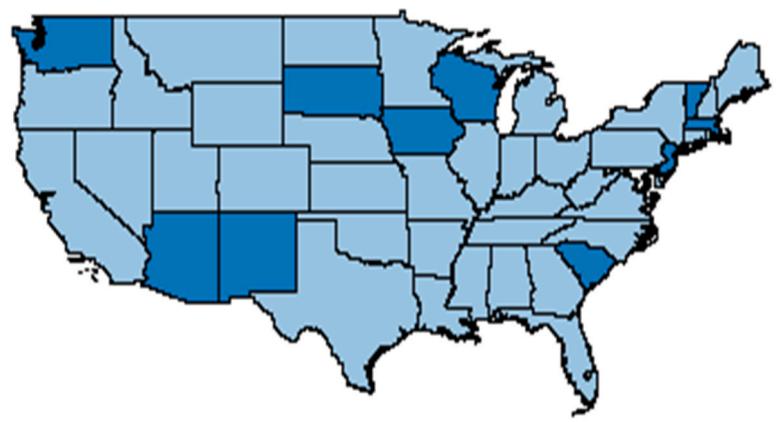
	<i>IVOL</i>	<i>SPREAD</i>	<i>AMIHUD</i>	<i>IVOL</i>	<i>SPREAD</i>	<i>AMIHUD</i>
Panel A	(1)	(2)	(3)	(4)	(5)	(6)
Bank Deregulation Index	-0.0173*** (0.004)	-0.1219*** (0.009)	-0.6339*** (0.037)	-0.0053** (0.003)	-0.0200** (0.008)	-0.0602* (0.032)
<i>MARKET_TO_BOOK</i>				-0.0040*** (0.000)	-0.0230*** (0.002)	-0.0647*** (0.008)
<i>SALES_GROWTH</i>				-0.0341*** (0.006)	-0.1970*** (0.025)	-0.3454*** (0.092)
<i>SIZE</i>				-0.0663*** (0.001)	-0.8062*** (0.005)	-1.7249*** (0.022)
<i>GDP</i>				0.0475 (0.110)	1.2223*** (0.420)	4.2124** (1.669)
<i>UNEMPLOYMENT</i>				-0.0085** (0.004)	0.0080 (0.009)	-0.2133*** (0.036)
<i>FINANCE</i>				-0.1538 (0.102)	0.3103 * (0.161)	-3.1162 * ** (0.584)
State FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
N	94,130	86,563	94,130	87,267	84,593	87,267
R-squared	0.033	0.078	0.090	0.184	0.318	0.231
Panel B	<i>IVOL</i> (1)	<i>SPREAD</i> (2)	<i>AMIHUD</i> (3)	<i>IVOL</i> (4)	<i>SPREAD</i> (5)	<i>AMIHUD</i> (6)
Bank Deregulation Index*High_AEM	-0.0078* (0.005)	-0.0916*** (0.011)	-0.1382*** (0.036)			
Bank Deregulation Index*High_REM				0.0033 (0.002)	-0.0348*** (0.011)	-0.1022*** (0.036)
<i>High_AEM</i>	0.0099 (0.017)	0.4410 * ** (0.030)	0.0054 (0.006)			
<i>High_REM</i>				0.0187 * ** (0.006)	0.0943 * ** (0.030)	0.2934 * ** (0.098)
<i>Bank Deregulation Index</i>	-0.0004 (0.004)	-0.0412 * ** (0.012)	-0.0070 (0.042)	-0.0013 (0.003)	0.0159 (0.013)	-0.0586 (0.043)
<i>MARKET_TO_BOOK</i>	-0.0020 * ** (0.001)	-0.0192 * ** (0.002)	-0.0359 * ** (0.006)	-0.0021 * ** (0.000)	-0.0193 * ** (0.002)	-0.0371 * ** (0.006)
<i>SALES_GROWTH</i>	-0.0218 * ** (0.005)	-0.1518 * ** (0.024)	-0.3481 * ** (0.076)	-0.0218 * ** (0.004)	-0.1377 * ** (0.024)	-0.3466 * ** (0.076)
<i>SIZE</i>	-0.0167 * ** (0.004)	-0.7806 * ** (0.005)	-1.0254 * ** (0.019)	-0.0172 * ** (0.001)	-0.7909 * ** (0.005)	-1.0320 * ** (0.019)
<i>GDP</i>	0.0398 (0.052)	0.6593 (0.432)	1.0340 (1.547)	0.0382 (0.094)	0.6904 (0.432)	1.0398 (1.548)
<i>UNEMPLOYMENT</i>	-0.0016 (0.003)	-0.0076 (0.015)	-0.0573 (0.051)	-0.0018 (0.003)	-0.0054 (0.015)	-0.0626 (0.051)
<i>FINANCE</i>	-0.1879 (0.132)	0.4280 (0.412)	-2.8410 * * (1.435)	-0.1883 * * (0.092)	0.4625 (0.413)	-2.9622 * * (1.435)
State FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
N	83,917	76,858	83,917	83,917	76,858	83,917
R-squared	0.218	0.325	0.271	0.222	0.323	0.272

(continued on next page)

Table 12 (continued)



Treatment States in 1995 (in dark blue)



Treatment States in 1996 (in dark blue)

Treatment States in 1995 (in dark blue)
Treatment States in 1996 (in dark blue)

Table A1
Variable definitions.

