The Effects of Credit Competition on Banks' Loan Loss Provision Timeliness

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Abstract: Prior research has documented specific benefits, but not costs, of timelier loan loss provisioning for reporting banks and the overall financial system. We examine one such cost in this paper. We argue that potential entrants into a local loan origination market use incumbent banks' reported loan loss provisions to assess incumbents' loan underwriting quality and thus the desirability of market entry. By loan underwriting quality, we mean banks' ability to evaluate credit risk to determine which loans to grant as well as the interest rates and other contractual terms of granted loans. Incumbents with better loan underwriting quality leave fewer profitable lending opportunities for potential entrants. We use variation in interstate branching deregulation across contiguous counties of adjacent states from 1994 to 2005 as a natural experiment to investigate how increased threat of entry affects incumbent banks' loan loss provision timeliness. We predict and find that incumbents more subject to entry reduce the timeliness of their bad news (but not good news) loan loss provisions to increase their perceived loan underwriting quality. Further, we predict and find variation in this behavior across loan origination markets attributable to incumbents' loan portfolio composition and borrower turnover in those markets.

Keywords: banks, deregulation, interstate branching, credit competition, loan loss provision, timeliness, natural experiment

1. Introduction

Some of the most influential financial policymakers emphasize the benefits of timelier loan loss provisioning for both reporting banks and the overall financial system. These policymakers typically argue that FAS 5's incurred loss model—which allows banks to recognize loan losses only if they are "incurred", "probable", and "can be reasonably estimated"—delays loan loss provisions during good economic times, rendering banks less well capitalized and thus less willing to originate loans when the business cycle turns down (Bernanke 2009; Dugan 2009; Financial Stability Forum 2009; U.S. Treasury 2009). The prior literature generally supports this argument.[1] Beatty and Liao (2011) and Bhat et al. (2012) find that banks that record timelier loan loss provisions exhibit lower loan origination procyclicality, because they maintain higher common equity during good economic times and understand their credit risk better. Bushman and Williams (2012a,b) find that these banks assume lower financial leverage, engage in less risk shifting (exploitation of deposit insurance), and are less prone to experience balance sheet contraction and to contribute to system-wide contraction, because timelier provisions increase bank transparency, enhance market discipline, and reduce unrecognized loss overhang.

While prior research has documented these and other specific benefits of timelier loan loss provisioning to banks and the overall financial system, it has not documented specific actual or perceived costs of such provisioning to banks.[2] We examine one such cost in this paper. We argue that potential entrants into a loan origination market use incumbent banks' reported loan

[1] Prior papers typically identify timelier loan loss provisions as provisions that are more strongly positively associated with future and sometimes also contemporaneous changes in non-performing loans. As discussed below, we identify timelier loan loss provisions consistently as annual provisions that are more positively associated with the next-year change in non-performing loans.

[2] Considerable prior research, most of which is conducted on samples of firms excluding financial institutions, explains that timelier recognition of losses (of any type, not just provisions for loan losses) may entail contracting and other costs; see Gormley et al. (2012) for a recent example.

loss provisions to assess the incumbents' loan underwriting quality and thus the desirability of market entry. By loan underwriting quality, we mean banks' ability to evaluate credit risk to determine which loans to grant as well as the interest rates and other contractual terms of granted loans. Incumbent banks with better loan underwriting quality leave fewer profitable lending opportunities for potential entrants. We use variation in interstate branching deregulation across contiguous counties of adjacent states from 1994 to 2005 to investigate how increased threat of entry affects incumbents' loan loss provision timeliness.

Prior research shows that information asymmetry between banks offering credit and potential borrowers affects banking industry structure and conduct (Dell'Ariccia et al. 1999; Marquez 2002; Dell'Ariccia and Marquez 2004, 2006, 2008). Due to their greater local market knowledge, including established relationships with borrowers, incumbent banks are less subject than potential entrants to this form of information asymmetry. This information advantage provides incumbents with market power. In extreme cases, fear of the "winner's curse" renders potential entrants unwilling to provide credit to incumbent banks' borrowers, so that incumbent banks capture those borrowers (Rajan 1992; Dell'Ariccia and Marquez 2004).

We develop our hypotheses based on three interrelated arguments. First, potential entrants into a loan origination market can use incumbent banks' loan loss provisions to infer their loan underwriting quality. All else being equal, an incumbent that experiences higher economic loan losses evidences lower loan underwriting quality. That incumbent is more likely to be subject to entry when these losses are observable to a greater extent by potential entrants. Second, incumbent banks can manage this extent because potential entrants cannot perfectly distinguish timelier *increases* in loan loss provisions (hereafter, "bad news loan loss provisions") from higher economic loan losses, despite the existence of other information about economic

loan losses. We validate the first two arguments, showing that incumbent banks that record timelier bad news (but not good news) loan loss provisions experience greater entry. Third, an incumbent bank's decisions regarding the timeliness of its loan loss provisions reflect a trade-off between the decision-making benefits described above and competitive costs. These costs increase with the threat of entry, tilting incumbent banks' incentives toward recording less timely bad news provisions.

While prior theoretical research shows that the threat of entry affects incumbent firms' financial reporting decisions (Darrough and Stoughton 1990), documenting this relation empirically requires confronting at least three research-design challenges. First, entry and incumbents' financial reporting decisions likely are endogenously determined. Second, firms often comprise multiple business units competing in different local markets, and relevant data to assess this relation are usually not publicly available for these units. Third, while it is possible to control for observable factors that affect incumbents' reporting decisions, unobservable factors also likely play sizeable roles in these decisions. Our research design addresses these challenges.

We address the first challenge by examining the effect of increased threat of entry by out-of-state banks caused by state-level interstate branching deregulation from 1994 to 2005 on incumbent banks' loan loss provision timeliness. Individual states implemented this deregulation to varying extents and at different times during this period. While this deregulation was shaped by a political process involving the relative influence of small versus large banks and other factors (Strahan 2003; Rice and Strahan 2010), this process has no apparent relation to incumbent banks' preexisting or intended loan loss provision timeliness at the time, and so we argue it constitutes a natural experiment for the purposes of this study.

Specifically, the Riegle-Neal Interstate Banking and Branching Efficiency Act of 1994 (IBBEA) eliminated federal restrictions on interstate banking (out-of-state bank acquisition or creation of in-state chartered banks) and branching (out-of-state bank acquisition or creation of in-state branches) expressed in the McFadden Act of 1927 and the Bank Holding Company Act of 1956 (Johnson and Rice 2008). However, IBBEA's provisions allowed states to continue to restrict interstate branching, which is a cheaper and easier means of entry than interstate banking. Some states imposed one or more of: (1) a minimum age at which in-state banks can be acquired by out-of-state banks, (2) a statewide cap on the amount of deposits that the merged institution could hold after an out-of-state bank acquires an in-state bank, (3) a prohibition on the creation of new branches by out-of-state banks (*de novo* branching), and (4) a prohibition on the acquisition of single branches by out-of-state banks. Collectively, these restrictions significantly reduced entry by out-of-state banks (Johnson and Rice 2008).

Following Rice and Strahan (2010), we construct an index of interstate branching restrictions for each state. The index is zero for states without entry restrictions (the greatest threat of entry) and increases by one for each of the four restrictions described above, up to a maximum of four (the least threat of entry).

We overcome the second and third challenges by using branch addresses obtained from the Federal Deposit Insurance Corporation (FDIC) to identify banks with branches in only one county ("one-county banks"); these local banks also are relatively comparable in their (small) size. We compare one-county banks in states that have experienced deregulatory events to matched one-county banks in contiguous counties of adjacent states that have experienced strictly less deregulation. This matched-pair research design both minimizes differences in unobservable factors across banks and enhances our ability to control for observable factors.

Given the benefits of timelier loan loss provisions documented by the prior literature, we expect incumbent banks to reduce the timeliness of their bad news provisions to dissuade entry only when potential entrants rely to a significant extent on those provisions to assess the returns to entering the incumbents' loan origination markets.[3] We expect this to occur primarily for heterogeneous (e.g., commercial and industrial) loans, for which relatively little information about the loans' creditworthiness is available outside of incumbent banks' financial and regulatory reports, local market knowledge is important to originate the loans effectively, and the winner's curse problem is significant. We also expect this to be more the case when the loan origination market exhibits lower borrower turnover.

Following extensive prior literature (Gambera 2000; Nichols et al. 2009; Beatty and Liao 2011; Bhat et al. 2012; Bushman and Williams 2012a,b), we estimate banks' loan loss provision timeliness by regressing annual loan loss provisions on next-year changes in non-performing loans and other explanatory variables. In this approach, changes in non-performing loans proxy for economic credit losses, and a more positive coefficient on next-year changes in nonperforming loans indicates timelier loan loss provisions. The prior literature finds that loan loss provisions predict next-year changes in non-performing loans for the average bank, with considerable variation in this predictive relation obtaining across banks. These findings reflect the fact that banks can base their provisions on all available information, including loans that are delinquent but not yet non-performing. Because we are primarily concerned with the timeliness of bad news loan loss provisions, we generalize the usual approach to allow the coefficient on

[3] Prior research that examines the effects of conservatism in contracting and market settings typically posits that firms must commit to conservatism to obtain the desired outcomes (e.g., improved contracting or lower cost of capital). In contrast, we posit only that potential entrants place some weight on incumbent banks' loan loss provisions in assessing their economic loan losses and thus loan underwriting quality.

next-year changes in non-performing loans to vary with the direction of the change, and focus on the coefficient on the increase in non-performing loans.

Consistent with the expectations discussed above, we find that the timeliness of bad news loan loss provisions, but not good news provisions, decreases for incumbent banks located in the counties where restrictions on interstate branching decrease. Moreover, we find the reduction of loan loss provision timeliness is higher for incumbents in counties where banks hold a larger proportion of heterogeneous loans and that exhibit lower borrower turnover. Our findings are robust to numerous specification analyses.

Our paper contributes to several extant literatures. First, it informs the ongoing policy debate about the desirability of requiring banks to record timelier loan loss provisions than they currently report under FAS 5's incurred loan loss model. Our findings suggest that imposing this requirement would lead to greater entry into local loan origination markets.

Second, our paper contributes to the literature on the competitive costs of financial report information. Theoretical research demonstrates that the relation between competition and disclosure depends on the natures of both variables (Darrough 1993; Verrecchia 1990). Intuitively, an incumbent firm's disclosures can deter entry by conveying either that the firm is strong (Milgrom and Roberts 1982) or that the market is undesirable (Darrough and Stoughton 1990). In cases where disclosure would induce entry, firms do not voluntarily disclose (Pagano and Jappelli 1993). We provide evidence that incumbent banks exposed to greater threat of entry reduce the timeliness of their bad news loan loss provisions to appear to have higher loan underwriting quality and thus deter entry.

Our paper is related to two recent studies. Burks et al. (2012) employ the same setting and find that banks exposed to greater threat of entry issue more press releases. They do not

provide evidence as to whether these press releases tend to convey good or bad news or whether good and bad news releases have different implications for entry, however. Bushman et al. (2013) show that a measure of banks' perceived competition derived from textual analysis of their financial reports is negatively associated with banks' loan loss provision timeliness, a finding the authors attribute to banks in competitive (i.e., low-profit) environments delaying provisions to appear to be more profitable rather than to have better loan underwriting quality.

