Finance and Economics Discussion Series
Divisions of Research & Statistics and Monetary Affairs
Federal Reserve Board, Washington, D.C.

Where Are All the New Banks? The Role of Regulatory Burden in New Charter Creation

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2014-113

Where Are All The New Banks? The Role of Regulatory Burden in New Bank Formation

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New bank formation in the U.S. has declined dramatically since the financial crisis, from well over 100 new banks per year to less than 1. Many have suggested that this is due to newly-instituted regulation, but the current weak economy and low interest rates (which both depress banking profits) could also have played a role. We estimate a model of bank entry decisions on data from 1976 to 2013 which indicates that at least 75% of the decline in new bank formation would have occurred without any regulatory change. The standalone effect of regulation is more difficult to quantify.

Key words: Bank Competition, Bank entry, Regulation

First Draft: April 2014
This Draft: January 5, 2016

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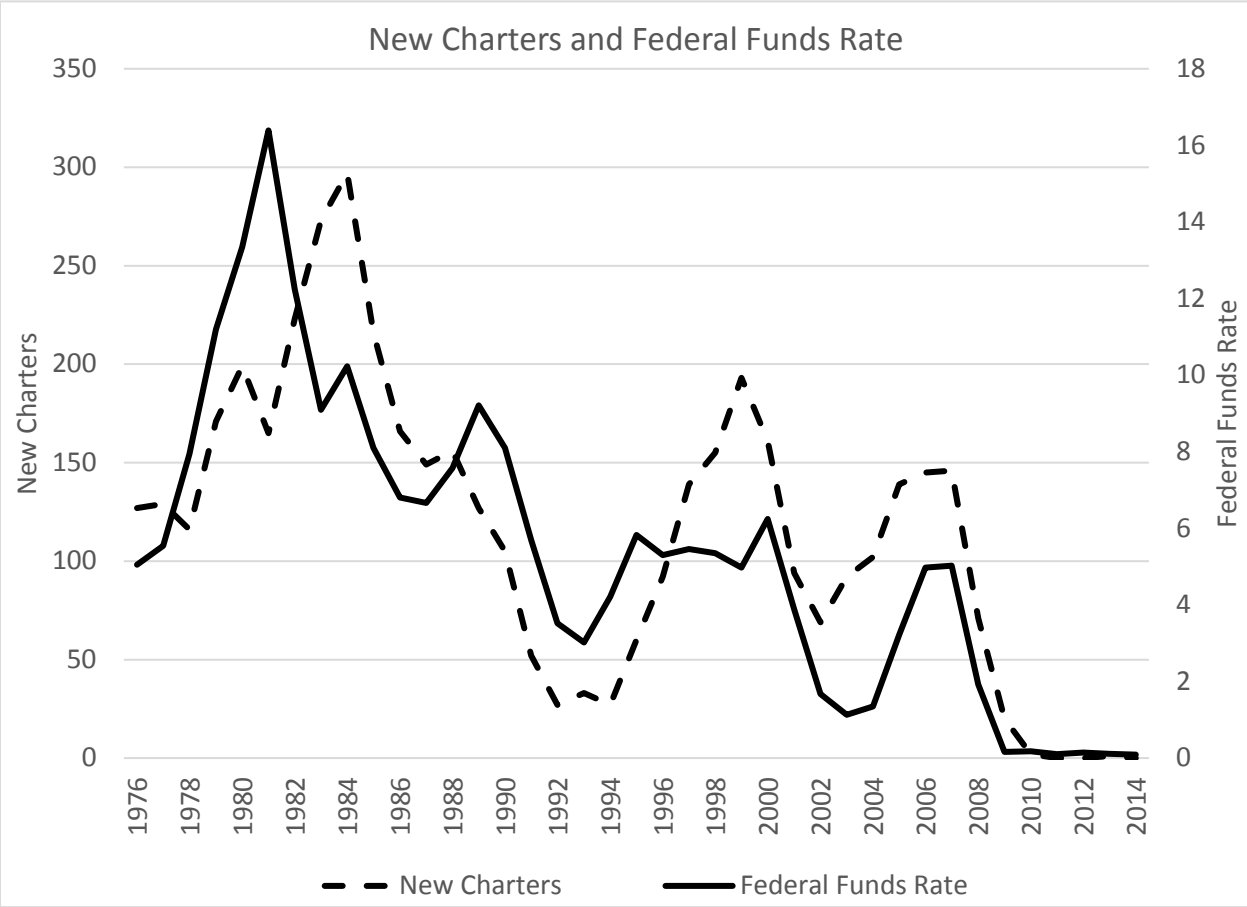
1. Introduction

The rate of new bank formation in the United States (the dashed line in Figure 1) declined dramatically in recent years. From 1976 to 2009, the average number of new banks formed each year exceeded 130, and some years saw the formation of nearly 300 new institutions. From 2010 to 2015, however, only 4 new banks were formed.[2]

Figure 1



[2] By "new bank" we mean a *de novo* enterprise, rather than a newly-formed subsidiary of an existing bank.

This dramatic reduction in the flow of new bank charters could be a concern for policymakers if, as some have suggested, the decline has been caused by the increased regulatory burden that was instituted in response to the recent financial crisis. Numerous regulations have been passed since the financial crisis: some affecting large banks; some affecting small banks; and some affecting both. These regulations include rules on capital, lending, regulatory compliance, and charter formation, among others. Collectively these regulations -- as well as uncertainty around their interpretation, enforcement, and future extension -- may have depressed banking profits, and thus new bank supply, to historically low levels.[3]

Other factors besides regulation, however, may have contributed to the decline in new bank charters. In particular, the macro economy has been weak since the financial crisis, which can reduce bank profits in at least two ways. First, the weak economy has introduced a low interest rate environment (the solid line in Figure 1), which diminishes new banks' ability to earn spread interest.[4] As seen in Figure 1, a strong correlation exists between interest rates and new entry.[5] Second, a weak economy may diminish household and business demand for banking services such as loans and deposit-taking services. If factors such as these have depressed entry, there may be less cause for concern that regulation is driving supply to such low levels.

The aim of this paper is to understand how much of the recent decline in new bank formation is attributable to increased regulatory burden as opposed to other factors.[6] We model banks' entry decisions using time- and geography-varying determinants of prospective profit,[7] and then use the

[3] One manifestation of these opinions was Senator Pat Toomey's comments at Federal Reserve Chair Janet Yellen's Senate Confirmation hearing in the fall of 2013. Senator Toomey specifically attributed the lack of new charters to the increased regulatory burden in recent years and asked the future Chair to address the issue.
[4] Evidence of this is presented later in this paper (Figure 2).
[5] Interest rates could be considered "regulation" in that the Federal Reserve Board sets the federal funds rate. However, this is not the sort of *prudential* regulation that we mean by "regulation" and "regulatory burden."
[6] Such as the weak economy, low interest rates, and weak banking demand.
[7] Such as consumer income, GDP, population, regulation, interest rates, and consumer creditworthiness.

model to predict the level of new bank formation absent any effect from post-crisis regulatory change. The results suggests that most of the current decline in new charters – approximately 75% or more in our preferred specifications – can be explained by non-regulatory factors. Whether or not regulation has had a constraining effect is harder to determine due to its contemporaneity with other factors.