Variable	Definition
<i>AEM</i>	Accruals-based earnings management, which equals the absolute value of discretionary accruals.
<i>DCFO</i>	Abnormal cash from operations, scaled by lagged total assets.
<i>ABS_DCFO</i>	The absolute value of <i>DCFO</i> .
<i>DPROD</i>	Abnormal production cost scaled by lagged total assets, where production costs are the sum of cost of goods sold and change in inventories.
<i>ABS_DPROD</i>	The absolute value of <i>DPROD</i> .
<i>DEXP</i>	Abnormal discretionary expenses scaled by lagged total assets, where discretionary expenses are the sum of advertising expense, R&D expense, and SG&A expense.
<i>ABS_DEXP</i>	The absolute value of <i>DEXP</i> .
<i>REM</i>	Total real earnings management, which equals the sum of <i>ABS_DCFO</i> , <i>ABS_DPROD</i> , and <i>ABS_DEXP</i> .
<i>Restatement</i>	Equals 1 if Audit Analytics indicates the firm restated financial results for a fiscal year (i.e., the firm subsequently restated its financial results for the fiscal year); it equals 0 otherwise.
<i>D_AEM</i>	Change in three-year-accumulation of accruals-based earnings management before and after the IBBEA deregulation year (excluding the deregulation year itself).
<i>D_REM</i>	Change in three-year-accumulation of real earnings management before and after the IBBEA deregulation year (excluding the deregulation year itself).
<i>Ex-ante Bank density</i>	The number of total bank branches divided by the population of the state in year 1994
<i>Ex-post Bank entry</i>	(The number of out-of-state bank branches in year <i>t</i> - the number of out-of-state bank branches in year 1994) / the population of the state in year <i>t</i>
<i>SBA-Ineligible</i>	Equals 1 if, in the year before deregulation, the firm's total employment or annual sales is above the threshold for SBA financing, and 0 otherwise.
<i>WW Index</i>	WW index = $-0.091 [(ib + dp)/at] - 0.062$ [indicator set to 1 if <i>dvc+dpv</i> is positive, and 0 otherwise] + $0.021 [dltt/at] - 0.044 [\log(at)] + 0.102$ [average industry sales growth, estimated separately for each two-digit SIC industry and each year, with sales growth defined as above] $- 0.035$ [sales growth], where all variables in italics are Compustat data items. Firms above median are coded as constrained.
<i>EFD</i>	External financing dependence for each two-digit SIC, assessed by first calculating each firm's EFD in year <i>t</i> within a specific two-digit SIC industry as [capital expenditures (<i>capx</i>) - funds from operations (<i>fopt</i>)] / <i>capx</i> . When <i>fopt</i> is missing, funds from operations is [income before extraordinary items (<i>ibc</i>) + depreciation and amortisation (<i>dpc</i>) + deferred taxes (<i>txdc</i>) + (equity in net loss)/earnings (<i>estbc</i>) + sale of property, plant, and equipment and investments gain/loss (<i>sppiv</i>) + funds from operations, other (<i>fopo</i>)]. We take the industry-level, two-digit SIC annually as the median firm <i>EFD</i> for each two-digit SIC.
<i>KZ Index</i>	The Kaplan-Zingales index is a relative measurement of reliance on external financing. Companies with higher <i>KZ Index</i> are more likely to experience difficulties when financial conditions tighten, because they may have difficulty financing their ongoing operations. $KZ\ Index = -1.001909 [(ib + dp)/lagged\ ppent] + 0.2826389 [(at + prcc_f \times csho - ceq - txdb)/at] + 3.139193 [(dltt + dlc)/(dltt + dlc + seq)] - 39.3678 [(dvc + dvp)/lagged\ ppent] - 1.314759 [che/lagged\ ppent]$, where all variables in italics are Compustat data items. Firms above median are coded as constrained.
<i>Bank Deregulation Index</i>	Equal to $4 - RS\ index$.
<i>RS Index</i>	Rice-Strahan index of interstate banking deregulation based on Rice and Strahan (2010). It ranges from 0 (deregulated) to 4 (highly regulated) based on regulation changes in a state.
<i>SIZE</i>	Natural logarithm of the book value of total assets (<i>at</i>) at the end of fiscal year <i>t</i> .
<i>MARKET_TO_BOOK</i>	Market capitalization divided by book value of common equity.
<i>SALES_GROWTH</i>	The change in sales divided by lagged total assets.
<i>GDP</i>	Annual growth rate in state GDP.
<i>UNEMPLOYMENT</i>	Annual average unemployment rate in a state.
<i>FINANCE</i>	The percentage of finance companies in a state, measured as the number of finance companies divided by the total number of companies in the state, as recorded by Compustat.
<i>IVOL</i>	The standard deviation of the residuals from regressing daily individual stock returns of the firm on the Fama-French three-factors in each month (we require 17 nonmissing daily returns in a month for the regression), averaged across the year.
<i>SPREAD</i>	$100 * [close\ price - 0.5 * (bid + ask) * 2] / [0.5 * (bid + ask)$, averaged across the year.
<i>AMIHUD</i>	$10,000,000 * return / (price * volume)$, averaged across the year.
<i>CFO</i>	Net cash flow from operation scaled by lagged total assets.
<i>LEVERAGE</i>	Long-term debt scaled by lagged total assets.
<i>LOSS</i>	A dummy variable which equals to one if the net income of the firm is negative.
<i>ROA</i>	Net income scaled by lagged total assets.

firms within 10 % of the SBA size thresholds. The two groups of firms have very similar characteristics such as market-to-book-equity ratio (*MARKET_TO_BOOK*), sales growth (*SALES_GROWTH*), and total assets (*SIZE*), although the SBA-ineligible group, by definition, has slightly higher average revenue and number of employees than the SBA-eligible group. Importantly, the results of Panel A confirm that SBA ineligible firms are clearly more financially constrained than SBA eligible firms across the three measures of financial constraints: the Kaplan-Zingales (*KZ*) index, the White-Wu (*WW*) index, and the index of dependence on external finance (*EFD*). Panel B compares SBA-eligible firms with SBA-ineligible firms within 20 % of the SBA size thresholds; the findings are similar to those in Panel A.