Third, our paper contributes to the literature documenting the beneficial effects of conditional conservatism. This literature generally finds that firms' commitment to timely loss recognition increases contracting efficiency and reduces information asymmetry in capital markets (Kothari et al. 2010). Our evidence indicates that timelier bad news loan loss provisions by incumbent banks increases entry into their loan origination markets. While costly for the reporting banks, entry likely enhances social welfare, because the prior literature finds that credit competition improves bank services (Jayaratne and Strahan 1998; Dick 2006), expands credit availability and lowers interest rates (Rice and Strahan 2010), and increases local economic growth (Jayaratne and Strahan 1996).

Finally, our research extends the industrial organization literature examining factors that create barriers to entry in markets. This paper demonstrates that incumbents' strategic accounting choices play a role in creating these barriers. Our paper is related to Zou (2012), who examines how entrant airlines use incumbent airlines' accumulated other comprehensive income arising from cash flow hedges of fuel costs in making route entry decisions.

The remainder of the paper is organized as follows. Section 2 provides relevant background and develops the hypotheses. Section 3 describes the sample and research design.

Section 4 discusses the primary empirical results and Section 5 summarizes the robustness analyses performed. Section 6 concludes.

2. Background and Hypothesis Development

2.1. Means of Geographical Expansion by Banks

Absent the restrictions discussed below, an out-of-state bank can expand geographically into a state in two primary ways. First, it can charter a new bank in the state or acquire an existing chartered bank in the state and maintain the bank's charter. These activities are referred to as "interstate banking." Second, it can acquire an existing bank in the state and convert the bank to one or more branches or establish new branches in the state. These activities are referred to as "interstate branching." Interstate banking is a significantly more expensive means to expand geographically than interstate branching, because chartered banks require separate management and governance and must meet regulatory capital and other requirements on a standalone basis.

Banks operating in a state can expand geographically by acquiring or opening new branches in the state. These activities are referred to as "intrastate branching."

2.2. Relaxation of Restrictions on Geographical Expansion by Banks

State-imposed restrictions on banks' geographical expansion arose early in United States history, in part as a consequence of provisions of the U.S. Constitution (Kroszner and Strahan 1999).[4] Beginning in the late 19th century and accelerating in the early 20th century, national

[4] The U.S. Constitution prohibited states from issuing fiat (i.e., paper) money and taxing interstate commerce. States imposed fees on bank charters and banking-related taxes and invested in banks to produce a substantial portion of their total revenues (Sylla et al. 1987). Because states could not earn these revenues on national banks, they prevented these banks from expanding into their territories.

banks developed first multi-bank chains (chartered banks in different states owned by one or a few individuals) and then multi-bank holding companies (entities that own separately chartered banks in different states) to evade these restrictions (Redlich 1951). While nominally leveling the competitive playing field for the state and national banks operating in a state, the McFadden Act of 1927 effectively reaffirmed the states' authority over branching by national banks in their territories. The McFadden Act did not restrict multi-bank holding companies, however, inducing further expansion of these companies, notably A. P. Giannini's founding of Transamerica Corporation in 1928 and Bank of America in 1930. The Bank Holding Company Act of 1956 gave states the authority to restrict interstate banking by these holding companies, thereby returning to these states the power to restrict expansion by out-of-state banks. Prior to 1970, all states prohibited interstate branching, and they significantly restricted interstate banking and intrastate branching.

Most states deregulated interstate banking and intrastate branching from 1970 to 1994 due to developments in technology (e.g., the ATM), competition (e.g., non-banks offering banking services such as cash management accounts), and other factors (Berger et al. 1995; Kroszner and Strahan 1999; Ryan 2007). This deregulation typically occurred on a gradual basis through reciprocal agreements with other states. In contrast, restrictions on interstate branching remained until the passage of IBBEA in 1994.

IBBEA permitted interstate banking (Section 101) and branching (Sections 102 and 103). Section 101 had relatively modest effects due to the prior deregulation of interstate banking. In contrast, Sections 102 and 103 permitted interstate branching for the first time, significantly reducing the cost to out-of-state banks of entering a state (Rice and Strahan 2010).

IBBEA provided states with various means to control the extent and timing of the implementation of the act's interstate branching provisions, however. States could "opt-in" early or "opt-out" of these provisions by passing a state law at any time between IBBEA's passage in September 1994 and the "trigger date" of June 1, 1997. All fifty states and Washington D.C. eventually opted in, although this occurred after considerable debate in nine states, including initial votes to opt out in three states (Golembe 1994; Hutnyan 1995). As discussed below, states could and to varying extents did impose four restrictions on interstate branching. Collectively, these restrictions erected barriers to entry by out-of-state banks, raised the cost of entry, and distorted the means of entry.

The first restriction is imposition of the minimum age at which in-state banks can be acquired by out-of-state banks. IBBEA allows states to set a minimum up to five years. This restriction may prolong the process of or even deter entry, depending on out-of-state banks' patience and opportunities to acquire sufficiently old in-state banks.

The second restriction is imposition of statewide deposit caps on the merged institutions created by acquisitions of in-state banks by out-of-state banks. IBBEA specifies a statewide deposit cap of 30%, but a state may impose a cap below 30%. This restriction prohibits any interstate acquisition for which the deposits of the merged institution exceed the specified cap.

The third restriction is prohibition of the creation of new branches by out-of-state banks. IBBEA allows such *de novo* interstate branching only if state law expressly permits it. This restriction makes entry both more expensive and less flexible, because entry is possible only via acquisition of existing banks or branches.

The fourth restriction is prohibition of the acquisition of single branches by out-of state banks. IBBEA states that an out-of-state bank may acquire branches of an in-state bank, without

acquiring the entire bank, only if the state permits such acquisitions. Similar to the third restriction, this restriction makes entry both more expensive and less flexible, because to acquire desired branches out-of-state banks may also have to acquire undesired branches and other portions of in-state banks.

States may amend their restrictions on interstate branching over time. Fifteen states amended their initial restrictions after the 1997 trigger date.

Following Rice and Strahan (2010), we construct an index of these four restrictions on interstate branching for each state in each year from 1994 to 2005. The index, denoted *RESTR*, is the sum of four zero-one indicator variables: *MINAGE* equals one if a state imposes a minimum age of three years or more on target institutions; *DEPCAP* equals one if a state imposes a deposit cap of less than 30%; *DENOVO* equals one if a state does not permit *de novo* interstate branching; and *SGLBR* equals one if a state prohibits the acquisition of single branches by out-of-state banks. *RESTR* ranges from zero (the greatest threat of entry) to four (the least threat of entry).[5]

Strahan (2003) and Rice and Strahan (2010) argue that differential deregulation on interstate branching across states, while shaped by a political process involving the relative influence of small versus large banks and other factors, represents an "ideal laboratory" or "instrument" to identify the effects of changes in banks' competitive environment. For example, Rice and Strahan provide evidence that this process was uncorrelated with the demand for credit. This setting has been used in numerous studies to identify the effect of competition on banking market structure (Dick 2006; Johnson and Rice 2008), banks' cost or profit efficiency (Koetter et

[5] Some states had not finalized their restrictions on interstate branching by 1994 or 1995. Following Tara Rice's suggestion, we code the branching restriction index for these state-year observations as four, the least threat of entry.

al. 2012), small business finance (Rice and Strahan 2010), and private firms' borrowing and investment (Zarutskie 2006).

None of the evidence in the literature suggests that the political process that led to these deregulatory events was associated with incumbent banks' pre-existing or intended loan loss provision timeliness. For this reason, we argue these events constitute a natural experiment for the purposes of this study. Nevertheless, we conduct robustness analysis showing that our reported results are robust to controlling for six variables affecting the political process identified by Rice and Strahan (2010), as well as related robustness analyses described in Section 5.4.

2.3. Loan Loss Provisions

An extensive empirical literature documents that banks' loan loss provisions, along with their supplemental financial and regulatory report disclosures, provide information to investors about the performance and creditworthiness of banks' loan portfolios (Wahlen 1994; Liu and Ryan 1995; Liu et al. 1997; Docking et al. 1997; Ahmed et al. 1999; Kanagaretnam et al. 2004). These findings obtain despite the fact that FAS 5's incurred loss model—which allows banks to recognize loan losses only if they are "incurred", "probable", and "can be reasonably estimated"—delays loan loss provisions to greater or lesser extent depending on the type of loan and other factors. See Ryan (2012a, Section 3) for a recent survey of this empirical literature and extensive discussion of FAS 5.

This literature also shows that loan loss provisions have a strong positive association with future changes in non-performing loans for the average bank, indicating that these provisions are a relatively timely measure of credit losses on loans, and documenting significant variation in loan loss provision timeliness across banks and time (Gambera 2000; Nichols et al. 2009; Beatty

and Liao 2011; Bhat et al. 2012; Bushman and Williams 2012a,b; Bushman et al. 2013). This literature further finds that banks that record timelier loan loss provisions generate various specific benefits for themselves and the overall financial system: less pro-cyclical lending (Beatty and Liao 2011; Bhat et al. 2012), lower leverage, less risk-shifting (exploitation of deposit insurance), less exposure to balance sheet contraction, and less contribution to system-wide balance-sheet contraction (Bushman and Williams 2012a,b).

Given these benefits, the existence of significant variation in the timeliness of loan loss provisions across banks and time suggests that banks perceive timely loan loss provisioning to involve costs. We examine one specific cost in this study—potential entrants may use incumbent banks' loan loss provisions to make inferences about their loan underwriting quality in deciding whether to enter the incumbents' markets.

2.4. Hypothesis Development

Although credit histories, scores, or ratings are available for many consumer and corporate borrowers, a pervasive problem in banking is that potential borrowers know more about their current creditworthiness and future prospects than do lenders. Moreover, the extent of this information asymmetry varies across banks, with incumbent banks being more knowledgeable than potential entrants. For example, loan agreements usually grant existing lenders the right to inspect borrowers' properties and books (Taylor and Sansone 2007), and checking account agreements usually grant these lenders the right to receive detailed accounts receivable and inventory information (Mester et al. 2007). Even ignoring their existing customer relationships, incumbents have greater local market knowledge. This knowledge provides incumbents with insight into the credit risks of loan applicants, enabling them to make better

decisions regarding whether and at what interest rate and other terms to grant credit than can potential entrants (Gan and Riddiough 2008). Potential entrants generally have to incur significant costs to acquire customer relationships or local market knowledge. Berger and Dick (2007) provide evidence that entrants invest heavily in branch networks to gain access to borrowers, depositors, and local market knowledge, and that these investments cause entrants' information disadvantage to decline gradually over time.

Prior research shows that incumbent banks' information advantage over potential entrants has significant effects on banking industry structure and conduct (Dell'Ariccia et al. 1999; Marquez 2002; Dell'Ariccia and Marquez 2004, 2006, 2008). This advantage provides incumbents with market power. In extreme cases, fear of the "winner's curse" renders potential entrants unwilling to provide credit to incumbents' borrowers (Rajan 1992; Dell'Ariccia and Marquez 2004).

Incumbent banks with better loan underwriting quality leave fewer profitable lending opportunities for potential entrants. Hence, potential entrants should attempt to determine whether incumbents' loan underwriting quality is sufficiently low that entering the local loan origination market would be profitable.