The remainder of the paper proceeds as follows: Section 2 discusses the existing literature on bank entry and profitability. Section 3 presents information on new charter formation, as well as relevant trends in bank profitability and branch expansion. Section 4 discusses our model of new banking entry, and Section 5 discusses the data we use to estimate the model. Section 6 describes our results and model predictions, and Section 7 concludes.

2. Literature

The literature on new charter formation has focused largely on entry into local banking markets, the factors that affect the probability of entry, and competitive outcomes. Since retail banking markets have been and continue to be local in geographic scope, these studies generally use local market conditions as profitability and entry determinants. Such determinants have included demographics, market growth, market concentration, and recent merger activity.

In one of the earliest studies, Hanweck (1971) considered new charter formations in 1968 and 1969. He showed that larger and less concentrated banking markets have significantly more charter formations. Such a result is consistent with most equilibrium models of entry. Other early papers include Boczar (1975) and Rose (1977), who focused on very restrictive samples from Florida and Texas respectively.

Three more recent studies -- Seelig and Critchfield (2003), Berger et al. (2004), and Keeton (2000) -- considered new charter formation in urban markets and the effects of mergers. They found that greater merger activity and stronger local demand conditions are both associated with greater entry.

Amel and Liang (1997) and Adams and Amel (2007) also focused on bank competition and local market determinants of entry, and considered both branch expansion and new charter formation. Amel and Liang examined bank profits and entry in over 2,000 banking markets from 1977-88. They established that local population, population growth, and high incumbent profits are strong determinants of entry.

Adams and Amel estimated a reduced-form model of bank entry from 1994 to 2008. Their paper likewise included measures of local market demand conditions, but also included past entry and strategic variables. They determined that local market demand conditions are correlated with higher entry probabilities, and that incumbent bank branch expansion and small bank presence deter entry. Contrary to the predictions of some static entry models, they found that past entry correlates positively with future entry, which suggests a role for persistent market-specific unobservables.

Cohen and Mazzeo (2007) estimated a static, single-period, cross-sectional Nash equilibrium across various geographic markets. They modeled aggregate entry decisions based on aggregate profitability determinants and found that banks of the same type (thrift, single market, and multi-market) compete with each other more intensely than they compete with banks of other types.

McCord and Prescott (2014) document that the recent decline in new charters is the main driver of the decline in the total number of domestic banks, as well as the shift upward in their size distribution. This underscores the structural effects on the industry that result from the slowdown in new entry.

Other papers discussing banking entry and competition include Amel and Liang (1990), Berger and Dick (2007), Jeon and Miller (2007), Stiroh and Strahan (2003). Useful discussions of entry in more general

contexts may be found in Bresnahan and Reiss (1991), Siegfried and Evans (1992), Siegfried and Evans (1994), and Sutton (1991).

3. Background on New Charter Formation and Banking Profitability

3.1 New Charter Formation

To begin accepting insured deposits, banks are required submit to a primary federal regulator's authority and to obtain insurance from the Federal Deposit Insurance Corporation (FDIC). Banks may open either with a federal charter, in which case their primary federal regulator is the Office of the Comptroller of the Currency (OCC), or with a state charter in which case the primary federal regulator is the Federal Reserve Board (FRB, for "member" banks) or the FDIC (for "nonmember" banks).

The filing fees and capital requirements for a new bank depend on state and charter type (see Appendix A). Georgia requires $3M in initial capital, New Jersey $6M. New York, which evaluates capital plans on a case-by-case basis, indicates that it may require over $30M in initial capital to start a successful bank in the New York City metropolitan area. The filing fees in all states are relatively modest compared to the capital requirements, with state medians of $3,000 and $1,500,000, respectively.

New banks also need to apply to the FDIC for participation in the deposit insurance fund in order to begin accepting insured deposits. In the application process, the FDIC collects information on business plans and capital plans, among other things, and requires that new charters abide by their business plans for an established period. In 2009, the required time was increased from three to seven years and this regulatory change is one that some industry observers have pointed to as having reduced the incentives to establish a new charter.

Once a charter is approved, it normally does not take long for a retail presence to be established. Indeed some charter-granting institutions require a physical branch to be opened within a certain number of months to avoid charter expiration.

New charters have a number of characteristics that make them unlike incumbents (Table 1).[8] [9]

Table 1

Mean Characteristics of New Banks and Incumbent Banks
Bank-Year Observations, 1994-2013

	New Charters	Incumbent, Low Asset (<$1 B)	Incumbent, High Asset (>=$1 B)
N	1712	169990	7280
Assets ($000)	$33,230	$131,100	$8,811,054
Deposits ($000)	$21,313	$108,663	$5,796,035
Single-Market Bank	94.9%	56.9%	11.0%
% Branches Rural	13.4%	46.0%	14.9%
% Branches MSA & Micropolitan [3]	86.6%	54.0%	85.1%
Net Interest Margin[1]	1.3%	3.7%	3.3%
Net Non-Interest Margin[2]	-4.1%	-2.3%	-1.7%
Fed Funds Holdings/Assets	21.8%	3.7%	1.0%
Loans/Assets	44.2%	62.8%	66.7%
Real Estate Loans/Assets	8.9%	21.5%	20.7%
C&I Loans/Assets	9.5%	7.7%	8.9%
Consumer Loans/Assets	1.9%	4.6%	2.2%
Securities/Assets	14.9%	14.6%	18.1%

[1] [(Interest Revenue) - (Interest Cost)] / Assets

[2] [(Non-Interest Revenue) - (Non-Interest Cost)] / Assets

[3] Micropolitan areas have a core urban population of 10,000 - 50,000.

[8] The table begins in 1994 when all series are available in regulatory filings.

[9] In this table (and other tables and figures) banks are considered "new charters" only in their first year of operation.

Newly chartered banks are significantly smaller, both by assets and deposits, than incumbents. They are more likely to be single-market banks and their initial branch placements are less likely to be rural than the average small bank. New charters earn smaller margins on both their interest and non-interest operations, and they also have rather different loan and asset holdings. They hold far more money in federal funds reserve deposits, and their overall lending is far below that of incumbent banks. [10]

3.2 Trends in Banking Profitability and Expansion

Three trends in banking profitability and incumbent expansion suggest (even before our econometric analysis) that factors other than regulation may be at work in depressing entry.

First, Figure 2 displays the federal funds rate and net interest margins of banks of various sizes and types.[11] Net interest margins are defined as the difference between interest revenue and interest costs, divided by total assets, and median annual values are shown. Large banks are those with $1B or more in assets; medium banks are those $250M - $1B in assets; and small banks are those with less than $250M.

[10] Other studies have also found differences between entrants and incumbents in non-banking contexts. For instance, Foster, Haltiwanger, and Syverson (2008) document that in certain manufacturing industries entrants are, on average, more productive than incumbents.