We next conduct a sharp RD analysis following Krishnan et al. (2014). Specifically, for firms in the deregulation states we identify changes in three-year-accumulated accruals-based and real earnings management before and after the IBBEA deregulation year (excluding the deregulation year itself). The change variables are denoted as *D_AEM* (change in accruals-based earnings management) and *D_REM* (change in real earnings management). The indicator variable *SBA Ineligible* equals 1 if the firm's total employment or annual sales are above the thresholds for SBA financing from three years before to three years after banking

deregulation; it equals 0 otherwise. We also create *Standardized Point*, which is the firm's total employment or annual revenue in the year before deregulation, divided by the SBA threshold for the firm's two-digit SIC industry. A firm is ineligible for SBA financing if *Standardized Point* is greater than 1.

One concern for the RD analysis is that firms may try to obtain federal funding by artificially restricting their size to comply with the SBA requirements. To address potential size manipulation, Fig. 2 analyzes the density function of *Standardized Point*, and it shows that it is smooth around the threshold value of 1. Fig. 3 further reports the results of local polynomial smoothing estimations of change after deregulation in average accruals-based and real earnings management, respectively, on *Standardized Point* around the eligibility threshold value of 1. The figure shows clear discontinuity at the SBA-eligibility threshold — the changes in annual accruals-based and real earnings management after the interstate banking and branching deregulation “jump” down for firms just above the SBA size threshold (i.e., firms that are more financially constrained), indicating that SBA-ineligible firms reduce earnings management more than their eligible counterparts because of the benefits of increased access to bank financing after banking deregulation. We then conduct the sharp RD analysis using the following regression

Table A2 Alternative Standard Error Clustering Structures. This table reports ordinary least-squares (OLS) regression estimates for the baseline regressions. The dependent variables in columns (1)-(10) are proxies for accruals-based and real earnings management. The variables are defined in Table A1 in the Appendix. Heteroskedasticity-robust standard errors are reported in parentheses and clustered at both the state and year levels (clustered at the state level) for columns (1)-(5) (columns (6)-(10)). *, **, and *** denote significance at the 10 %, 5 %, and 1 % levels.

	AEM (1)	ABS_DCFO (2)	ABS_DPROD (3)	ABS_DEXP (4)	REM (5)	AEM (6)	ABS_DCFO (7)	ABS_DPROD (8)	ABS_DEXP (9)	REM (10)
Bank Deregulation Index	-0.0015** (0.001)	-0.0020 (0.001)	-0.0022** (0.001)	-0.0045*** (0.001)	-0.0065** (0.003)	-0.0015** (0.001)	-0.0020 (0.002)	-0.0022* (0.001)	-0.0045*** (0.001)	-0.0065** (0.003)
MARKET_TO_BOOK	-0.0008*** (0.000)	0.0022*** (0.000)	0.0009*** (0.000)	0.0001 (0.003)	0.0023*** (0.000)	-0.0008*** (0.000)	0.0022*** (0.000)	0.0009*** (0.000)	0.0001 (0.003)	0.0023*** (0.000)
SALES_GROWTH	0.0764*** (0.003)	0.0986*** (0.005)	0.1429*** (0.004)	0.1594*** (0.006)	0.3975*** (0.012)	0.0764*** (0.004)	0.0986*** (0.006)	0.1429*** (0.005)	0.1594*** (0.006)	0.3975*** (0.011)
SIZE	-0.0319*** (0.001)	-0.0561*** (0.001)	-0.0390*** (0.007)	-0.0615*** (0.002)	-0.1373*** (0.003)	-0.0319*** (0.001)	-0.0561*** (0.002)	-0.0390*** (0.006)	-0.0615*** (0.002)	-0.1373*** (0.002)
GDP	0.0631* (0.033)	0.0964 (0.059)	0.0998* (0.053)	0.0380 (0.070)	0.1919* (0.115)	0.0631 (0.045)	0.0964 (0.064)	0.0998 (0.075)	0.0380 (0.082)	0.1919 (0.126)
UNEMPLOYMENT	0.0011 (0.001)	0.0035*** (0.001)	-0.0023 (0.002)	0.0002 (0.002)	0.0012 (0.004)	0.0011 (0.001)	0.0035*** (0.001)	-0.0023 (0.002)	0.0002 (0.002)	0.0012 (0.004)
FINANCE	0.0296 (0.022)	-0.0665 (0.041)	-0.0202 (0.042)	-0.0153 (0.049)	0.0367 (0.096)	0.0296 (0.032)	-0.0665 (0.044)	-0.0202 (0.055)	-0.0153 (0.060)	0.0367 (0.102)
State FE	YES									
Year FE	YES									
Clustering Structure	State & Year	State	State	State	State	State				
N	106,289	110,655	99,774	89,520	88,265	106,289	110,655	99,774	89,520	88,265
R-squared	0.218	0.206	0.163	0.201	0.259	0.218	0.206	0.163	0.201	0.259

framework:

$$\begin{aligned}
 & \text{Changes in earnings management}_{i,t} \\
 & = \beta_0 + \beta_1 \text{SBA Ineligible}_{i,t} + \beta_2 \text{CONTROLS}_{i,t} + \text{State FE} + \text{Year FE} + \varepsilon_{i,t}
 \end{aligned}
 \tag{7}$$

We start by analyzing a sample of firms within 10 % of the SBA size threshold. The results are reported in Panel A of Table 8. Standard errors are clustered at the state level. Columns 1 and 5 of Panel A show that the regression coefficient of *SBA Ineligible* is negative and statistically significant at the 1 % level (at the 10 % level) when the change in accruals-based earning management (the change in real earning management) is the dependent variable, suggesting that SBA-ineligible firms experience greater reduction in earnings-management intensity after banking deregulation than SBA-eligible firms do. As SBA-ineligible firms have slightly higher revenue and number of employees than SBA-eligible firms, we further control for the logarithm of total assets (*SIZE*), the logarithm of revenue (*LOG (REVENUE)*), and the logarithm of the number of employees (*LOG (EMPLOYEE)*) in different regression specifications.¹³ The RD regression results remain qualitatively, as shown in columns 2-4 and columns 6-8 of Panel A. We then repeat our experiment using a sample of firms within 20 % of the SBA threshold; the results, which are in Panel B of Table 8, are even stronger than the previous results.