We argue that incumbent banks exercise discretion to reduce the timeliness of their bad news provisions, but not their good news provisions, to appear to have good underwriting quality and thereby dissuade potential entrants from entering their loan origination markets. Logically, potential entrants might infer one of three primary non-discretionary drivers of incumbents' provisions for loan losses, holding other information about incumbent banks' economic loan losses constant: (1) loan underwriting quality, (2) the arrival of news about loan performance

after loan origination, and (3) FAS 5's accounting requirements.[6] The first two drivers pertain to the level of incumbents' economic loan losses and the third pertains to the timeliness of incumbents' reported loan loss provisions. Below, we describe the different inferences that potential entrants likely would make about these drivers from bad versus good news provisions.

Potential entrants are likely to assign considerable probability that poor loan underwriting quality causes bad news loan loss provisions, but are unlikely to assign much probability that good underwriting quality causes good news provisions. The reason is it is far easier for incumbents with poor loan underwriting quality to write loans for which they underestimate credit losses than for either incumbents with poor (good) loan underwriting quality to write loans for which they overestimate (accurately estimate) credit losses. This is the winner's curse problem mentioned above. Potential entrants likely assign similar probability that the arrival of bad (good) news after loan origination causes bad (good) news loan provisions.

Potential entrants are unlikely to assign much probability that FAS 5 causes bad news loan loss provisions, but may infer that FAS 5 causes good news loan loss provisions, because the standard's three conditions for recording losses require banks to compile sufficient evidence of loan default before recording loan loss provisions. These conditions actively work against banks recording timely bad news provisions, and may yield good news loan loss provisions.

Based on the discussion above, we expect potential entrants to ascribe bad news loan loss provisions first to bad underwriting quality, second to bad luck, and third to FAS 5. We expect potential entrants to ascribe good news loan loss provisions first to good luck, second to FAS 5, and third to good loan underwriting quality. Consistent with these expectations, in a validation

[6] Prior research documents numerous discretionary drivers of banks' loan loss provisions and related inferences by market participants about banks' health and other characteristics that we do not discuss here; see Ryan (2012a, Section 3.3) for a recent summary of this research.

test we show that timelier bad news loan loss provisions lead to more entry but that timelier good news loan loss provisions have no effect on entry.[7]

We argue that an incumbent bank's decisions regarding the timeliness of its bad news loan loss provisions should reflect a trade-off between the benefits associated with less procyclical lending and risk-taking and the costs of encouraging more entry. The cost of incurring more entry increases when deregulation intensifies entry threats, tilting incumbents' incentives toward reducing the timeliness of their bad news loan loss provisions. This yields our first hypothesis:

> *H1a: The timeliness of incumbents' bad news loan loss provisions decreases with the threat of entry by out-of-state banks into incumbents' local markets.*

> *H1b: The timeliness of incumbents' good news loan loss provisions has no association with the threat of entry by out-of-state banks into incumbents' local markets.*

We refer to hypotheses H1a and H1b collectively as H1.

Given the benefits of timelier loan loss provisions documented by the prior literature, we expect incumbent banks to reduce the timeliness of their provisions to deter entry only when potential entrants rely to a significant extent on those provisions to assess the returns to entering the incumbents' local loan origination markets. We expect this to occur primarily for heterogeneous (e.g., commercial and industrial) loans, for which relatively little information about the loans' creditworthiness is available outside of incumbent banks' financial and

[7] This finding rules out the possibility that potential entrants infer that incumbents have better post-origination credit risk modeling (Bhat et al. 2012) from timelier bad news loan loss provisions, which would discourage entry. Despite this fact, we control for size in our empirical models, because Bhat et al. find that bank size is the most significant determinant of the quality of credit risk modeling.

regulatory reports, local market knowledge is important to originate the loans effectively, and the winner's curse problem is significant.[8]

We also expect this to be more the case when the local loan origination market exhibits higher borrower turnover, which we proxy for using growth in non-government establishments. Marquez (2002) demonstrates that the information asymmetry between incumbent and potential entrant banks is mitigated by higher borrower turnover.

This discussion yields the following hypotheses:

H2a: Hypothesis H1a holds more strongly as the incumbent banks' proportion of heterogeneous loans increases.

H2b: Hypothesis H1a holds less strongly as borrower turnover in the local market increases.

We refer to hypotheses H2a and H2b collectively as H2.

3. Data and Research Design

3.1. Sample Selection and Matching of Treatment and Control Banks

Our sample selection is intended to address the three research-design challenges described in the introduction by yielding samples of treatment and control banks that are matched as closely as possible based on local markets and other characteristics but for which the two samples are subject to strictly different levels of interstate branching deregulation. We refer

[8] Alternatively, incumbents might believe that their information advantage for heterogeneous loans is so large that they are adequately protected against entry, and thus be less likely to defer bad news loan loss provisions. To rule out this possibility, for each county-year, we calculate the average proportion of commercial and industrial loans for all one-county banks, weighted by total assets, and next year's proportion of branches owned by out-of-state banks. We find that these variables are significantly positively correlated, consistent with incumbents being more exposed to entry on heterogeneous than homogeneous loans.

to the sample of banks with less (more) restricted interstate branching, as indicated by lower (higher) *RESTR*, as the treatment (control) sample.

We perform this matching at the county level, primarily because the banking literature conventionally treats counties as local markets (Gilbert and Kochin 1989; Clair et al. 1994; Prager and Hannan 1998; Berger et al. 1999; Rhoades 2000; Calomiris and Mason 2003; Ashcraft 2005; Garmaise and Moskowitz 2006; Huang 2008).[9] This convention is consistent with the geographical proximity of banks to most of their borrowers and depositors. For example, Petersen and Rajan (2002) report a median distance of five miles between small business borrowers and their primary lending banks during 1990-1993. The counties included in our sample have a median size of 587 square miles, so parties located five miles apart likely are located in the same county. To obtain variation in deregulation of interstate branching, however, we match contiguous counties of adjacent states with strictly different deregulation. Figure 1 depicts an example of such contiguous counties.

Tara Rice provided us with data on the four types of interstate branching restrictions by state from 1994 to 2005. For each year in this period, we identify pairs of neighboring states for which one state imposes all of the interstate branching restrictions that the other does and at least one additional restriction; we refer to the restrictions in the former state as "strictly tighter".[10] For a pair of states to be included in the sample, we require both states to have the same restrictions for at least one year during our sample period (we refer to these years as "pre-deregulation") and one state to have strictly tighter restrictions for at least three subsequent years

[9] Similar local geographic-matching approaches have been used in other social science literatures (Fox 1986; Card and Kruger 1994; Holmes 1998; Black 1999; Huber and Arceneaux 2007; Keele and Titiunik 2012).

[10] To illustrate, if state A imposes a minimum age of five years for in-state banks to be acquired by out-of-state banks and state B forbids *de novo* interstate branching and the acquisition of single branches of an institution, then we deem two states' restrictions to be not comparable even though state B has more restrictions. In contrast, if state C has the same minimum age requirement as state A and prohibits *de novo* interstate branching, then state C's restrictions are strictly tighter than those in state A.

(we refer to these years as "post-deregulation"). The first part of this requirement mitigates the heterogeneity of states in the pre-deregulation period. The second part provides a reasonable period of time in the post-deregulation period for incumbent banks to be subject to increased threat of entry by out-of-state banks and to adjust their loan loss provision timeliness accordingly. Table 1 lists the 68 state pairs meeting this requirement.

Allan Collard-Wexler provided us with contiguous county data. For each of the 68 state pairs, we identify pairs of contiguous counties of adjacent states, for a total of 734 county pairs. To further mitigate the heterogeneity of the treatment and control samples, and because proxies for competition nationwide or over other broad geographical areas do not capture local market competition (Ryan 2012b), we include only banks with branches in one county ("one-county banks") in these samples. We identify one-county banks using data on branch addresses from the annual Summary of Deposits (SOD) surveys of the Federal Deposit Insurance Corporation (FDIC). We include all one-county banks in each county pair with the necessary data in the pre- and post-deregulation periods in the corresponding treatment and control samples. If either county in a pair does not have any one-county banks with the necessary data in either the pre- or post-deregulation periods, we delete that pair for both periods. We obtain deposits by branch from the SOD surveys.

We obtain all financial variables for the one-county banks in the samples from the Commercial Bank Reports of Income and Condition (Call Reports). Chartered commercial banks must file these public reports annually with bank regulators. These reports contain banks' balance sheets, income statements (including loan loss provisions), and other information. Approximately 25% of the one-county banks in our sample are owned by multibank holding

companies; we find in untabulated analysis that eliminating these banks yields the same inferences as the reported empirical results.

We obtain data on county characteristics from the U.S. Census Bureau. Requiring available data for other test and control variables described below yields a final sample of 22,569 bank-year observations for our primary analyses. On average, the one-county banks in our sample hold 56% of the deposits in their counties in 1994, indicating that these banks play a significant role in the counties' economies.

In the variable designations described below, we denote firms by the subscript i, counties by the subscript c, states by the subscript s, and time by the subscript t.

3.2. Homogeneity of the Treatment and Control Samples

We match one-county banks in contiguous counties to mitigate heterogeneity of the treatment and control samples, except regarding deregulation of interstate branching, thereby increasing the power of our tests and the interpretability of our results. Our primary goal in this matching is to control for unobservable (or hard-to-observe) characteristics such as future growth opportunities, because we control for observable characteristics in the empirical models. Despite this fact, to provide some sense for how well this matching achieves this goal, we calculate the absolute values of differences in observable characteristics between the treatment and control samples in the last pre-deregulation year. We compare these calculated amounts to the absolute values of differences in observable characteristics between the treatment sample and three alternative reasonable but not as closely geographically or size-matched control samples in that year: (1) all one-county banks in states in the U.S. with the same restrictions on interstate branching as the original control states (i.e., the states of the original control banks), (2) all one-

state banks in the original control states, and (3) all one-state banks in states with the same restrictions on interstate branching as the original control states.

Specifically, we compute the average for all one-county banks in each treatment and control county of the natural logarithm of total assets (*SIZE*), total equity capital divided by total assets (*CAP*), earnings before loan loss provisions times 1000 divided by total assets (*EARNB*), loan loss provisions times 1000 divided by lagged total loans (*LLP*), commercial and industrial loans divided by total loans (*C&I*), total loans divided by total assets (*LOANS*), total deposits divided by total liabilities (*DEPOSITS*), and core deposits divided by total deposits (*CORE*). The Appendix provides detailed definitions of these and all other variables used in this study. We calculate the absolute values of the differences in these averages of each of these variables for each pair of contiguous treatment and control counties. Column 1 of Table 2 reports the means of these absolute values across all of the pairs of contiguous counties. Columns 2-4 of the table report the same statistics calculated using the three alternative control samples. Comparison of column 1 to the other three columns indicates that matching based on contiguous counties produces considerably smaller differences between treatment and control groups for all of these variables.

3.3. Validation that Timelier Bad News Loan Loss Provisions Increase Entry

In the hypothesis development, we argue that potential entrants are more likely to enter a local market when incumbent banks record timelier bad news loan loss provisions. We conduct analysis to validate this argument in this section. To do this, we develop proxies for the timeliness of bad news and good news loan loss provisions and for future entry at the county-year level.