[11] Figure 2, Table 2, and Figure 3 begin in 1984 when all data are available in regulatory filings.

Figure 2

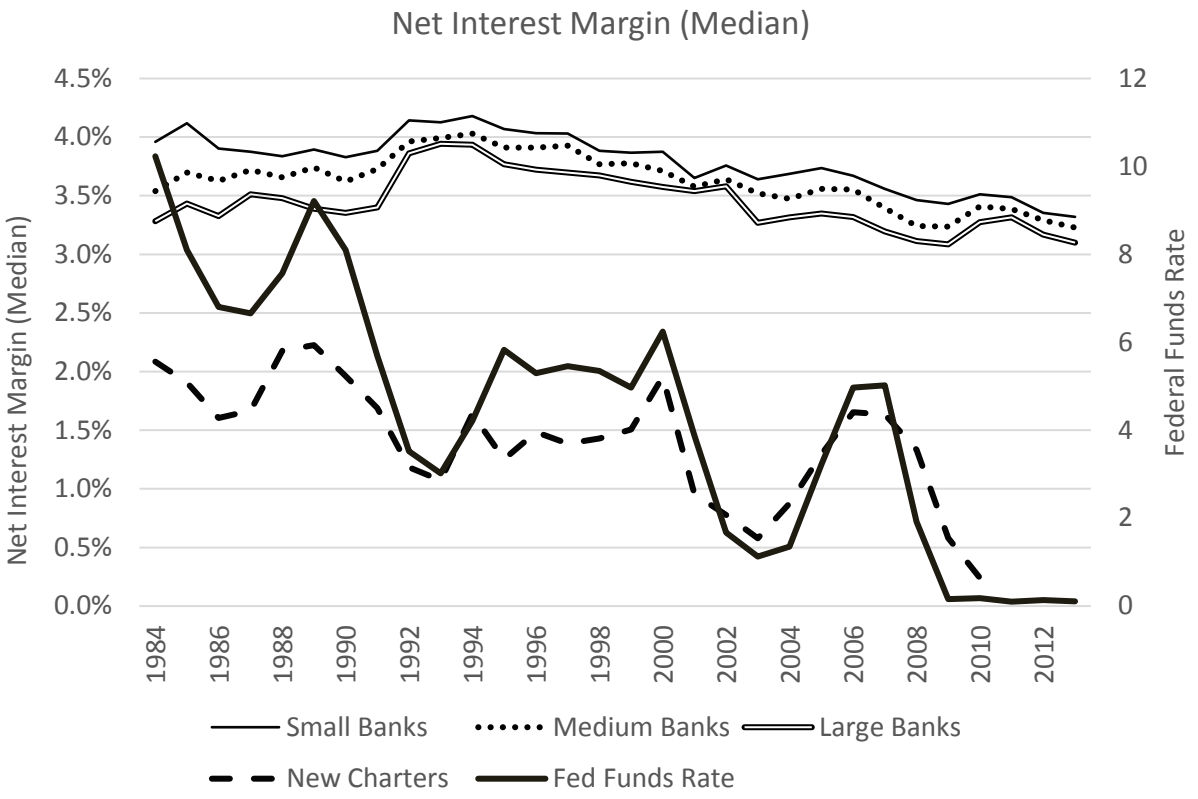


Table 2

Correlation of Net Interest Margin and Federal Funds Rate 1984-2013

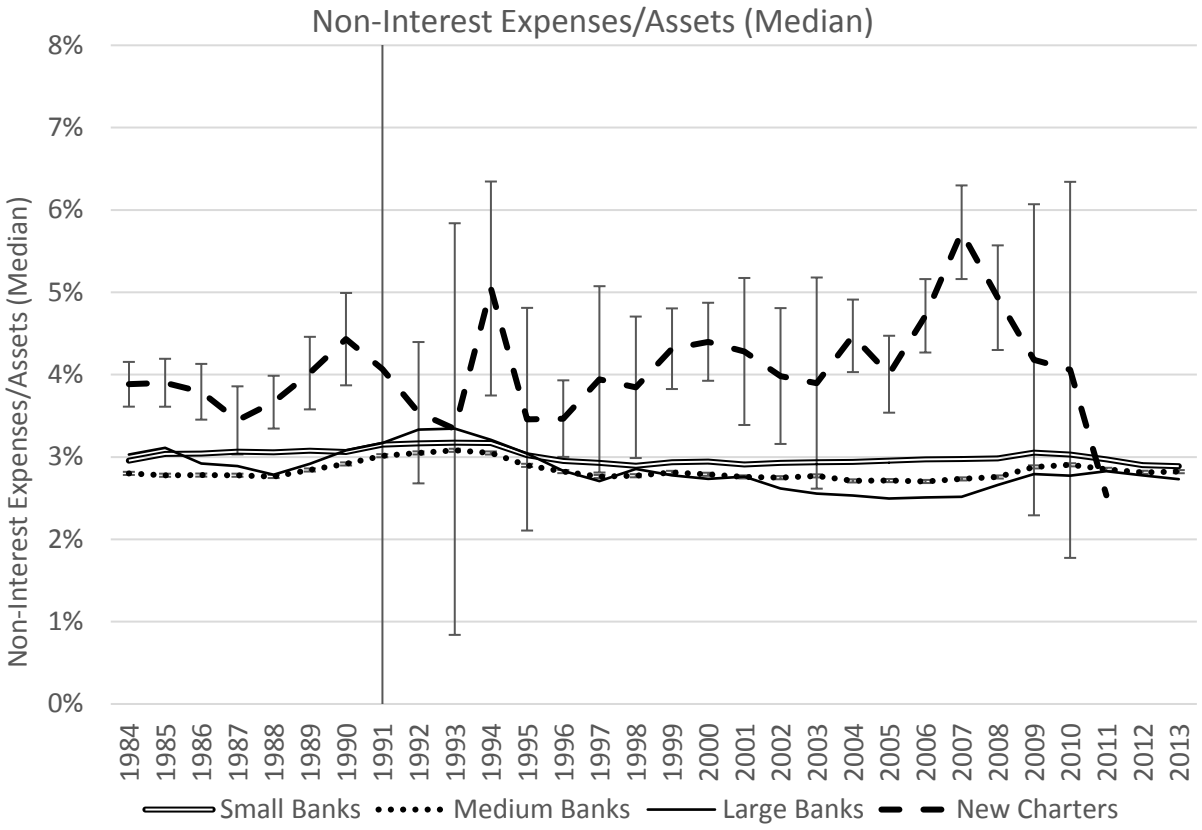
New Charters	0.9152***
Incumbent Small Banks (<$250M)	0.6523***
Incumbent Medium Banks ($250M - $1B)	0.4840***
Incumbent Large Banks (>$1B)	0.2740

Correlations are of each bank type's median annual NIM with annual FFR over the years indicated.
***<0.01, **<0.05, *<0.1

Relative to incumbent banks, entrant banks' net interest margins are both lower and more tied to the federal funds rate. The correlation of entrant banks' interest margins and the federal funds rate is 0.92 (Table 2), a higher correlation than for incumbent banks of any size. Entrant banks do not have a stock

of loans that were issued in earlier time periods (at potentially higher interest rates), and instead have larger holdings of federal funds reserves. Because of this greater exposure to current interest rates, would-be new charters may be reluctant to form during low-interest-rate regimes when their potential profits from interest operations are low.