Taken together, these findings from our sharp RD analysis clearly show that the dampening effect of external credit market development on the intensity of firms' accruals-based and real earnings management occurs via providing them with easier access to external bank financing which helps alleviate their financial constraints.

5.2. Cross-sectional analysis with financial constraint measures

To further investigate how banking deregulation affects earnings management among firms with different levels of financial constraint, we consider several financial-constraint proxies following Duchin et al. (2010): the Kaplan-Zingales (*KZ*) index, the White-Wu (*WW*) index, and the index of dependence on external finance (*EFD*). We classify firms as constrained or unconstrained by dividing the sample at the medians of the three proxies in each year and each industry grouped by two-digit SIC code. We consider firms with higher-than-median *KZ*, *WW*, and *EFD* indices as financially constrained (and firms with lower-than-median indices as financially unconstrained). If the impact of the IBBEA implementation on earnings management intensity occurs via relaxing financial constraints, we expect financially constrained firms to show a more significant reduction in the intensity of earnings management after banking deregulations than financially unconstrained firms. The results are in Table 9.

We find that the financially constrained firms reduce the intensity of their earnings management significantly after bank deregulation; financially unconstrained firms do not. We also find that the difference between the two groups in the effects of banking deregulation are statistically significant in five out of six cases.

In addition, we conduct the mediation analysis similar to Zaman et al. (2022) to examine whether financial constraints play a mediating role on the effect of interstate banking deregulations in decreasing corporate earnings management. The results from this mediation analysis are reported in Table A11 in the Appendix. Panels A1 and A2 of Table A11 focus on the mediating role of *WW*; Panels B1 and B2 focus on the mediating role of *KZ*; Panels C1 and C2 focus on the mediating role of *EFD*.

The regression results of Panel A1 of Table A11 shows that 1) interstate banking deregulations lead to both a significant reduction in

¹³ To avoid multicollinearity, we do not put these three control variables together in the regressions.

Table A3

Alternative Fixed Effects Results. This table reports ordinary least-squares (OLS) regression estimates for accruals-based and real earnings management controlling for alternative fixed effects. In columns (1) and (2), we control for both firm fixed effects and year fixed effects. In column (3) and (4), we control for state fixed effects, industry fixed effects, and year fixed effects. The variables are defined in Table A1 in the Appendix. Heteroskedasticity-robust standard errors are reported in parentheses and clustered at the firm level. *, **, and *** denote significance at the 10 %, 5 %, and 1 % levels.

	AEM (1)	REM (2)	AEM (3)	REM (4)
Bank Deregulation Index	-0.0011* (0.001)	-0.0073*** (0.003)	-0.0016*** (0.001)	-0.0072*** (0.002)
MARKET_TO_BOOK	-0.0002 (0.000)	0.0000 (0.001)	-0.0009 ** (0.000)	0.0013 ** (0.001)
SALES_GROWTH	0.0693 *** (0.002)	0.2352 *** (0.009)	0.0767 *** (0.002)	0.3955 *** (0.010)
SIZE	-0.0323 *** (0.002)	-0.1067 *** (0.007)	-0.0320 *** (0.000)	-0.1316 *** (0.002)
GDP	0.0471 ** (0.024)	0.2573 *** (0.087)	0.0595 ** (0.028)	0.1858 * (0.112)
UNEMPLOYMENT	0.0015 (0.001)	0.0026 (0.004)	0.0011 (0.001)	0.0029 (0.004)
FINANCE	-0.0091 (0.028)	-0.1346 (0.120)	0.0358 (0.023)	0.1135 (0.097)
Firm FE	YES	YES	NO	NO
Year FE	YES	YES	YES	YES
State FE	NO	NO	YES	YES
Industry FE	NO	NO	YES	YES
N	106,289	88,265	88,265	88,265
R-squared	0.276	0.289	0.223	0.297

Table A4

Subsample Regression Results. This table reports ordinary least-squares (OLS) regression estimates for the baseline regressions for subsamples before and after 2000. The dependent variables in columns (1)-(4) are proxies for accruals-based and real earnings management. The variables are defined in Table A1 in the Appendix. Heteroskedasticity-robust standard errors are reported in parentheses and clustered at the firm level. *, **, and *** denote significance at the 10 %, 5 %, and 1 % levels.

	1989–1999		2000–2010	
	AEM (1)	REM (2)	AEM (3)	REM (4)
Bank Deregulation Index	-0.0013 *** (0.000)	-0.0049 *** (0.000)	-0.0004 ** (0.000)	-0.0028 ** (0.001)
MARKET_TO_BOOK	-0.0004 *** (0.000)	0.0075 *** (0.000)	-0.0015 *** (0.000)	0.0001 (0.000)
SALES_GROWTH	0.0757 *** (0.001)	0.3567 *** (0.005)	0.0748 *** (0.002)	0.4227 *** (0.007)
SIZE	-0.0208 *** (0.000)	-0.0843 *** (0.001)	-0.0400 *** (0.000)	-0.1673 *** (0.002)
GDP	0.1027 *** (0.030)	-0.0019 (0.003)	0.0580 (0.041)	0.2479 (0.164)
UNEMPLOYMENT	-0.0000 (0.001)	0.2823 ** (0.122)	0.0029 * (0.002)	0.0054 (0.007)
FINANCE	-0.0100 (0.035)	0.0083 * (0.004)	0.0539 (0.071)	0.4287 (0.290)
State FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
N	56,766	44,126	49,523	44,139
R-squared	0.166	0.221	0.237	0.278

treatment firms' earnings management and a significant reduction in their financial constraints as proxied by *WW* Index, 2) the degree of financial constraints as proxied by *WW* Index is positively related to both accruals-based earnings management (*AEM*) and real earnings management (*REM*), and 3) controlling for *WW* Index significantly weakens the relations between *Bank Deregulation Index* and both *AEM* and *REM*. In Panel A2, the small p-values from the Sobel test and Goodman test confirm the indirect effects of *Bank Deregulation Index* on *AEM* and *REM* through *WW* Index. The significant reduction in the magnitude of the regression coefficient estimates of *Bank Deregulation Index* when controlling for *WW* Index is further confirmed by Hayes bootstrapping approach. The results are qualitatively similar albeit weaker for Panels B1, B2, C1 and C2 when we use *KZ* Index and *EFD* Index as the alternative measures of financial constraints.