We build the proxies for the timeliness of bad news and good news loan loss provisions up from the bank-year level. These proxies have two components, with the first component capturing loan loss provision timeliness and the second capturing whether the news about loan losses is bad or good. To calculate the first component in a simple fashion that reflects individual incumbent banks' loan loss provisioning in specific years, we measure loan loss provision timeliness for a bank-year as the loan loss provision divided by ten times the next-year change in non-performing loans.[11] We calculate the weighted average of this ratio for the bank-year observations in each county-year, where the weights equal individual banks' shares of the total assets of the banks in the county in that year. $TLRATIO_{ct}$ denotes these weighted-average ratios.

To calculate the second component, we create two zero-one indicator variables to distinguish bad news versus good news next-year changes in non-performing loans; $BNEW_{it+1}$ ($GNEW_{it+1}$) equals one if the next-year change in non-performing loans is positive (negative) for each bank-year observation. We calculate weighted averages of $BNEW_{it+1}$ and $GNEW_{it+1}$ across the bank-year observations in each county-year, where the weights are the same as before. We create two zero-one indicator variables to distinguish county-years that primarily experience bad and good news changes in non-performing loans: $BNEWC_{ct+1}$ ($GNEWC_{ct+1}$) equals one if the weighted average of $BNEW_{it+1}$ is greater (less) than 0.5.

The proxy for future entry by out-of-state banks in county c in year t is the change from year t to year t+3 in the proportion of branches in the county that are owned by out-of-state banks, denoted $\Delta OUTST_{ct+3}$. We use a three-year window to allow time for out-of-state banks to enter

[11] We multiply the next-year change in non-performing loans by ten for the sole purpose of making the coefficients in the validation models easier to report. Similar variable scalings elsewhere in the paper serve similar purposes.

the incumbents' local markets. In untabulated analysis, we find the use of alternative windows to measure $\Delta OUTST$ and defining entry in terms of the change in out-of-state banks' share of deposits in the county yield the same inferences as the reported empirical results.

To determine the relationship between the timeliness of incumbent banks' bad news and good news loan loss provisions and out-of-state banks' entry, we regress $\Delta OUTST_{ct+3}$ on $BNEWC_{ct+1}$, $TLRATIO_{ct}$, the interactions between $BNEWC_{ct+1}$ and $TLRATIO_{ct}$ and between $GNEWC_{ct+1}$ and $TLRATIO_{ct}$, and control variables that capture other drivers of local market entry by out-of-state banks discussed below.

$$\begin{aligned}\Delta OUTST_{ct+3} = {} & \phi_0 + \phi_1 BNEWC_{ct+1} + \phi_2 TLRATIO_{ct} \times BNEWC_{ct+1} + \phi_3 TLRATIO_{ct} \times GNEWC_{ct+1} \\ & + \phi_4 RESTR_{st} + \phi_5 NBIZ_{ct} + \phi_6 HHI_{ct} + \phi_7 BKRUPTB_{st} + \phi_8 BKRUPTC_{st} \\ & + \phi_9 UNEMPL_{ct} + \eta_s + \delta_t + \varepsilon_{ct}.\end{aligned} \tag{1}$$

Because the dependent variables (as well as most of the explanatory variables) are measured at the county-year level, we must estimate equation (1) at that level. Naturally, the state-year level control variables discussed below take the same value for all of the corresponding county-years.

We expect incumbent banks that record timelier bad news loan loss provisions to experience increased entry, and thus the coefficient ϕ_2 on $TLRATIO_{ct} \times BNEWC_{ct+1}$ in equation (1) to be positive. In contrast, we expect timelier good news loan loss provisions to have no effect on entry, and thus the coefficient ϕ_3 on $TLRATIO_{ct} \times GNEWC_{ct+1}$ to be zero. We include the uninteracted $BNEWC_{ct+1}$ to ensure that the sign of the news alone does not drive either ϕ_2 or ϕ_3. We have no expectations for the coefficient ϕ_1 on $BNEWC_{ct+1}$.[12]

Equation (1) includes the following control variables. The state-level interest branching restriction index ($RESTR_{st}$) controls for the level of barriers to entry through interstate branching.

[12] Entry could be induced by either bad or good news, depending on the type of investor. For example, bad news might attract Warren Buffett-type value investors, while good news might attract growth investors.

The county-level number of non-government establishments in thousands ($NBIZ_{ct}$) controls for local market size. The county-level Herfindahl-Hirschman index of deposit concentration (HHI_{ct}) controls for the existing level of competition in the local market. State-level business and consumer bankruptcy rates ($BKRUPTB_{st}$ and $BKRUPTC_{st}$, respectively) and the county-level unemployment rate ($UNEMPL_{ct}$) control for economic conditions in the local market. We expect negative coefficients on all of the control variables except for $NBIZ_{ct}$, on which we expect a positive coefficient. We include state fixed effects (η_s) and year fixed effects (δ_t) to capture other local market and time-related factors. Unless indicated otherwise, we say that a coefficient or other statistic is statistically significant when the significance level is 5% or better in a two-tailed test.

Panels A and B of Table 3 report the descriptive statistics and correlation matrix, respectively, for the variables in equation (1), with all variables measured at the county-year level. The average change in the proportion of branches owned by out-of-state banks from year t to year t+3 ($\Delta OUTST_{ct+3}$) is 0.057. The average timeliness ratio ($TLRATIO_{ct}$) is 0.006. $\Delta OUTST_{ct+3}$ is significantly negatively correlated with the interstate branching restriction index, $RESTR_{st}$, consistent with deregulation increasing entry.

Table 4 reports the estimation of equation (1). With the exception of $BKRUPTB_{st}$, the coefficients on the control variables all have the expected signs. The coefficients on $NBIZ_{ct}$ and HHI_{ct} are significant.

We find that $\Delta OUTST_{ct+3}$ is significantly positively associated with incumbent banks' bad news loan loss provisions, as evidenced by a significantly positive coefficient ϕ_2 on $TLRATIO_{ct} \times BNEWC_{ct+1}$ (t=5.0). In contrast, we find that $\Delta OUTST_{ct+3}$ is not associated with incumbent banks' good news loan loss provisions, as evidenced by an insignificant coefficient ϕ_3

on $TLRATIO_{ct} \times GNEWC_{ct+1}$. These coefficients are significantly different (t=2.2). These results indicate that timelier recognition of bad news loan loss provisions by incumbent banks increases entry into local markets by out-of-state banks.[13]

3.4. Approach for Testing Hypothesis H1

Hypothesis H1 posits that the threat of entry by out-of-state banks is inversely related to the timeliness of incumbents' bad news loan loss provisions (H1a), but not to the timeliness of their good news provisions (H1b). Similar to prior research (Gambera 2000; Nichols et al. 2009; Beatty and Liao 2011; Bhat et al. 2012; Bushman and Williams 2012a, 2012b), we measure the timeliness of loan loss provisions, LLP_{it}, as the strength of their association with the next-year change in non-performing loans, ΔNPL_{it+1}.[14] To test both hypotheses H1a and H1b, we distinguish increases and decreases in year-ahead non-performing loans, $BNEW_{it+1}$ and $GNEW_{it+1}$. We incorporate the state-level interstate branching restriction index, $RESTR_{st}$, because we expect that incumbent banks in states more subject to entry through interstate branching record less timely bad news loan loss provisions.

Specifically, we regress the loan loss provision for year t times 1000 divided by year t-1 total loans, LLP_{it}, on $BNEW_{it+1}$, ΔNPL_{it+1}, $RESTR_{st}$, interactions among these variables and also among $GNEW_{it+1}$ and the latter two variables, and control variables described below:

[13] Somewhat relatedly, we considered the possibility that incumbent banks managed their loan loss provisions to influence the likelihood that they were M&A targets as a consequence of IBBEA. Using the Federal Reserve's Commercial Bank database, we identified 491 bank-year observations of acquired incumbent banks in our sample (2.2% of the sample). Inconsistent with this possibility, we find that an indicator variable for these observations is insignificantly correlated with similar measures of the timeliness of good news and bad news loan loss provisions as described in this section.

[14] This approach is similar in motivation to Basu's (1997) approach to estimating timely loss recognition. It is not subject to concerns with using (endogenous) stock returns as the measure of news, however.

$$
\begin{aligned}
LLP_{it} = {} & \gamma_0 + \gamma_1 BNEW_{it+1} + \gamma_2 RESTR_{st} \times BNEW_{it+1} + \gamma_3 RESTR_{st} \times \Delta NPL_{it+1} \times BNEW_{it+1} \\
& + \gamma_4 \Delta NPL_{it+1} \times BNEW_{it+1} + \gamma_5 RESTR_{st} \times GNEW_{it+1} + \gamma_6 RESTR_{st} \times \Delta NPL_{it+1} \times GNEW_{it+1} \\
& + \gamma_7 \Delta NPL_{it+1} \times GNEW_{it+1} + \gamma_8 \Delta NPL_{it} + \gamma_9 \Delta NPL_{it-1} + \gamma_{10} \Delta NPL_{it-2} + \gamma_{11} NPL_{it-3} \\
& + \gamma_{12} LLA_{it-1} + \gamma_{13} LLP_{it-1} + \gamma_{14} CAP_{it} + \gamma_{15} EARNB_{it} + \gamma_{16} SIZE_{it} + \gamma_{17} BKRUPTB_{st} \\
& + \gamma_{18} BKRUPTC_{st} + \gamma_{19} UNEMPL_{ct} + \eta_s + \delta_t + \eta_s \times \Delta NPL_{it+1} + \delta_t \times \Delta NPL_{it+1} + \varepsilon_{it} .
\end{aligned}
\tag{2}
$$

We are primarily interested in the coefficient γ_3 on $RESTR_{st} \times \Delta NPL_{it+1} \times BNEW_{it+1}$, which hypothesis H1a predicts is positive, because banks better protected from entry through interstate branching should record more timely loan loss provisions. In contrast, hypothesis H1b predicts the coefficient γ_6 on $RESTR_{st} \times \Delta NPL_{it+1} \times GNEW_{it+1}$ is zero. We include the other variables involving $BNEW_{it+1}$, $GNEW_{it+1}$, ΔNPL_{it+1}, and $RESTR_{st}$ to ensure that their omission does not drive the estimates of γ_3 and γ_6. Since restrictions on interstate branching are imposed at the state level, we calculate standard errors clustering observations by state.

To ensure that these estimates reflect the timeliness of the current loan loss provision rather than other factors, equation (2) includes control variables appearing in the prior literature (e.g., Beatty and Liao 2011) or that are motivated by our contiguous-county research design. To allow for serial correlation of changes in non-performing loans, we control for the similarly defined changes in nonperforming loans in the prior three years (ΔNPL_{it}, ΔNPL_{it-1}, and ΔNPL_{it-2}) as well as the year t-3 level of nonperforming loans divided by year t-4 total loans, denoted NPL_{t-3}, to capture any further lags. To allow banks' past loan loss reserving to affect their current loan loss provisions, we control for banks' prior loan loss reserving using the year t-1 loan loss allowance and provision divided by year t-2 total loans (LLA_{it-1} and LLP_{it-1}, respectively). To incorporate incumbent banks' incentives to exercise discretion over loan loss provisions, we control for equity capital divided by total assets (CAP_{it}), earnings before loan loss provisions divided by year t-1 total assets ($EARNB_{it}$), and the logarithm of total assets in

millions of dollars ($SIZE_{it}$).[15] While the economic conditions in contiguous counties likely are similar, to capture any differences we control for the state-level business and consumer bankruptcy rates ($BKRUPTB_{st}$ and $BKRUPTC_{st}$, respectively) and the county-level unemployment rate ($UNEMPL_{ct}$).