Figure 3



Error bars represent 95% confidence interval for population mean.

Second, Figure 3 does not indicated any obvious effect of regulatory cost in one place that one might expect to find it. The figure displays the median non-interest costs as a percentage of assets (for the same categories of bank type). Many of the compliance costs that have been suggested to have

reduced entry would be expected to affect these non-interest operations of banks.[12] In levels, non-interest expenses are consistently higher for new charters than for incumbents, but neither type of bank shows any obvious increase in these expenses in recent years. Incumbent banks' expense ratios (the relatively smooth lines toward the bottom of Figure 3) do not change much at all over the entire period, and if anything new charters' expenses have decline in recent years, though these observations are based on so few entrants that it is difficult to make any statistically meaningful inference.

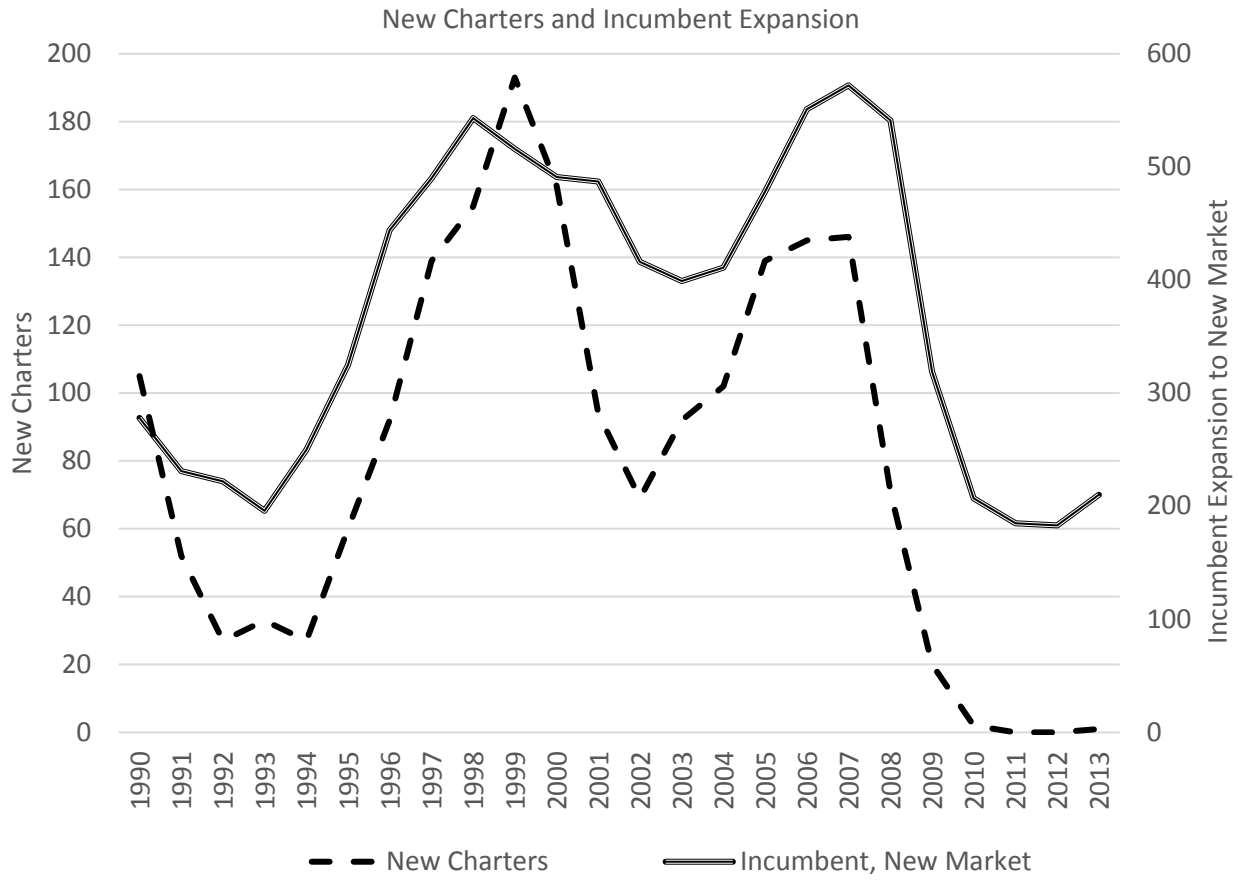
Third, another form of bank entry – branch expansion by existing banks into new geographic markets – has declined dramatically in recent years, as well (Figure 4). The figure demonstrates that these two forms of entry are complements, not substitutes, and the decline in *de novos* is not being replaced by incumbent expansion.[13] An implication of this is that some regulations (those affecting only *de novos*) are not likely to be the main source of the entry void. For example, the FDIC's 2009 restrictions on *de novo* banks' probationary period is not likely to explain a decline in incumbent expansion, so at least some other factors would appear to be operating.[14]

[12] These include regulatory compliance stipulated by the Dodd-Frank Financial Reform Act, and new requirements for *de novo* banks that seek deposit insurance from the FDIC. Admittedly, some regulations may also be expected to affect interest margins, such as new rules for mortgage lending that have been instituted by the Consumer Financial Protection Bureau, and increased capital and liquidity requirements that have been instituted by the Basel Committee.

[13] The annual correlation since 1990 between national *de novo* entry and national expansionary entry is 0.93. In the 1980s there was proportionally higher *de novo* entry likely due to 1980 deregulation, though apart from this level shift the series moved together in these years, as well.

[14] Of course, the other factors could be regulations that affect both expansion and *de novo* entry (such as rules on mortgage lending and capital requirements). The point is that some regulations (those only affecting *de novos*) do not seem likely to be the whole story.

Figure 4



These three descriptive facts suggest that non-regulatory factors could have contributed to a decline in new bank formation, and our econometric model attempts to provide a more systematic inference.