Taken together, these results further support our earlier empirical

findings and suggest that banking deregulation reduces the intensity of earnings management through providing firms with easier access to external banking financing which relaxes their financial constraints.

5.3. Alternative monitoring mechanism

In this section, we further explore an alternative bank monitoring mechanism that may also help explain why banking deregulation negatively affects corporate earnings management. Specifically, banking deregulation enables better-performing banks to expand geographically, and outperforming banks can monitor borrowing firms more effectively. In addition, the consolidation wave in banking following deregulation also prompts local banks to enhance their monitoring on borrowing firms. Strengthened bank monitoring thus leads to a reduction in corporate earnings management.

Table A5

Robustness Checks: Historical Headquarter Locations. This table reports ordinary least-squares (OLS) regression estimates for the baseline regressions, with *Bank Regulation Index* defined using historical headquarters state information. The dependent variables are accruals-based earnings management (*AEM*) and real earnings management (*REM*). The variables are defined in [Table A1](#) in the Appendix. Heteroskedasticity-robust standard errors are in parentheses and clustered at the firm level. *, **, and *** denote significance at the 10 %, 5 %, and 1 % levels.

	AEM (1)	REM (5)
Bank Deregulation Index	-0.0013** (0.001)	-0.0054*** (0.001)
MARKET_TO_BOOK	-0.0007 * ** (0.000)	0.0032 * ** (0.000)
SALES_GROWTH	0.0591 * ** (0.001)	0.3267 * ** (0.005)
SIZE	-0.0256 * ** (0.000)	-0.1063 * ** (0.001)
GDP	0.0035 * ** (0.001)	0.0106 * ** (0.003)
UNEMPLOYMENT	-0.0011 (0.001)	-0.0036 (0.003)
FINANCE	-0.0364 * ** (0.013)	-0.0979 * (0.056)
State FE	YES	YES
Year FE	YES	YES
N	105,516	87,998
R-squared	0.219	0.262

Table A6

Robustness Checks: Shorter Sample Period 1993–1998. This table reports ordinary least-squares (OLS) regression estimates for the baseline regressions using the sample period around the first passage of the IBBEA from 1993 to 1998. The dependent variables are accruals-based earnings management (*AEM*) and real earnings management (*REM*). The variables are defined in [Table A1](#) in the Appendix. Heteroskedasticity-robust standard errors are in parentheses and clustered at the firm level. *, **, and *** denote significance at the 10 %, 5 %, and 1 % levels.

	AEM (1)	REM (5)
Bank Deregulation Index	-0.0010** (0.000)	-0.0039*** (0.001)
MARKET_TO_BOOK	-0.0008 * ** (0.000)	0.0035 * ** (0.000)
SALES_GROWTH	0.0597 * ** (0.001)	0.3328 * ** (0.005)
SIZE	-0.0270 * ** (0.000)	-0.1128 * ** (0.001)
GDP	0.0034 * ** (0.001)	0.0108 * ** (0.003)
UNEMPLOYMENT	0.0001 (0.001)	0.0020 (0.003)
FINANCE	0.0416 (0.032)	0.1089 (0.130)
State FE	YES	YES
Year FE	YES	YES
N	28,936	27,081
R-squared	0.178	0.221

To investigate this mechanism, we examine the heterogenous effects of banking deregulations on treatment firms with strong versus weak corporate governance. If banks’ strengthened monitoring plays a role in decreasing earnings management of treatment firms, we expect that the effects of banking deregulations on treatment firms’ accruals-based earnings management and real earnings management should be stronger for those treatment firms with weak governance strength.

We use co-opted director ratio ([Coles et al., 2014](#)) to proxy for firms’ internal corporate governance strength and use institutional ownership to proxy for firms’ external corporate governance strength. Co-opted

Table A7

Robustness Check: Additional Controls. This table reports ordinary least-squares (OLS) regression estimates for the baseline regressions with additional controls. The variables are defined in [Table A1](#) in the Appendix. Heteroskedasticity-robust standard errors are in parentheses and clustered at the firm level. *, **, and *** denote significance at the 10 %, 5 %, and 1 % levels.

	AEM (1)	REM (2)
Bank Deregulation Index	-0.0013** (0.001)	-0.0059*** (0.001)
MARKET_TO_BOOK	-0.0008 * ** (0.000)	0.0029 * ** (0.000)
SALES_GROWTH	0.0800 * ** (0.001)	0.4080 * ** (0.004)
SIZE	-0.0288 * ** (0.000)	-0.1254 * ** (0.001)
CFO	-0.0007 * ** (0.000)	-0.0021 * ** (0.000)
LEVERAGE	0.0000 * ** (0.000)	0.0001 * ** (0.000)
LOSS	0.0356 * ** (0.001)	0.1149 * ** (0.005)
ROA	-0.0001 * ** (0.000)	-0.0003 * ** (0.000)
GDP	0.0681 * ** (0.025)	0.2283 * ** (0.101)
UNEMPLOYMENT	0.0012 (0.001)	0.0027 (0.004)
FINANCE	0.0289 (0.026)	0.0002 (0.112)
State FE	YES	YES
Year FE	YES	YES
N	105,001	87,057
R-squared	0.229	0.267

Table A8

Deregulating and Control States. The treatment states start deregulation in 1995 and 1996. We compile this list based on the table listing out-of-state branching restrictions and the dates of these regulation changes in [Rice and Strahan \(2010\)](#). The control states are neighboring states that do not deregulate. The maps show the treatment states in 1995 and 1996.