Equation (2) also includes state fixed effects, η_d, and year fixed effects, δ_t, to control for differences in the level of loan loss provisions across states and time, respectively.[16] Finally, the equation includes interactions of ΔNPL_{it+1} with the state (time) fixed effects to control for differences of loan loss provision timeliness across states (time).

The research design we use to test hypothesis H1—which constructs matched treatment and control groups of banks in contiguous counties of adjacent states and includes the control variables and fixed effects described above in equation (2)—controls for both *observable* and, more importantly, *unobservable* factors affecting interstate branching deregulation and/or incumbent banks' loan loss provision timeliness. Specifically, the matched groups and fixed effects control for *unobservable* location- and time-related factors. To illustrate, one such unobservable factor is expected future growth in the state or local economies. States anticipating growth are more likely to deregulate banking (Kroszner and Strahan 1999). Banks may delay recognition of expected losses to attract external financing for their investment opportunities. Contiguous counties should be similar in their expected future growth and other unobservable factors; to the extent they are not, the state fixed effects capture time-invariant location-related differences.

[15] Moyer (1990), Beatty et al. (1995), Collins et al. (1995), Kim and Kross (1998), Ahmed et al. (1999), and Liu and Ryan (2006) and others provide evidence that banks manage one or both of capital and earnings using loan loss provisions.

[16] Replacing the state fixed effects with bank fixed effects yields similar results.

Our approach is substantially similar to the differences-in-differences research design used extensively in research in accounting and other social sciences.[17] See Gormley et al. (2012, pp. 173-174) for extensive discussion of this point in the context of an analogous research setting—how entry by foreign banks into India affects borrowers' timely loss recognition—and research design.

3.4. Approach for Testing Hypothesis H2

Hypothesis H2 posits that the strength of the inverse relation between the threat of entry by out-of-state banks and the timeliness of incumbents banks' bad news loan loss provisions increases with the incumbents' proportion of heterogeneous loans (H2a) and decreases with borrower turnover in the local loan origination market (H2b). To test hypothesis H2a (H2b), we partition the full sample into above- and below-median heterogeneous loans (borrower turnover) subsamples. Specifically, we compute the average of commercial and industrial loans divided by total loans for the one-county banks in each contiguous county pair across the sample period and partition the country pairs into above- and below-median subsamples. Similarly, we compute the average growth of the number of non-government establishments in each continuous county pair across the sample period and partition the county pairs into above- and below-median subsamples.[18] We expect a more positive coefficient γ_3 on $RESTR_{st} \times \Delta NPL_{it+1} \times BNEW_{it+1}$ for the subsamples of contiguous county pairs with an above-median proportion of heterogeneous loans or below-median borrower turnover than for the other subsamples. We expect a zero coefficient γ_6 on $RESTR_{st} \times \Delta NPL_{it+1} \times GNEW_{it+1}$ in all subsamples.

[17] Examples of studies employing the difference-in-difference research design include Jayaratne and Strahan (1996, 1998), Bertrand and Mullainathan (2003), Dick (2006), Zarutskie (2006), Beck et al. (2010), Giroud and Mueller (2010), Callen et al. (2010), Koetter et al. (2012), and Armstrong et al. (2012).

[18] Alternatively, in untabulated analyses we partitioned based on growth in population or employment in non-government establishments, both of which yield the same inferences as the reported results.

4. Empirical Results

4.1. Descriptive Statistics and Correlations

Panels A and B of Table 5 report descriptive statistics and correlations, respectively, for the variables in equation (2) for the overall (i.e., combined treatment and control) sample; due to the large number of interactive variables in the equation, we only include statistics for the uninteracted variables. The average total assets of banks in our sample is $74 million, consistent with one-county banks being small. The mean (median) of earnings before loan loss provisions times 1000 divided by total assets ($EARNB_{it}$) is 13.757 (12.425); this low return on assets reflects banks' high financial leverage, which yields normal return on equity. The average branching restriction index is 3.035, indicating that the average bank in the sample is exposed to over three of the four interstate branching restrictions.

The correlations of LLP_{it} with the explanatory variables in equation (2) generally are consistent with those reported in prior studies. For example, LLP_{it} is significantly positively correlated with $EARNB_{it}$, consistent with income smoothing, and also with CAP_{it}, consistent with more solvent banks reserving more for loan losses. LLP_{it} is significantly positively correlated with the current and two prior year changes in non-performing loans ($\Delta NPL_{it}, \Delta NPL_{it-1}, \Delta NPL_{it-2}$), NPL_{it-3}, and the two bankruptcy variables, consistent with banks reserving more for loan losses when economic loan losses are higher. Perhaps surprisingly, however, LLP_{it} is significantly negatively correlated with the year-ahead change in non-performing loans (ΔNPL_{it+1}). This could be attributable to LLP_{it}'s high correlation with net loan charge-offs, since charge-offs reduce non-performing loans.

4.2. Regression Analyses

Table 6 reports the OLS estimation of equation (2). Hypothesis H1a posits that incumbent banks located in states with greater restrictions on interstate branching record timelier bad news loan loss provisions, while hypothesis H1b posits that these banks do not record differentially timely good news loan loss provisions. Consistent with both hypotheses, the coefficient on $RESTR_{st} \times \Delta NPL_{it+1} \times BNEW_{it+1}$ is significantly positive (t=2.2), while the coefficient on $RESTR_{st} \times \Delta NPL_{it+1} \times GNEW_{it+1}$ is insignificant. These coefficients are not quite significantly different, however (t=1.6). The coefficients on the control variables generally are as expected. For example, as in prior research (Wahlen 1994; Ahmed et al. 1999; Kanagaretnam et al. 2004; Bushman and Williams 2012a; Kilic et al. 2012), we find a significant positive coefficient on $EARNB_{it}$, consistent with the sample banks smoothing their income using loan loss provisions.

Table 7 reports the OLS estimation of equation (2) partitioning the overall sample into above- and below-median subsamples based on incumbent banks' proportion of commercial and industrial loans. Hypothesis H2a posits that incumbents that write more heterogeneous loans record less timely bad news loan loss provisions to reduce entry by out-of-state banks. Consistent with this hypothesis, the coefficient on $RESTR_{st} \times \Delta NPL_{it+1} \times BNEW_{it+1}$ is significantly positive in the high commercial and industrial loans subsample (t=3.8) and insignificant in the other subsample. These two coefficients are significantly different (t=3.6).

Interestingly, the coefficients on both $\Delta NPL_{it+1} \times BNEW_{it+1}$ and $\Delta NPL_{it+1} \times GNEW_{it+1}$ are significantly positive in the low commercial and industrial loans subsample. These coefficients likely reflect the fact that provisions for homogeneous loans, which rise as these loans become

delinquent but are not yet nonperforming, predict near-term changes in non-performing loans more strongly than do provisions for heterogeneous loans, as explained by Ryan (2012a).

Table 8 reports the OLS estimation of equation (2) partitioning the overall sample into above- and below-median subsamples based on a proxy for borrower turnover, growth in the number of non-government enterprises, in incumbent banks' counties. Hypothesis H2b posits that incumbent banks with lower borrower turnover record less timely bad news loan loss provisions. Consistent with this hypothesis, the coefficient on $RESTR_{st} \times \Delta NPL_{it+1} \times BNEW_{it+1}$ is significantly positive (t=3.1) in the low borrower turnover subsample and insignificant in the other subsample. These two coefficients are significantly different (t=2.0).

In summary, the results of estimating equation (2) uniformly support hypotheses H1 and H2.

5. Robustness Analyses

We conducted a number of robustness analyses for equation (2) in addition to the results reported in Tables 6-8. To conserve space, we tabulate only the standard difference-in-difference analyses discussed in Section 5.6. Our inferences are unaffected by all of these analyses.

5.1. An Alternative Measure of Economic Loan Losses

In our primary analyses, we use the next-year change in non-performing loans to proxy for economic loan losses. Alternatively, we proxy for economic loan losses by the sum of the next-year change in non-performing loans and next-year net loan charge-offs. This proxy captures the fact that loan charge-offs reduce non-performing loans, all else being equal.

5.2. Overall Health of Incumbent Banks

A possible alternative explanation for our results is that incumbent banks record lower loan loss provisions in an attempt to appear overall healthier (more solvent and profitable), rather than as better loan originators. We include $CAP_{it} \times \Delta NPL_{it+1}$ and $EARNB_{it} \times \Delta NPL_{it+1}$ in equation (2) to rule out this alternative explanation.

5.3. Interaction between the Proportion of Heterogeneous Loans and Borrower Turnover

We partition the sample into four subsamples based on the intersection of above- versus below-median splits for both incumbent banks' proportion of heterogeneous loans and borrower turnover in incumbent banks' counties. We estimate equation (2) for these four subsamples, and find that the coefficient on $RESTR_{st} \times \Delta NPL_{it+1} \times BNEW_{it+1}$ is significantly positive only in the subsample with both high proportion of heterogeneous loans and low borrower turnover. This indicates that incumbent banks can deter entry only when they have substantial information advantage regarding their existing borrowers *and* new borrowers arise relatively slowly.

5.4. Additional Drivers of the Interstate Branching Deregulation

Entry barriers arise in part from political processes shaped by interest group lobbying and ideologies (Economides et al. 1996; Kroszner and Strahan 1999; Rice and Strahan 2010). This raises the concern that a state's (de)regulation of interstate branching may be correlated with variation in the incentives of banks in the state to record timely loan loss provisions. We performed three tests to rule out this possibility.

First, in our main analyses, we include state fixed effects in equation (2) to capture persistent factors in a state, such as industry composition. Second, following Kroszner and Strahan (1999), we calculate six variables related to the deregulation of *intrastate* branch banking, which should be shaped by related political processes in the year before the passage of IBBEA (1993): (1) the size of the insurance sector relative to banking, (2) small bank share of all banking assets in a state, (3) the relative capital-to-asset ratios of small versus large banks, (4) the fraction of small nonfinancial firms, (5) whether a state is controlled by Democrats, and (6) the share of state legislature that is Democrat. We correlate these six variables with our interstate branching deregulation index, *RESTR*. Consistent with Rice and Strahan (2010), we find that only the small bank share of all banking assets in a state and is significantly correlated with *RESTR*. Third, we include six these variables as well as their interactions with ΔNPL_{it+1} in equation (2).[19]

5.5. Additional Controls

We considered various bank and county characteristics that might affect the timeliness of incumbent banks' loan loss provisions, both separately and interacted with ΔNPL_{it+1}, in equation (2). The bank characteristics are a zero-one indicator variable that equals one if a bank's financial report is audited, a zero-one indicator variable that equals one if the bank is controlled by a multi-bank holding company, and the bank's proportions of commercial and industrial, agriculture, consumer, and real estate loans. The county characteristics are a zero-one indicator variable that equals one if a county belongs to a Metropolitan Statistical Area and the murder rate

[19] We exclude the state fixed effects and state fixed effects interacted with ΔNPL_{it+1} in this specification of equation (2).

in a county. The murder rate likely is related to credit risk because violent crime diminishes economic prosperity (Henderson 1999).