4. Model

Despite entry being a forward-looking decision, we employ a static entry model for two reasons: First, future profitability determinants (such as interest rates and demographics) generally move predictably with current values (and to the extent that they do not, it is unclear that firms can anticipate

deviations).[15] Second, although using a static model assumes that other firms' potential entry decisions do not dissuade my own, this assumption is somewhat more benign in our context since only 0.5% of county-year observations have more than one entrant.[16]

Our model posits that prospective entrants' decisions to enter a particular county in a particular year are determined by the entrants' expected profits there. Expected profits are determined by interest rates, regulation, the demographics of the county (population, income, employment, etc.), changes in these demographics, and (in some specifications) the local competitive environment.[17] Firms' entry decisions are determined according to:

$$NewCharter_{mt} = \begin{cases} \geq 1 & if\ X_{mt} + \beta_2 i_{mt} + \beta_3 r_{mt} + \beta_4 R_{mt} + \varepsilon_{mt} > 0 \\ 0 & otherwise \end{cases}$$

$NewCharter_{mt}$ is a [0,1] binary decision to enter county *m* in year *t*.[18] X_{mt} represents a vector of local demand variables such as income, population, income growth, unemployment, population growth, and population density. i_{mt} is the average federal funds rate in year *t*. r_{mt} is a vector of risk variables in a county, such as consumers' average credit scores and number of delinquencies in the particular area. R_{mt} captures regulatory variables that may vary by time and geography. ε_{imt} is normally distributed and i.i.d. across markets *m* and time *t*.

[15] As confirmation of this, robustness specifications that use leading values of independent regressors change the results very little.

[16] These also represent fewer than 20% of county-year observations with entry, and tend to occur in counties with dozens of competitors (where one would expect an additional entrant to affect competitors' profits by a smaller amount than where fewer competitors were present).

[17] In our main specification, we do not include regressors reflecting the presence of competitors due to their endogeneity. However, we do run some robustness specifications with such regressors and the results change very little (see Tables 6 and 7).

[18] This variable is 1 in the year of entry, and 0 for later years (unless there is another entrant). We also run ordered probit specifications to capture additional information contained in county-year observations with more than one entrant, but the parameters and predictions of the model are very similar (see Tables 6 and 7). This is unsurprising since so few observations have more than one entrant (see Table 3 and footnote 16).

The measures of regulatory effect are dummy variables to capture various regulatory regimes.[19] We also estimate specifications with state fixed effects to capture time-invariant, state-specific regulatory conditions, though these change the results very little (see Tables 6 and 7). We considered using other measures of regulation – such as pages of banking regulation or required capital ratios – but judged them to be too restrictive in their functional form. Regulations may affect firm behavior by introducing uncertainty over the regulation's future extension, enforcement, or implementation. Regime dummy variables seemed to us the least restrictive functional form for capturing this uncertainty effect.

We model bank competition and entry decisions as occurring at the local geographic level. Despite the existence of national banks that compete across many geographic markets, retail banking is a geographically local activity, and most bank customers demonstrate a preference for close proximity to a bank for most transactions. Antitrust enforcement agencies – the Department of Justice (DOJ) and the federal bank regulatory agencies – consider retail banking markets to be local, and all previous studies to our knowledge consider competition and entry decisions to occur at the local level.[20]

We use the county as the level of observation, rather than the slightly broader definitions (in some cases) of markets used by regulatory authorities. We do this to take advantage of the finer data that we have for both new charters and demographics at the county level. Bank branching decisions appear to focus more on immediate service areas of the branch rather than entire metropolitan statistical areas, and we may more closely match this feature by using counties for the new charter decision.

We anticipate the regression results will indicate that a higher federal funds rate and more robust local demographic variables lead to greater new charter creation, while increased risk factors lead to lower

[19] Appendix B contains a description of major national banking regulatory reforms since the start of our sample period. These variables are 0 before the regulation, and 1 in perpetuity after the regulation. They do not "turn off" once a new regime is instituted, because new regulations generally do not undo old ones.
[20] See Group of Ten (2001), Adams and Amel (2007), Adams, Kiser, and Brevoort (2007), and Feinberg (2009) for further discussion.

new charter creation. The effect of each regulatory regime should depend on whether the regulation was a liberalization or restriction of banking activity.

5. Data

New charter data are constructed from the Summary of Deposits (SOD) and the National Information Center (NIC) data.[21] The SOD is an annual census of insured banking institutions that is taken as of June 30 of each year, and tracks information at a branch level. The NIC data track banks and their holding companies over time, allowing us to see new bank entities. We consider a new charter to be a new banking institution that is not a subsidiary of an existing banking organization.[22]

Federal funds rates come from the Federal Reserve Bank of New York, and county-level demographic variables are pulled from the Bureau of Economic Analysis (BEA), Bureau of Labor Statistics (BLS), and U.S. Census. The BEA provides data on population and per-capita income at their mid-year estimated levels dating back to 1975. The BLS provides annual average unemployment rates for each year dating back to 1990, and the Census provides the land area of each county, which is used to calculate population densities.

[21] Our new charters include both banks and thrifts. They do not include credit unions, which may have different entry considerations than for-profit institutions, and have also not been the focus of the discussion of regulatory burden. It is worth noting that the number of new credit unions has declined significantly in recent years, as well, according to the National Credit Union Administration.

[22] An additional purpose of the SOD data is to calculate local HHIs and percentages of deposits in small banks. In calculating HHIs, we exclude urban branches with greater than $1 billion in deposits and rural branches with greater than $500 million in deposits due to the likelihood that a significant portion of these deposits are allocated to the branch for legal or tax purposes. We weight thrift deposits at 50%, consistent with Federal Reserve Board antitrust practice, to reflect their limited competitive influence.

We use the FRBNY Consumer Credit Panel/Equifax Data for information on the credit history of residents in each county, starting in 1999. The data include average Equifax credit scores and the number of annual credit inquiries conducted by third parties for a random sample of residents. Additionally, they include the share of each county's population that has at least one account that is 60-days delinquent as of December 31. The dataset includes all people with a credit history and Social Security numbers ending in certain digits.[23]

Table 3 presents summary statistics of our regression sample.[24]

Table 3

A. Summary Statistics

County-Year Observations, 1976-2014

	N	Mean[1]	Median	Std	Min	Max
Federal Funds Rate (%)	117,944	5.5	5.3	3.8	0.1	16.4
Per Capita Income ($1000s)	117,944	$26.0	$24.7	$8.6	$5.8	$126.5
Change ($1000s)	117,944	$0.5	$0.5	$1.7	$(50.3)	$46.4
Population (1000s)	117,944	85.6	23.7	279.1	0.1	10,017.1
% Change	117,944	0.6	0.5	2.0	-76.8	42.6
People per Square Mile (1000s)	117,944	0.2	0.0	1.6	0.0	71.2
Unemployment Rate (%) [2]	46,619	6.3	5.7	2.8	0.7	30.6
Delinquency Rate (%) [3]	46,619	1.9%	1.8%	0.9%	0.0%	13.0%
Mean Inquiries [3]	46,619	1.5	1.4	0.6	0.0	4.1
Mean Equifax Credit Score [3]	46,619	686	689	28	580	772
% Deposits in Small Banks [4]	116,084	63%	73%	33%	0%	100%
HHI [4]	116,061	0.33	0.26	0.22	0.01	1.00

[1] Unweighted over county-year observations.
[2] Data series begins in 1999
[3] Data series begins in 1999 and comes from FRBNY Consumer Credit Panel/Equifax Data.
[4] Not calculable in county-year observations that have no banks.