Treatment State	Control State
1995	
CA	HI, OR, AZ
CT	NY
DE	NJ
ID	MT, NV, OR, WA, WY
KS	NE, OK, CO
MI	OH, WI, IN
MO	NE, OK, TN, AR, IA, IL, KY
NC	SC, TN, GA
NV	OR, UT, AZ, ID
PA	WV, NJ, NY, OH
RI	MA
TX	AR, LA, NM, OK
UT	WY, AZ, CO, ID, NM, NV
VA	WV, DC, KY, TN
1996	
AZ	CO
IA	IL, MN, NE, SD
MA	NH, NY
NJ	NY, PA
NM	OK, CO
SC	GA
SD	WY, MN, ND, NE
VT	NH, NY
WA	AK, OR
WI	IL, MI, MN

directors are those directors appointed after the firm’s CEO took office; such directors may be “captured” by the CEO and not necessarily serve shareholder interests to monitor the CEO. Thus, greater co-opted

Table A9

Results Based on a Propensity-Score-Matched Sample. This table reports OLS regression estimates of the effects of banking deregulations on firm's earnings management, using a propensity-score-matched sample of treatment firms headquartered in the states which adopted banking deregulations and control firms in the neighbouring states which do not deregulate. For each treatment firm, we select a control firm in a non-deregulated neighboring state that operates in the same 2-digit SIC industry as the treatment firm and has the closest propensity score estimated based on observable firm characteristics in the first deregulation year, using one-to-one nearest-neighbour matching (without replacement). Panel A provides the means of the firm characteristics for the treatment firms and propensity-score-matched control firms and the P-values of mean differences. Panel B reports the regressions results using the propensity-score-matched sample. Definitions of variables are provided in Appendix A. Heteroskedasticity-robust standard errors are in parentheses and clustered at the firm level. *, ** and *** denote statistical significance at the 10 %, 5 % and 1 % level, respectively.

Panel A	Deregulated state	Neighbouring states	
Variable	Mean	Mean	p-value
MARKET_TO_BOOK	2.5371	2.4498	0.6387
SALES_GROWTH	0.1984	0.1786	0.1993
SIZE	4.5541	4.5033	0.4624
PROFITABILITY	0.0405	0.0346	0.7879
LEVERAGE	0.3216	0.3181	0.3341
Panel B	AEM	REM	
	(1)	(2)	
Bank Deregulation Index	-0.0014 ** (0.001)	-0.0076 *** (0.003)	
MARKET_TO_BOOK	-0.0002 ** (0.000)	-0.0108 ** (0.005)	
SALES_GROWTH	0.0610 *** (0.004)	0.3144 *** (0.013)	
SIZE	-0.0165 *** (0.001)	-0.0673 *** (0.003)	
PROFITABILITY	-0.0497 *** (0.003)	-0.2196 *** (0.011)	
LEVERAGE	0.0335 *** (0.004)	0.0368 *** (0.013)	
GDP	-0.0058 (0.006)	-0.0076 (0.023)	
UNEMPLOYMENT	0.1036 (0.277)	0.4803 (1.013)	
FINANCE	-0.0016 (0.012)	-0.0281 (0.043)	
State FE	YES	YES	
Year FE	YES	YES	
N	4019	3153	
R-squared	0.212	0.267	

director ratio indicates weaker internal governance strength. Moreover, it is known that greater institutional ownership indicates better external governance strength (Harzell and Starks, 2003). We then partition the full sample into subsamples based on whether the firm is identified as having a higher-than-median co-opted director ratio (Co-opt) or having lower-than-median institutional ownership (IO) in year $t-3$ to $t-1$, and reestimate the baseline regressions for each subsample.

As shown in the Table 10, we find that the negative effects of banking deregulations on treatment firms' accruals-based and real earnings management are only significant for the subsample with higher-than-median co-opted director ratio (indicating weak internal governance) and the subsample with lower-than-median institutional ownership (indicating weak external governance). The difference in the coefficient estimates of *Bank Deregulation Index* between the subsamples are also statistically significant in three out of the four cases. These findings suggest that interstate banking deregulations indeed have stronger effects on accruals-based and real earnings management of firms with weaker corporate governance, likely because banks play a more

prominent role in monitoring the managers of such firms. The findings hence support the alternative bank monitoring mechanism in explaining the findings of reductions in accruals-based earnings management and real earnings management for the treatment firms after banking deregulations.

6. Banking deregulations, accounting restatement, and information environment

We have shown that the development of an external credit market via banking deregulations reduces earnings manipulation. In this section, we further investigate whether and how banking deregulations affect firms' accounting restatement likelihood and information environment. As the consequence of the reduction in earnings manipulation, we expect banking deregulations to help decrease accounting restatement likelihood and improve firms' information environment.

6.1. Banking deregulations and accounting restatement

Earnings management can increase the likelihood of accounting restatement (e.g., Ettredge et al., 2010). Accordingly, we further examine whether external credit market development, as proxied by interstate banking and branching deregulations, decreases the likelihood of accounting restatement. Using data on accounting restatements from the Audit Analytics database, our sample contains data from 1995 to 2010 for firms that issue accounting restatements. We create an indicator variable, *Restatement*, which equals 1 if Audit Analytics indicates a firm restated its financial results for a fiscal year (i.e., the firm subsequently restates financial results of the fiscal year) and 0 otherwise.¹⁴ The results using panel OLS regressions are reported in Table 11.

The coefficients in columns (1) and (2) suggest that interstate banking and branching deregulations are significantly and negatively related to the instances of accounting restatement, consistent with our previous empirical findings on intensity of earnings management. In terms of economic significance, on average an accounting restatement is 1.2 % points less likely (i.e., 4×0.0031 in column 1) among firms headquartered in states that are fully open to out-of-state branching during the year after deregulation, compared to firms in states with the most restrictions on out-of-state branching. This magnitude is large; the average likelihood of accounting restatement is 7.84 % in the sample.