5.6. Standard Difference-in-Difference Design

As discussed in Section 3.3, our research design is very similar to a difference-in-difference design. We performed a more typically structured difference-in-difference design to corroborate our primary results. We first sort the overall sample observations into four subsamples: the control group in the pre-deregulation period (4,129 observations), the control group in the post-deregulation period (7,678 observations), the treatment group in the pre-deregulation period (3,949 observations), and the treatment group in the post-deregulation period (6,813 observations). We then estimate an equation similar to equation (2) but without the inclusion of interactions with *RESTR*, fixed effects, and other features discussed in Section 3.3 for the four subsamples. We report the coefficients on $\Delta NPL_{it+1} \times BNEW_{it+1}$ for the four subsamples as well as the salient differences in these coefficients and significance levels in Table 9. We find that the coefficient on $\Delta NPL_{it+1} \times BNEW_{it+1}$ is significantly positive and insignificantly different for the control and treatment groups in the pre-regulation period. From the pre- to the post-regulation periods, the coefficient $\Delta NPL_{it+1} \times BNEW_{it+1}$ drops significantly for the treatment group (t=2.9) but does not change significantly for the control group, yielding a significant difference in the coefficient across the two groups in the post-deregulation period (t=2.0).

5.7. Clustering by Shared Borders of Adjacent States

In the primary analyses, we calculate standard errors clustering bank-year observations by state, which adjusts for the correlation of these observations due to interstate branching

deregulation or other common events. Banks in contiguous counties of adjacent states also likely experience common events. To capture this source of cross-correlation, we instead calculate standard errors clustering bank-year observations by shared border of adjacent states.

5.8. Weighted Least Squares

We estimated equation (2) using weighted least squares, where the weights are the number of banks in each county-year.

6. Conclusion

While the specific benefits of timelier loan loss provisioning to banks and the financial system as a whole are relatively well understood, the specific costs to banks are not. We argue that potential entrants to local loan origination markets use the information in incumbent banks' loan loss provisions to assess the incumbents' loan underwriting quality and thus the desirability of market entry. We further argue that, to forestall entry, the incumbents adjust the timeliness of their loan loss provisions. We exploit an exogenous increase in the threat of entry arising from the removal of state-level restrictions on interstate branching in the U.S. during 1994–2005 to conduct a natural experiment. We employ a research design that compares one-county banks in contiguous counties of adjacent states with strictly different interest branching deregulation.

We first conduct a validation analysis which shows that counties with incumbent banks that record timelier bad news (but not good news) loan loss provisions experience more entry by out-of-state banks in the following three years. We then show that, consistent with our hypotheses, incumbent banks operating in states that eliminate restrictions on interstate branching delay recognition of bad news (but not good news) loan loss provisions, and that this

discretionary behavior is concentrated among banks in counties with a high proportion of heterogeneous loans and a low degree of borrower turnover.

Our evidence suggests that credit competition plays a significant role in bank's discretionary loan loss provisioning. Accordingly, extant proposals to require timelier provisions may entail unintended consequences for the competitiveness of individual banks.

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APPENDIX
Variable Definitions

Bank variables:	
LLP	Provision for loan and lease losses (RIAD4230) multiplied by 1000 and divided by lagged total loans (RCFD1400).
NPL	The sum of total loans and lease finance receivables nonaccrual (RCFD1403) and total loans and lease finance receivables past due 90 days or more and still accruing (RCFD1407) divided by lagged total loans (RCFD1400).
ΔNPL	Change of *NPL*.
BNEW	An indicator variable that takes the value of one if $\Delta NPL \geq 0$.
GNEW	An indicator variable that takes the value of one if $\Delta NPL < 0$.
LLA	Allowance for loan and lease losses (RCFD3123) divided by lagged total loans (RCFD1400).
SIZE	The logarithm of total assets (RCFD2170) in millions of U.S. dollars.
CAP	Total equity capital (RCFD3210) divided by total assets (RCFD2170).
EARNB	The sum of income before extraordinary items and other adjustments (RIAD4300) and provision for loan and lease losses (RIAD4230). multiplied by 1000 and divided by total assets (RCFD2170).
C&I	Commercial and industrial loans (RCFD1600) divided by total loans (RCFD1400)
LOANS	Total loans (RCFD1400) divided by total assets (RCFD2170).
DEPOSITS	Total deposits (RCFD2200) divided by total liabilities, which are calculated as total assets (RCFD2170) minus total equity capital (RCFD3210).
CORE	Core deposits divided by total deposits (RCFD2200). Core deposits are total deposits minus the aggregate balance of each deposit account with a balance of more than $100,000 (RCON2710).
State variables:	
MINAGE	An indicator variable that takes the value of one if a state imposes a minimum age of three years or more on target institutions.
DEPCAP	An indicator variable that takes the value of one if a state imposes a statewide cap of less than 30% on deposits that any one bank could hold.
DENOVO	An indicator variable that takes the value of one if a state does not permit out-of-state banks to open new branches.
SGLBR	An indicator variable that takes the value of one if a state disallows out-of-state banks from acquiring single branches or portions of a banking institution.
RESTR	The sum of *MINAGE*, *DEPCAP*, *DENOVO*, and *SGLBR*.

BKRUPTB	The number of business bankruptcy filings divided by the number of non-government establishments.
BKRUPTC	The number of consumer bankruptcy filings divided by the number of population.

County variables:

TLRATIO	Timeliness ratio at the county-year level, calculated as the average of the timeliness ratio of all one-county banks in that county for each year, weighted by each bank's total assets. A bank's timeliness ratio is loan loss provisions divided by next year's change in non-performing loans, divided by 10.
BNEWC	An indicator variable that takes the value of one if the mean of *BNEW* of all one-county banks in that county for each year, weighted by each bank's total assets, is greater than or equal to 0.5.
GNEWC	An indicator variable that takes the value of one if the mean of *BNEW* of all one-county banks in that county for each year, weighted by each bank's total assets, is less than 0.5.
ΔOUTST	The change in the proportion of branches owned by out-of-state banks in a county.
NBIZ	The number of non-government establishment in a county, divided by 1000.
HHI	Herfindahl-Hirschman Index of deposit concentration among banks in a county.
UNEMPL	Unemployment rate.

Note: Call Report variable designations are in parentheses

Figure 1
Contiguous Counties of Neighboring States with
Strictly Different Interstate Branching Deregulation

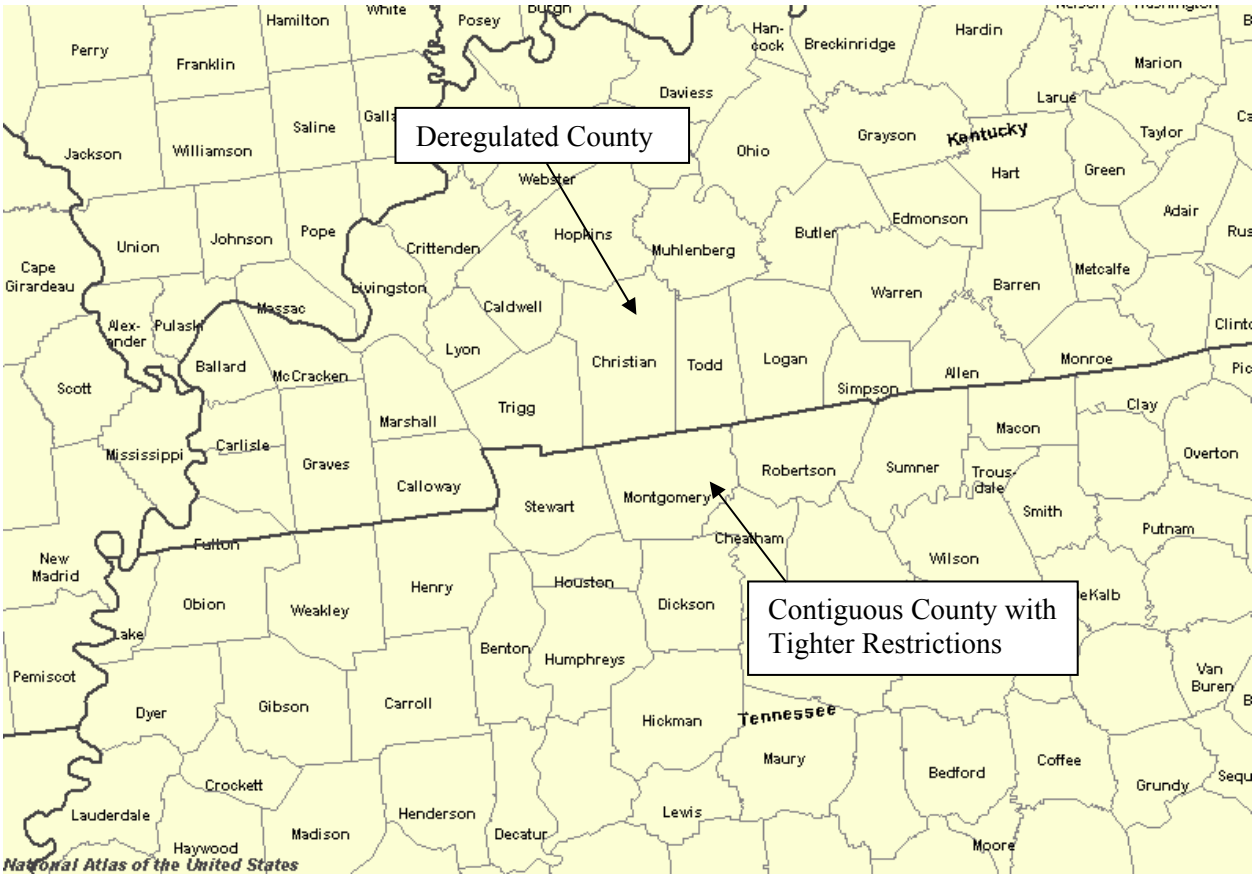

Table 1
Adjacent States Exhibiting Strictly Different Interstate Branching Deregulation