B. Frequency of New Charters

County-Year Observations, 1976-2014

[23] For a more complete discussion of the data, see Lee and van der Klaauw (2010).
[24] Our unit of observation is a county-year pair. We use county and county equivalents in the United States, of which there are approximately 3,100. This number has changed slightly over time, and we lose a small number of observations which do not report demographic data in certain years.

# New Charters	Freq	Pct	Cum Pct
0	114,736	97.3%	97.3%
1	2,657	2.3%	99.5%
2	351	0.3%	99.8%
3	98	0.1%	99.9%
4	41	0.0%	99.9%
5	21	0.0%	100.0%
6	9	0.0%	100.0%
7	10	0.0%	100.0%
8	4	0.0%	100.0%
9+	17	0.0%	100.0%

Some of our specifications use data from 1976 to 2013, though not all variables extend back to 1976. We run some specifications on shorter samples (starting from 1999) with more regressors. The results are very similar across the sample durations (see Tables 6 and 7).

The federal funds rate is the only continuous regressor that does not vary by county within a year (the binary regulatory regime dummy variables also do not vary by county). The federal funds rate ranges over the sample period from just above 0 to over 16 percent. The unemployment rate, per capita income, and changes in per capita income exhibit far more variability at the county level than at the national level. Unemployment reached 30% in some county-years. Population ranges from under 100 people in Loving County, TX, to over 10 million in Los Angeles County, CA. Population density, population change, creditworthiness, and market structure variables also exhibit variation across counties and over time.

Panel B of Table 3 shows that the vast majority of county-year observations (97.5%) experience no new charters. The number of county-year observations with 2 or more entrants is even smaller (one half of one percent of all observations), which is why the ordered and standard probits we present yield such similar results.

6. Results

6.1 Estimation Results

We discuss here our two primary specifications (displayed in Table 4), but we also run a number of other specifications for robustness (displayed in Table 6 at the end of the text). Specification (S1) runs our model on a shorter time sample with a greater number of control variables, while specification (L1) runs the model on a longer time sample without some control variables that do not exist in earlier periods. [25] The results do not change substantially between the two sample periods. The baseline specification (1) for both sample periods is an ordered probit on county-year data. The dependent variable is the number of new charters in a county-year observation, and the marginal effects of coefficients (evaluated at the mean values of regressors) are displayed.

Table 4

Specification:	(S1)	(L1)
Observation Type	County-Yr	County-Yr
Dep Var	New Chtr	New Chtr
Sample Start	1999	1976
Sample End	2013	2013
Probit Type	ordered	Ordered
Notes	-	-
Observations	46,619	117,944
r2_p	0.323	0.247
Coefficient Estimates		
ln_fedfunds	0.0049***	0.0067***
ln_population	0.0147***	0.0163***
%_change_population	0.0012***	0.0036***
population_density	-0.0002	-0.0003***
percapita_income	0.0003***	0.0006***

[25] "S" is for short sample, "L" is for long sample. The short sample runs from 1999 through 2013 and includes controls for unemployment and credit worthiness; the long sample runs from 1976 through 2013 and does not include those controls.

change_percapita_income	-0.0005	0.0008**
unemployment_rate	-0.0006*	
mean_equif_credit_score	-0.0001*	
mean_credit_inquiries	0.0066***	
delinquency_rate	-0.4153***	
D_2010+ (DoddFrank passed)	-0.0387***	-0.0528***
D_2002+ (Sarbanes Oxley)	0.0014	0.0018
D_2001+ (Anti-Money Laundering)	-0.0078***	-0.0098***
D_1999+ (Gramm Leach Bliley)		0.0072***
D_1995+ (Riegle Neal)		0.0169***
D_1991+ (FDICIA)		-0.0186***
D_1989+ (FIRREA)		-0.0105***
D_1982+ (Garn St Germain)		0.0042***
D_1980+ (DIDMCA)		-0.0030*

In both baseline specifications, the estimation results yield expected signs for statistically significant variables. The federal funds rate is positively correlated with new charter creation.[26] Population, population growth, and per capita income all have positive and significant coefficients. Population density has a negative coefficient, consistent with the need for geographic differentiation as consumers spread out, but it is not significant in the short panel. Change in per capita income has a positive coefficient in specification (L1) and is insignificant in the short sample. The unemployment rate has the expected negative sign and is significant. [27]

The coefficient on mean Equifax credit score has an unintuitive sign, but it is only significant at the 10% level. The other two credit regressors - the number of credit inquiries per capita (a measure of demand for credit and banking services) and the delinquency rate – are more statistically significant and have the

[26] Alternative specifications (not shown) use the 10-year Treasury note rates, the yield curve (the 10-year Treasury note rate minus the FFR), and various functional forms of these interest rate variables. The results change very little. In the interest of space we did not report all of these robustness specifications here.

[27] In a separate specification, not shown, we tried using national unemployment data in a long panel (because county-level unemployment data are unavailable before 1990). The coefficient was not significant, and the model predictions changed very little.

expected signs. Among the regulation dummy variables that are significant, all have the expected sign. Liberalizing regimes (Garn-St Germain, Riegle-Neal, and Gramm-Leach-Bliley) have positive coefficients and restrictive regimes (the remaining regulations) have negative coefficients.[28] The pseudo R-squared is higher in the shorter sample (specification (S1)).

The remaining specifications ((2)-(11) in both the S and L samples) are displayed in Table 6. These serve as robustness checks of the model in order to:

- make predictions strictly out-of-sample by stopping the regression sample in 2009 (2),
- test the standard probit rather than the ordered probit (3),
- include state fixed effects to capture time-invariant state banking regulation (4),
- include structural regressors that are likely to be endogenous but that have been demonstrated by past literature to have predictive power for entry (5),
- allow for any post-crisis structural shift to have occurred earlier, either because of anticipation of regulation or because of other factors ((6) and (7)),[29]
- assume the interest rate affects entry decisions linearly, rather than logarithmically, to estimate a lower bound of the interest rate's effect on entry ((8) and (9)),
- use one-year lagged regressors in case potential entrants do not receive updated information on profitability determinants in a timely manner (10), and
- use one-year forwarded regressors to account for foresight on the part of potential entrants with regard to future profitability determinants (11)).

[28] Sarbanes Oxley (2002) was the only regulatory regime without a significant effect on new charter creation, which is unsurprising because the reform dealt with publicly-traded companies which are typically much larger than *de novo* entrants.

[29] The Dodd-Frank Act was signed into law in July 2010, was initially proposed in June 2009, and was preceded by Lehman Brothers' collapse in September 2008. These three months were the peak months for Google searches of "regulatory reform." The FDIC increased restrictions on de novo banks in August 2009.

The robustness specifications lead to little change in the regression coefficients. With few exceptions, coefficients have similar signs, magnitudes, and statistical significance. We will discuss the differences between the specifications more extensively in the next section on prediction.

6.2 Model Predictions

Because the probit is a non-linear model, interpretation of regression results is easier using model predictions. We provide these predictions first in graphical form in Figures 5A and 5B.