6.2. Banking deregulations and information environment

Since credit market development via banking deregulations decreases earnings manipulation, we further expect it to improve firms' information environment. We use three proxies to measure firms' information environment: idiosyncratic stock return volatility, effective spread, and Amihud's (2002) illiquidity measure (e.g., Fang and Peress, 2009; Karpoff et al., 2013). Greater levels of idiosyncratic volatility (*IVOL*), effective spread (*SPREAD*), and stock illiquidity (*AMIHU*) indicate higher information asymmetry and thus worse information environment. Data to construct these variables are obtained from the Center for Research in Security Prices (CRSP). We report the panel OLS regression results on the effect of banking deregulations on firms' information environment in Table 12.

In Panel A of Table 12, columns (1) to (3) show that banking and branching deregulations are significantly and negatively related to idiosyncratic volatility, effective spread and stock illiquidity, respectively. Columns (4) to (6) further show that the results remain qualitatively unchanged when we additionally control for time-varying firm and state characteristics. In terms of economic magnitudes, in the years after deregulation, firms headquartered in states that are fully open to

¹⁴ We use overall restatement data and do not distinguish between different reasons for restatement.

Table A10

Placebo Tests Based on the Pseudo Samples. This table reports the distributions of the regression coefficient estimates of *Bank Deregulation Index* based on OLS regressions using the pseudo samples. Specifically, we randomly assign deregulation dates to each deregulating state and randomly assign deregulation states. We repeat this process 1000 times to generate 1000 pseudo samples for each random assignment exercise. We then run the baseline regressions using these pseudo samples to obtain the coefficient estimates of Bank Deregulation Index.

Means, standard deviations and percentiles of the coefficient estimates of Bank Deregulation Index using the pseudo samples												
	Dep. Var.	Mean	Std Dev	1	5	10	25	50	75	90	95	99
<i>Randomly assigned dates</i>	AEM	0.0000	0.0004	-0.0010	-0.0007	-0.0005	-0.0003	-0.0000	0.0003	0.0005	0.0007	0.0010
	REM	-0.0001	0.0016	-0.0038	-0.0027	-0.0021	-0.0011	0.0001	0.0010	0.0019	0.0025	0.0035
<i>Randomly assigned states</i>	AEM	0.0000	0.0005	-0.0013	-0.0007	-0.0006	-0.0004	-0.0000	0.0004	0.0007	0.0008	0.0010
	REM	0.0000	0.0019	-0.0044	-0.0031	-0.0022	-0.0016	-0.0001	0.0017	0.0023	0.0033	0.0045

Table A11

Robustness Check: Channel Analysis. This table reports the results from mediation analysis that examines whether financial constraints play a mediating role on the effect of interstate banking deregulations in decreasing corporate earnings management. We use *WW Index*, *KZ Index* and *EFD Index* as the measures of financial constraints. Panel A reports the regression results. Panel B reports the results from the indirect path tests for the mediating role of financial constraints. Control variables are included in the regressions but are omitted from reporting for brevity. The variables are defined in Table A1 in the Appendix. Heteroskedasticity-robust standard errors are in parentheses and clustered at the firm level. *, **, and *** denote significance at the 10 %, 5 %, and 1 % levels.

Panel A1: Regression results for the mediating role of WW Index									
Dep. Var.:	AEM (1)	WW Index (2)	AEM (3)	AEM (4)	REM (5)	WW index (6)	REM (7)	REM (8)	
Bank Deregulation Index	-0.0015*** (0.001)	-0.0713** (0.031)		-0.0002* (0.000)	-0.0065*** (0.002)	-0.0680** (0.031)		-0.0025* (0.001)	
WW Index			0.0203*** (0.000)	0.0215*** (0.000)			0.0614*** (0.000)	0.0628*** (0.000)	
Control	YES	YES	YES	YES	YES	YES	YES	YES	
State FE	YES	YES	YES	YES	YES	YES	YES	YES	
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	
N	106,289	105,340	105,340	105,340	88,265	87,681	87,681	87,681	
R-squared	0.218	0.249	0.215	0.221	0.259	0.247	0.250	0.261	
Panel A2: Indirect path tests for the mediating role of WW Index									
	Bank Deregulation Index → WW Index → AEM				Bank Deregulation Index → WW Index → REM				
Sobel test p-value	0.0146 **				0.0732 *				
Goodman test p-value	0.0153 **				0.0745 *				
Hayes Bootstrapping coefficient (5000 repetitions)	-0.0013 ***				-0.0056 ***				
Panel B1: Regression results for the mediating role of KZ Index									
Dep. Var.:	AEM (1)	KZ index (2)	AEM (3)	AEM (4)	REM (5)	KZ index (6)	REM (7)	REM (8)	
Bank Deregulation Index	-0.0015*** (0.001)	-0.6738** (0.303)		-0.0010* (0.001)	-0.0065*** (0.002)	-0.7505** (0.348)		-0.0005 (0.002)	
KZ index			0.0001 (0.000)	0.0001 (0.000)			0.0081*** (0.000)	0.0074*** (0.000)	
Control	YES	YES	YES	YES	YES	YES	YES	YES	
State FE	YES	YES	YES	YES	YES	YES	YES	YES	
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	
N	106,289	103,126	103,126	103,126	88,265	87,476	87,476	87,476	
R-squared	0.218	0.246	0.250	0.256	0.259	0.246	0.296	0.298	
Panel B2: Indirect path tests for the mediating role of KZ Index									
	Bank Deregulation Index → KZ Index → AEM				Bank Deregulation Index → KZ Index → REM				
Sobel test p-value	0.1413				0.0311 **				
Goodman test p-value	0.1385				0.0394 **				
Hayes Bootstrapping coefficient (5000 repetitions)	-0.0000				-0.0045 *				
Panel C1: Regression results for the mediating role of EFD Index									
Dep. Var.:	AEM (1)	EFD Index (2)	AEM (3)	AEM (4)	REM (5)	EFD Index (6)	REM (7)	REM (8)	
Bank Deregulation Index	-0.0015*** (0.001)	-0.0048** (0.002)		-0.0011* (0.001)	-0.0065*** (0.002)	-0.0054** (0.003)		-0.0039* (0.002)	
EFD Index			0.0146*** (0.001)	0.0146*** (0.001)			0.0283*** (0.004)	0.0282*** (0.004)	
Control	YES	YES	YES	YES	YES	YES	YES	YES	
State FE	YES	YES	YES	YES	YES	YES	YES	YES	
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	
N	106,289	105,664	105,664	105,664	88,265	87,762	87,762	87,762	
R-squared	0.218	0.277	0.235	0.240	0.259	0.270	0.237	0.241	
Panel C2: Indirect path tests for the mediating role of EFD Index									
	Bank Deregulation Index → EFD Index → AEM				Bank Deregulation Index → EFD Index → REM				
Sobel test p-value	0.0616 *				0.0809 *				
Goodman test p-value	0.0622 *				0.0838 *				
Hayes Bootstrapping coefficient (5000 repetitions)	-0.0001 *				-0.0023 *				