Border	Period	Less Restricted State	Restr-iction Index	More Restricted State	Restr-iction Index
1	1997-2005	Alabama	3	Mississippi	4
2	1998-2001	Tennessee	2	Alabama	3
	2002-2005	Tennessee	1	Alabama	3
3	1997-2001	Arizona	3	Colorado	4
	2002-2005	Arizona	2	Colorado	4
4	1995-2001	Utah	2	Arizona	4
	1997-2005	Utah	2	Arizona	3
5	1997-2005	Louisiana	3	Arkansas	4
6	2000-2005	Oklahoma	1	Arkansas	4
7	1997	Tennessee	3	Arkansas	4
	1998-2001	Tennessee	2	Arkansas	4
	2002-2005	Tennessee	1	Arkansas	4
8	2000-2005	Texas	1	Arkansas	4
9	1996-2005	New Mexico	3	Colorado	4
10	2000-2005	Oklahoma	1	Colorado	4
11	1995-2000	Utah	2	Colorado	4
	2001-2005	Utah	1	Colorado	4
12	1997-2005	Wyoming	3	Colorado	4
13	1995-1996	Connecticut	1	New York	4
	1997-2005	Connecticut	1	New York	2
14	1995-2005	Rhode Island	0	Connecticut	1
15	1996-2005	Maryland	0	Delaware	3
16	1996-2005	New Jersey	1	Delaware	3
17	1996-2005	Pennsylvania	0	Delaware	3
18	1996	North Carolina	0	Georgia	4
	1997-2005	North Carolina	0	Georgia	3
19	1998-2001	Tennessee	2	Georgia	3
	2002-2005	Tennessee	1	Georgia	3
20	1996-2005	Nevada	3	Idaho	4
21	1998-2005	Oregon	3	Idaho	4
22	1995-2000	Utah	2	Idaho	4
	2001-2005	Utah	1	Idaho	4
23	1996-2004	Washington	3	Idaho	4
	2005	Washington	1	Idaho	4
24	1997-2005	Wyoming	3	Idaho	4
25	1997	Indiana	0	Illinois	4
	1998	Indiana	0	Illinois	3
	1999-2004	Indiana	1	Illinois	3
26	1998-2004	Illinois	3	Iowa	4
	2005	Illinois	0	Iowa	4
27	1998-2004	Illinois	3	Missouri	4
	2005	Illinois	0	Missouri	4
28	1997-1998	Indiana	0	Kentucky	4
	1999	Indiana	1	Kentucky	4
29	1999-2005	Ohio	0	Indiana	1
30	1997-2005	Minnesota	3	Iowa	4
31	1996-2005	South Dakota	3	Iowa	4
32	1996-2005	Wisconsin	3	Iowa	4
33	2000-2005	Oklahoma	1	Kansas	4
34	2000-2005	Kentucky	3	Missouri	4
35	1997-1999	Ohio	0	Kentucky	4
	2000-2005	Ohio	0	Kentucky	3
36	1997	Tennessee	3	Kentucky	4
	1998-1999	Tennessee	2	Kentucky	4
37	1996-1999	Virginia	0	Kentucky	4
	2000-2005	Virginia	0	Kentucky	3
38	1997-1999	West Virginia	1	Kentucky	4
	2000-2005	West Virginia	1	Kentucky	3
39	1997-2005	Louisiana	3	Mississippi	4
40	1997-1999	Louisiana	3	Texas	4
41	1997-2000	Maine	0	New Hampshire	4
	2001	Maine	0	New Hampshire	1
42	1996	Maryland	0	West Virginia	4
	1997-2005	Maryland	0	West Virginia	1
43	1997-2000	Massachusetts	1	New Hampshire	4
44	1997-2005	Massachusetts	1	New York	2
45	1995-1996	Rhode Island	0	Massachusetts	4
	1997-2005	Rhode Island	0	Massachusetts	1
46	1997	Tennessee	3	Mississippi	4
	1998-2001	Tennessee	2	Mississippi	4
	2002-2005	Tennessee	1	Mississippi	4
47	2000-2005	Oklahoma	1	Missouri	4
48	1997	Tennessee	3	Missouri	4
	1998-2001	Tennessee	2	Missouri	4
	2002-2005	Tennessee	1	Missouri	4
49	1997-2003	North Dakota	3	Montana	4
	2004-2005	North Dakota	1	Montana	4
50	1996-2005	South Dakota	3	Montana	4
51	1997-2005	Wyoming	3	Montana	4
52	1996-2005	South Dakota	3	Nebraska	4
53	1997-2005	Wyoming	3	Nebraska	4
54	1995-2005	Utah	2	Nevada	4
	1996-2000	Utah	2	Nevada	3
55	1996-2000	Vermont	2	New Hampshire	4
	2001	Vermont	0	New Hampshire	1
56	1996	New Jersey	1	New York	4
	1997-2005	New Jersey	1	New York	2
57	1996-2005	Pennsylvania	0	New Jersey	1
58	1996-1999	New Mexico	3	Oklahoma	4
59	1996-1999	New Mexico	3	Texas	4
60	1995-2005	Utah	2	New Mexico	4
	1996-2000	Utah	2	New Mexico	3
61	1996	Pennsylvania	0	New York	4
	1997-2005	Pennsylvania	0	New York	2
62	1996	North Carolina	0	South Carolina	4
	1997-2005	North Carolina	0	South Carolina	3
63	1996	North Carolina	0	Tennessee	4
	1997	North Carolina	0	Tennessee	3
	1998-2001	North Carolina	0	Tennessee	2
	2002-2005	North Carolina	0	Tennessee	1
64	1997-2005	Ohio	0	West Virginia	1
65	1996	Pennsylvania	0	West Virginia	4
	1997-2005	Pennsylvania	0	West Virginia	1
66	1996	Virginia	0	Tennessee	4
	1997	Virginia	0	Tennessee	3
	1998-2001	Virginia	0	Tennessee	2
	2002-2005	Virginia	0	Tennessee	1
67	1995-2005	Utah	2	Wyoming	4
	1997-2000	Utah	2	Wyoming	3
68	1996	Virginia	0	West Virginia	4
	1997-2005	Virginia	0	West Virginia	1

Table 2
Benefits of Using Matched Treatment and Control Samples of One-County Banks from Contiguous Counties of Neighboring States with Strictly Different Interstate Branching Deregulation

	Absolute Value of the Difference Between One-County Banks in Treatment Sample and			
	Original Control Sample of One-County Banks in Contiguous Counties	One-County Banks in any State with Same Regulation as Original Control State	One-State Banks in Original Control State	One-State Banks in any State with Same Regulation as Original Control State
	(1)	(2)	(3)	(4)
	Mean	Mean	Mean	Mean
SIZE	0.672	0.781	0.960	1.128
CAP	0.025	0.028	0.030	0.033
EARNB	4.239	5.011	4.754	13.154
LLP	4.451	5.353	4.344	6.411
C&I	0.063	0.077	0.080	0.098
LOANS	0.102	0.118	0.129	0.138
DEPOSITS	0.036	0.038	0.049	0.055
CORE	0.071	0.081	0.082	0.099
	(5)	(6)	(7)	(8)
	Median	Median	Median	Median
SIZE	0.523	0.653	0.743	0.884
CAP	0.017	0.019	0.021	0.022
EARNB	2.442	3.045	3.043	3.651
LLP	2.016	2.261	2.466	2.538
C&I	0.045	0.060	0.058	0.074
LOANS	0.090	0.098	0.107	0.113
DEPOSITS	0.019	0.020	0.024	0.024
CORE	0.052	0.065	0.062	0.076

Table 3
Descriptive Statistics for the Validation Test

Panel A: Summary Statistics for the Sample at the County-Year Level

Variable	Mean	STD	P25	Median	P75
$\Delta OUTST_{ct+3}$	0.057	0.128	0.000	0.000	0.095
$BNEWC_{ct+1}$	0.490	0.500	0.000	0.000	1.000
$TLRATIO_{ct} \times BNEWC_{ct+1}$	0.137	2.229	0.000	0.000	0.032
$TLRATIO_{ct} \times GNEWC_{ct+1}$	-0.130	1.457	-0.048	0.000	0.000
$RESTR_{st}$	2.921	1.420	2.000	4.000	4.000
$NBIZ_{ct}$	2.812	5.636	0.331	0.685	2.132
HHI_{ct}	0.262	0.154	0.161	0.224	0.320
$BKRUPTB_{st}$	0.006	0.005	0.004	0.005	0.007
$BKRUPTC_{st}$	0.005	0.002	0.003	0.005	0.006
$UNEMPL_{ct}$	5.280	2.135	3.700	4.800	6.300

Panel B: Pearson Correlation Matrix for the Sample at the County-Year Level

	$\Delta OUTST_{ct+3}$	$BNEWC_{ct+1}$	$TLRATIO_{ct} \times BNEWC_{ct+1}$	$TLRATIO_{ct} \times GNEWC_{ct+1}$	$RESTR_{st}$	$NBIZ_{ct}$	HHI_{ct}	$BKRUPTB_{st}$	$BKRUPTC_{st}$
$BNEWC_{ct+1}$	-0.046*								
$TLRATIO_{ct} \times BNEWC_{ct+1}$	0.036*	0.063*							
$TLRATIO_{ct} \times GNEWC_{ct+1}$	0.008	0.087*	0.006						
$RESTR_{ct}$	-0.041*	0.024*	0.007	-0.011					
$NBIZ_{ct}$	0.156*	-0.037*	0.002	0.008	-0.220*				
HHI_{ct}	-0.110*	0.020*	-0.017	-0.042*	0.122*	-0.281*			
$BKRUPTB_{st}$	-0.023*	-0.020*	0.001	-0.049*	0.048*	-0.001	0.083*		
$BKRUPTC_{st}$	-0.012	0.015	0.004	-0.018	-0.317*	-0.067*	0.008	-0.077*	
$UNEMPL_{ct}$	0.028*	-0.020*	0.008	0.029*	0.029*	-0.095*	0.105*	-0.037*	0.147*

Notes: N=7,435. *Denotes significance at the 10% level (using a two-tailed test).

Table 4
Loan Loss Provision Timeliness and Out-of-State Bank Entry

	$\Delta OUTST_{ct+3}$
$BNEWC_{ct+1}$	-0.009**
	(2.56)
$TLRATIO_{ct} \times BNEWC_{ct+1}$	0.002***
	(5.07)
$TLRATIO_{ct} \times GNEWC_{ct+1}$	0.001
	(1.15)
$RESTR_{st}$	-0.009*
	(1.85)
$NBIZ_{ct}$	0.002***
	(7.31)
HHI_{ct}	-0.095***
	(3.56)
$BKRUPTB_{st}$	0.552
	(0.97)
$BKRUPTC_{st}$	-2.204
	(0.42)
$UNEMPL_{ct}$	-0.000
	(0.09)
Constant	0.091*
	(1.96)
State FE	Yes
Year FE	Yes
Observations	7435
Adj. R-squared	0.133

Notes: The table reports the estimation of equation (1). The absolute values of the t statistics are calculated clustering observations by state are presented in parentheses.* (**) [***] denotes significance at the 0.10 (0.05) [0.01] level in a two-tailed test. Variables are defined in the Appendix.