Figure 5A

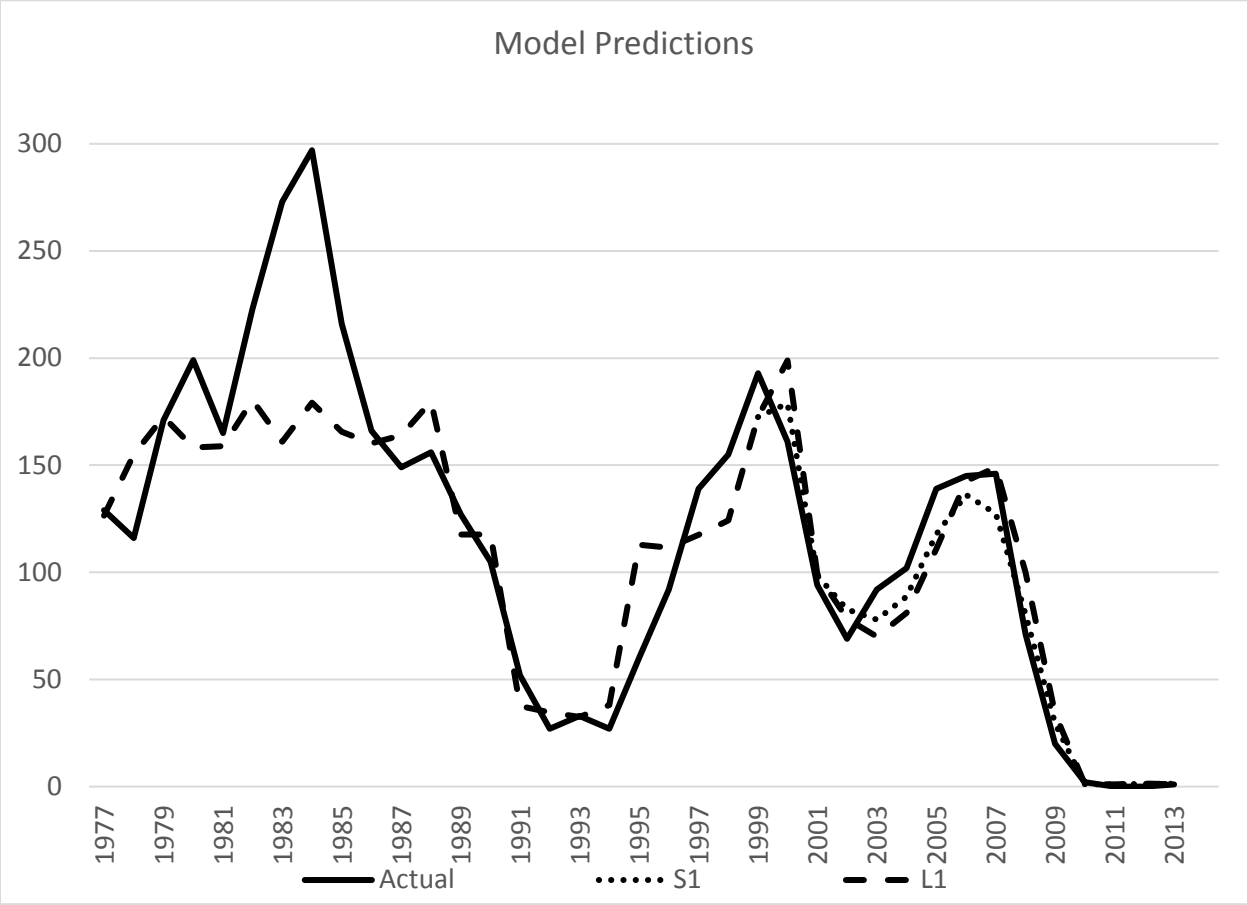


Figure 5A shows the actual number of new charters by year (the heavy line), as well as in-sample predictions by our two baseline specifications. This figure is intended to evaluate the fit of the model, as

both sets of model predictions are intended to match the "Actual" line. (L1) does not match the "Actual" well during the 1970s and early 1980s, which was a period that was marked by high inflation and changing monetary policy. [30] However, (L1) matches the "Actual" fairly well starting in the mid- to late-1980s; and (S1) does well from its starting point in 1999. Figure 5A does not make any attempt to decompose the decline in new charters, nor to predict counterfactual levels of charter formation.