out-of-state branching on average have idiosyncratic volatility that are lower by 2.1 % points (i.e., 4×0.0053 in column 4), effective spread that are narrower by 0.08 % point (i.e., 4×0.0200 in column 5), and stock illiquidity that are lower by 0.24 % point (i.e., 4×0.0602 in column 3) than firms in states that restrict out-of-state branching the most. These reductions in idiosyncratic volatility, effective spread, and stock illiquidity account for 56.30 %, 7.04 % and 20.82 % of the median idiosyncratic volatility, effective spread, and stock illiquidity in the sample, respectively.

If banking deregulations improve firms' information environment via decreasing earnings manipulation, it is intuitive that the effect of banking deregulations on information environment should be more pronounced for those firms that have higher earnings management intensity *ex ante*. Thus, we construct the indicator variable *High_AEM* (*High_REM*), which equals 1 if the average *AEM* (average *REM*) of the firm from year *t*-3 to *t*-1 (the window of three years before the *Bank Deregulation Index* measurement year *t*) is greater than the corresponding sample median of year and equals 0 otherwise. We then include *Bank Deregulation Index*High_AEM* (*Bank Deregulation Index*High_REM*), *High_AEM* (*High_REM*), *Bank Deregulation Index*, control variables, and state and year fixed effects in the regressions.

In Panel B of Table 12, columns (1) to (3) show that the coefficients of *Bank Deregulation Index*High_AEM* are significantly negative across the three regressions with idiosyncratic volatility, effective spread and stock illiquidity as the dependent variables. Columns (4) to (6) further show that the coefficients of *Bank Deregulation Index*High_REM* are significantly negative when effective spread and stock illiquidity are the dependent variables. Thus, these findings suggest that consistent with our expectation, the effect of banking deregulations on improving firms' information environment is indeed significantly greater for those firms having more intensive earnings manipulation *ex ante*.

In addition, we further investigate whether banking deregulations have a stronger impact on corporate earnings management in treatment firms with more opaque information environment *ex ante*. To test this conjecture, we partition the full sample into subsamples based on whether the firm has higher-than-median idiosyncratic stock return volatility (*IVOL*), effective spread (*SPREAD*), or Amihud's (2002) illiquidity measure (*AMIHUD*) in year *t*-3 to *t*-1, and reestimate the baseline regressions for each subsample. As shown in the Table A12 in the Appendix, we find that the negative effects of banking deregulations on accruals-based earnings management and real earnings management are indeed stronger for treatment firms with more opaque information environment as indicated by *high IVOL*, *high SPREAD*, or *high AMIHUD*. These results suggest that banking deregulations reduce earnings management and improve corporate information environment particularly for those treatment firms with more opaque information environment.

To summarize, we show that interstate banking and branching deregulations also help decrease accounting restatement likelihood and improve firms' information environment.

7. Conclusions

This paper examines how credit market development affects the intensity of accruals-based and real earnings management among firms. We exploit the staggered implementation of banking and branching deregulation in the United States under the Interstate Banking and Branching Efficiency Act of 1994 to identify this effect. We find a significant decrease in the intensity of accruals-based and real earnings management after banking deregulations. The documented effect on corporate earnings management is significantly stronger for those deregulated states that have lower bank branch density before deregulation and those states that have greater out-of-state bank entry after deregulation. Our results are consistent with the interstate banking and branching deregulations exogenously lifting the barrier for out-of-state banks' entry and thus increasing the local competition among banks and the access to bank financing. Decreasing financial constraints

reduce firms' incentives to engage in costly earnings management in order to raise external financing. Our results hold in various robustness tests that address endogeneity concerns, which suggests that the uncovered impact of banking deregulation on firms' earnings management is most likely causal.

We further provide empirical evidence that banking deregulations affect earnings management by providing firms with easier access to external bank financing. Using a sharp regression discontinuity methodology, we find that firms slightly above the threshold for financial aid from the U.S. Small Business Administration reduce the intensity of earnings management more after banking deregulation compared to firms that meet the SBA eligibility threshold. Our cross-sectional analysis using various financial constraint measures further confirms these findings.

Our empirical evidence clearly suggests that external credit market development through the IBBEA implementation has a potentially causal and dampening effect on the intensity of corporate earnings management. Consistent with the findings on earnings management, we further find that the IBBEA implementation significantly reduces the instances of financial results being subsequently affected by accounting restatements and significantly improve firms' information environment. The findings of the study could be of interest to regulators, investors, and academics.

Appendix A

See Tables A1-A11.

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