Table 5
Descriptive Statistics for the Main Analyses

Panel A: Summary Statistics for the Sample at the Bank-Year Level

Variable	Mean	STD	P25	Median	P75
LLP_{it}	0.335	0.447	0.015	0.177	0.419
$RESTR_{st}$	3.035	1.301	3.000	4.000	4.000
$BNEW_{it+1}$	0.500	0.500	0.000	0.000	1.000
ΔNPL_{it+1}	0.000	0.010	-0.004	0.000	0.003
ΔNPL_{it}	0.000	0.011	-0.004	0.000	0.003
ΔNPL_{it-1}	-0.001	0.011	-0.005	0.000	0.003
ΔNPL_{it-2}	-0.001	0.012	-0.005	0.000	0.003
NPL_{it-3}	0.013	0.015	0.002	0.008	0.019
LLP_{it-1}	0.004	0.009	0.000	0.002	0.004
LLA_{it-1}	0.018	0.024	0.011	0.015	0.020
CAP_{it}	0.109	0.040	0.083	0.098	0.122
$EARNB_{it}$	0.014	0.009	0.009	0.012	0.016
$SIZE_{it}$	4.307	1.010	3.566	4.200	4.931
$BKRUPTB_{st}$	0.007	0.006	0.004	0.006	0.007
$BKRUPTC_{st}$	0.005	0.002	0.003	0.004	0.006
$UNEMPL_{ct}$	5.172	1.938	3.800	4.800	6.100

Panel B: Pearson Correlation Matrix for the Sample at the Bank-Year Level

	LLP_{it}	$RESTR_{st}$	$BNEW_{it+1}$	ΔNPL_{it+1}	ΔNPL_{it}	ΔNPL_{it-1}	ΔNPL_{it-2}	NPL_{it-3}	LLP_{it-1}	LLA_{it-1}	CAP_{it}	$EARNB_{it}$	$SIZE_{it}$	$BKRUPTB_{st}$	$BKRUPTC_{st}$
$RESTR_{st}$	0.007														
$BNEW_{it+1}$	-0.064*	0.030*													
ΔNPL_{it+1}	-0.072*	0.016*	0.664*												
ΔNPL_{it}	0.079*	0.003	-0.180*	-0.304*											
ΔNPL_{it-1}	0.087*	-0.013*	-0.029*	-0.049*	-0.278*										
ΔNPL_{it-2}	0.052*	-0.033*	-0.051*	-0.052*	-0.040*	-0.253*									
NPL_{it-3}	0.148*	0.029*	-0.095*	-0.075*	-0.129*	-0.198*	-0.437*								
LLP_{it-1}	0.598*	-0.006	-0.044*	-0.039*	-0.058*	0.079*	0.066*	0.192*							
LLA_{it-1}	0.152*	0.053*	-0.029*	-0.042*	-0.044*	0.066*	0.029*	0.247*	0.310*						
CAP_{it}	0.055*	-0.056*	0.015*	-0.008	-0.002	0.002	0.022*	-0.005	0.120*	0.225*					
$EARNB_{it}$	0.474*	0.043*	0.004	0.014*	0.002	0.010	0.006	0.030*	0.525*	0.232*	0.263*				
$SIZE_{it}$	0.168*	-0.203*	-0.036*	-0.023*	-0.005	-0.012*	-0.006	0.043*	0.212*	0.085*	-0.020*	0.304*			
$BKRUPTB_{st}$	0.203*	0.074*	0.000	-0.003	-0.003	-0.002	-0.018*	0.123*	0.235*	0.088*	0.118*	0.247*	0.087*		
$BKRUPTC_{st}$	0.035*	-0.298*	0.002	0.014*	0.027*	0.050*	0.061*	-0.085*	-0.022*	-0.077*	0.002	-0.036*	-0.018*	-0.099*	
$UNEMPL_{ct}$	0.008	0.050*	-0.004	-0.007	-0.007	0.000	-0.005	0.092*	-0.030*	-0.009	-0.036*	-0.046*	-0.015*	-0.087*	0.170*

Notes: N=22,569. *Denotes significant at the 10% level in a two-tailed test.

Table 6
Interstate Branching Restrictions and Loan Loss Provision Timeliness

	LLP_{it}
$BNEW_{it+1}$	0.023
	(0.09)
$RESTR_{st} \times BNEW_{it+1}$	-0.033
	(0.61)
$RESTR_{st} \times \Delta NPL_{it+1} \times BNEW_{it+1}$	17.506**
	(2.16)
$\Delta NPL_{it+1} \times BNEW_{it+1}$	5.928
	(0.16)
$RESTR_{st} \times GNEW_{it+1}$	-0.012
	(0.14)
$RESTR_{st} \times \Delta NPL_{it+1} \times GNEW_{it+1}$	2.087
	(0.24)
$\Delta NPL_{it+1} \times GNEW_{it+1}$	12.397
	(0.30)
ΔNPL_{it}	77.860***
	(10.60)
ΔNPL_{it-1}	84.964***
	(15.94)
ΔNPL_{it-2}	78.090***
	(9.70)
NPL_{it-3}	69.226***
	(9.01)
LLP_{it-1}	0.204***
	(23.07)
LLA_{it-1}	-14.266***
	(5.06)
CAP_{it}	-7.862***
	(9.25)
$EARNB_{it}$	0.115***
	(14.87)
$SIZE_{it}$	0.034
	(0.45)
$BKRUPTB_{st}$	-4.421
	(1.25)
$BKRUPTC_{st}$	118.542
	(1.33)

$UNEMPL_{ct}$	0.043
	(1.47)
Constant	-0.390
	(0.50)
State FE	Yes
Year FE	Yes
State FE×ΔNPL_{it+1}	Yes
Year FE×ΔNPL_{it+1}	Yes
Observations	22569
Adj. R-squared	0.475

Notes: The table reports the estimation of equation (2). The absolute values of the t-statistics based on the standard errors clustered by state are presented in parentheses. * (**) [***] denotes significant at the 0.10 (0.05) [0.01] level in a two-tailed test. Variables are defined in the Appendix.

Table 7
Partition by Proportion of Commercial and Industrial Loans

	Proportion of C&I Loans	
	High	*Low*
$BNEW_{it+1}$	0.236	-0.231
	(0.72)	(0.80)
$RESTR_{st} \times BNEW_{it+1}$	-0.136	0.027
	(1.53)	(0.42)
$RESTR_{st} \times \Delta NPL_{it+1} \times BNEW_{it+1}$	44.892***	-2.145
	(3.83)	(0.31)
$\Delta NPL_{it+1} \times BNEW_{it+1}$	-57.662	283.464***
	(1.29)	(3.91)
$RESTR_{st} \times GNEW_{it+1}$	-0.016	-0.069
	(0.14)	(0.85)
$RESTR_{st} \times \Delta NPL_{it+1} \times GNEW_{it+1}$	15.237	-10.799
	(0.97)	(1.12)
$\Delta NPL_{it+1} \times GNEW_{it+1}$	4.103	263.537***
	(0.07)	(3.73)
ΔNPL_{it}	76.588***	79.899***
	(13.90)	(6.09)
ΔNPL_{it-1}	86.416***	83.649***
	(15.44)	(9.44)
ΔNPL_{it-2}	76.731***	80.245***
	(16.20)	(5.56)
NPL_{it-3}	71.399***	66.467***
	(7.78)	(4.69)
LLP_{it-1}	0.203***	0.206***
	(11.23)	(24.09)
LLA_{it-1}	-20.145***	-12.712***
	(2.82)	(5.98)
CAP_{it}	-6.332***	-9.232***
	(3.78)	(9.06)
$EARNB_{it}$	0.114***	0.117***
	(11.00)	(13.74)
$SIZE_{it}$	0.103	-0.056
	(0.95)	(0.73)
$BKRUPTB_{st}$	-8.254	-2.554
	(0.20)	(0.74)
$BKRUPTC_{st}$	163.828	80.939
	(1.47)	(0.86)

$UNEMPL_{ct}$	0.006	0.088**
	(0.18)	(2.40)
Constant	-0.848	0.301
	(1.01)	(0.37)
State FE	Yes	Yes
Year FE	Yes	Yes
State FE×ΔNPL_{it+1}	Yes	Yes
Year FE×ΔNPL_{it+1}	Yes	Yes
Observations	11244	11325
Adj. R-squared	0.305	0.601

Notes: The table reports the estimation of equation (2) for subsamples of county pairs for which incumbent banks have above- versus below-median proportions of commercial and industrial loans. The absolute values of the t-statistics based on the standard errors clustered by state are presented in parentheses. * (**) [***] denotes significant at the 0.10 (0.05) [0.01] level in a two-tailed test. Variables are defined in the Appendix.

Table 8
Partitioning by Growth in the Number of Non-government Establishments

	Growth in the Number of Non-government Establishments	
	Low	*High*
$BNEW_{it+1}$	0.338	-0.313
	(0.72)	(1.36)
$RESTR_{st} \times BNEW_{it+1}$	-0.073	0.015
	(0.78)	(0.23)
$RESTR_{st} \times \Delta NPL_{it+1} \times BNEW_{it+1}$	27.837***	2.365
	(3.07)	(0.19)
$\Delta NPL_{it+1} \times BNEW_{it+1}$	56.294*	34.973
	(1.98)	(0.60)
$RESTR_{st} \times GNEW_{it+1}$	0.060	-0.090
	(0.46)	(1.30)
$RESTR_{st} \times \Delta NPL_{it+1} \times GNEW_{it+1}$	12.609	-12.461
	(0.95)	(1.46)
$\Delta NPL_{it+1} \times GNEW_{it+1}$	65.670	38.299
	(1.54)	(0.81)
ΔNPL_{it}	74.677***	81.748***
	(10.57)	(7.43)
ΔNPL_{it-1}	88.224***	80.337***
	(16.45)	(8.79)
ΔNPL_{it-2}	85.679***	71.278***
	(11.59)	(5.24)
NPL_{it-3}	80.964***	60.378***
	(15.79)	(3.92)
LLP_{it-1}	0.199***	0.210***
	(15.60)	(14.18)
LLA_{it-1}	-35.958***	-12.218***
	(3.57)	(6.73)
CAP_{it}	-7.795***	-7.982***
	(4.21)	(9.98)
$EARNB_{it}$	0.124***	0.111***
	(7.28)	(13.66)
$SIZE_{it}$	0.023	0.051
	(0.19)	(0.63)
$BKRUPTB_{st}$	-16.502	-3.680
	(0.49)	(1.00)
$BKRUPTC_{st}$	147.602	143.717
	(1.50)	(1.20)

$UNEMPL_{ct}$	0.025	-0.000
	(0.54)	(0.00)
Constant	-0.801	0.133
	(0.66)	(0.16)
State FE	Yes	Yes
Year FE	Yes	Yes
State FE×ΔNPL_{it+1}	Yes	Yes
Year FE×ΔNPL_{it+1}	Yes	Yes
Observations	11293	11276
Adj. R-squared	0.329	0.594

Notes: The table reports the estimation of equation (2) for subsamples of county pairs for which the paired counties have below- versus above-median growth in the number of non-government establishments. The absolute values of the t-statistics based on the standard errors clustered by state are presented in parentheses. * (**) [***] denotes significant at the 0.10 (0.05) [0.01] level in a two-tailed test. Variables are defined in the Appendix.

Table 9
Standard Difference-in-Differences Approach

	control	*treatment*	*control minus treatment*
pre-deregulation	66.876**	77.224***	-10.348
	(2.24)	(5.82)	(-0.32)
	[4129]	[3949]	
post-deregulation	60.587***	20.773	39.814**
	(4.52)	(1.46)	(2.04)
	[7678]	[6813]	
pre-deregulation minus post- deregulation	6.289	56.451***	
	(0.19)	(2.90)	

Notes: The table presents selected results from the estimation of an equation similar to equation (2)—but without the inclusion of interactions with *RESTR*, fixed effects, and other features—for the control and treatment groups in the pre- and post-deregulation periods. Specifically, the table reports the coefficients on $\Delta NPL_{it+1} \times BNEW_{it+1}$, salient differences of these coefficients across the four samples, and significance levels. The absolute values of the t-statistics based on the standard errors clustered by state are presented in parentheses. The number of observations in each subsample is presented in square brackets. * (**) [***] denotes significant at the 0.10 (0.05) [0.01] level in a two-tailed test. Variables are defined in the Appendix.