Figure 5B

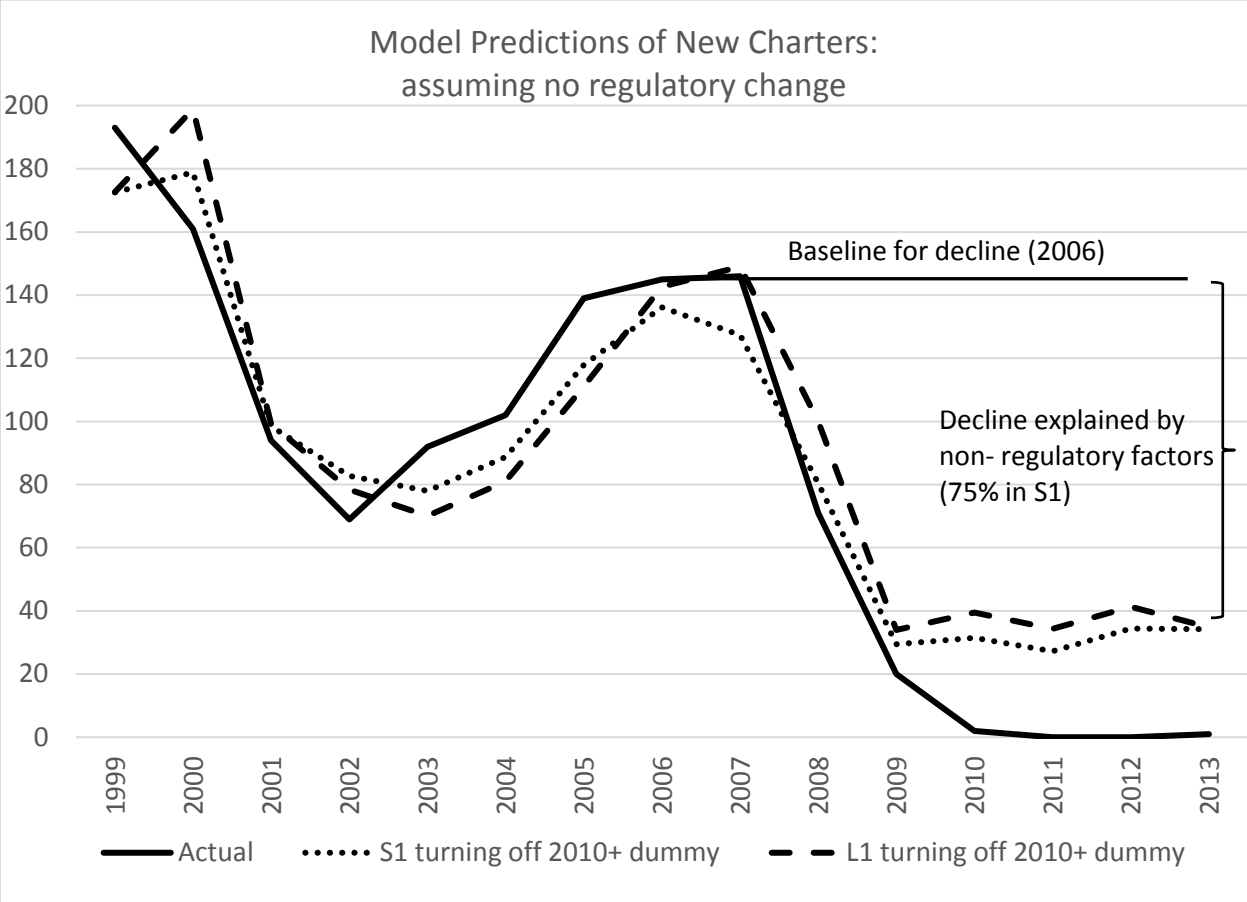
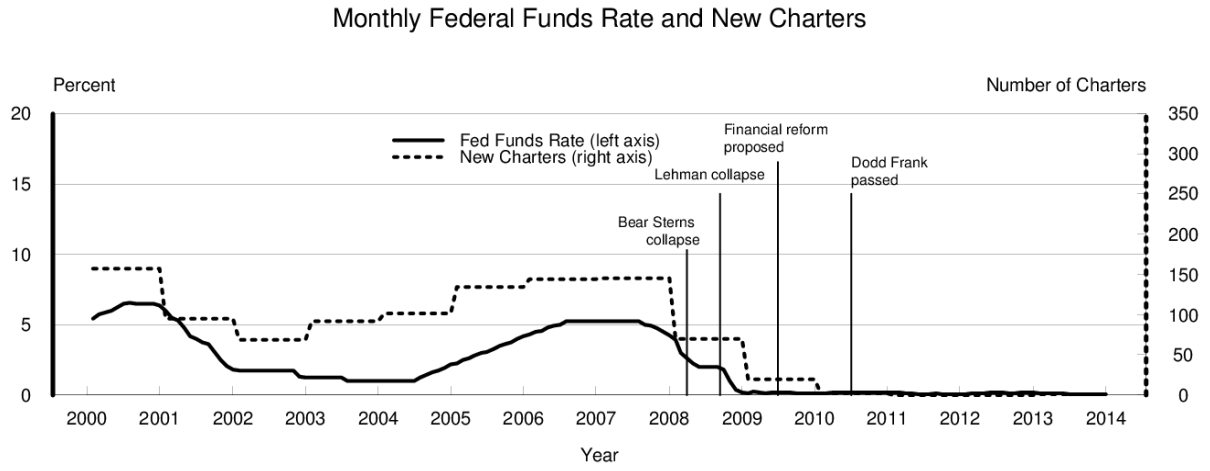


Figure 5B, in contrast, does attempt to decompose the decline in new charters by predicting counterfactual levels of charter formation. The actual number of new charters is, again, the heavy, dark

[30] Model (S1) cannot make predictions before 1999 because certain regressors in that model are not available.

line. The dashed lines are the predictions of new charters by our two baseline specifications *on the assumption of no new regulatory effect* since the financial crisis. Even without a regulatory effect, the predicted number of new charters by each of our two baseline models drops off sharply from the baseline year of 2006. This suggests that a large portion of the current decline in new charter formation would have occurred absent any regulatory factors.

Figure 6



It is not as straightforward to estimate the decline in charters attributable to regulation, because new regulation has been coincident with a number of other potential entry-dampening events (see Figure 6). These include interest rates near the zero lower bound, and crisis-induced changes in perceptions of risk and the economic outlook. The best we can do to capture regulation is to include a "regime shift" dummy variable (starting in 2010, 2009, or 2008, depending on the specification) though this may also capture effects of nearly-coincident non-regulatory factors.

The effect of this "regime shift" dummy variable is large, and accounts for an even greater portion (94% in (S1)) of the drop in new charters than our other regressors explain. However, we are unable to ascribe this effect to regulation alone; and, in principle, it is possible that none of this effect is due to

regulation. So our model suggests that absent regulatory factors, non-regulatory factors would have caused at least 75% of the decline in new charters, and that absent non-regulatory factors, regulatory factors could have caused anywhere from 0 to 93%.

Table 5 quantifies what Figure 5B shows visually. Table 5 decomposes the model's predicted percentage decline in bank charters due to non-regulatory versus potentially-regulatory factors for our two baseline specifications. We use 2006 as the baseline level of charters before any decline, because 2006 is the last year in which economic and banking conditions were not affected by the financial crisis. In 2006 (row [A]) the actual number of charters was 145, while specifications (S1) and (L1) predict 136 and 142, respectively. In row [B] we calculate the number of charters the model predicts with 2013 regressors (including the depressed economic and interest rate variables), but without any structural break. These values are 34 and 35, respectively. Row [C] calculates that 75% ([136-34]/136) or 76% ([142-35]/142) of the decline can be explained without any regulatory effect.

Table 5

Model Predictions

Specification:	(S1)	(L1)
Observation Type	County-Yr	County-Yr
Dep Var	New Chtr	New Chtr
Sample Start	1999	1976
Sample End	2013	2013
Probit Type	ordered	ordered
Notes		
Observations	46,619	117,944
r2_p	0.323	0.247
Model Predictions		
[A] 2006 (Actual = 145)	136.16	142.6
[B] 2013 wo D_2010+	34.17	34.79
[C] % decline wo D_2010+ (1-[B]/[A])	75%	76%
[D] 2006 w D_2010+	8.72	7.17
[E] % decline from D_2010+ (1-[D]/[A])	94%	95%

Rows [D] and [E] calculate the effect caused by the structural break, which could be caused by regulatory change, though as was discussed above this effect could be capturing additional interest rate or other effects. Row [D] calculates the model's predicted number of new charters, with the use of 2006 levels of all regressors (i.e., representing a healthy economy) but with the post-crisis structural break dummy "turned on." The predicted numbers of new charters are 9 and 7, respectively, for the two specifications. Correspondingly, row [E] displays the percentage of the current decline caused by this "structural break," 94% and 95%, respectively.

It is not contradictory that rows [C] and [E] both represent such high percentages, or that they sum to over 100%. These effects are not additive; they are multiplicative, because numerous factors could persuade any single would-be entrant not to enter. Row [C] suggests that the recent weak demographic, demand, and interest rate variables have deterred 75% of would-be *de novo* entrants. Row [E] suggests that additional post-crisis factors (potentially regulation, zero-bound interest rate effects, perceptions of risk, etc.) have deterred 94%. The model suggests, then (consistent with reality), that almost all potential entrants have been deterred by some combination of the two effects.

The set of predictions for all 22 specifications of the model are contained in Table 7. The predictions are fairly consistent across specifications, with anywhere between 61% and 86% of the decline in charters (row [C]) being explained by non-regulatory variables.[31] This number could understate non-regulatory effects if the structural break is picking up, for example, additional zero-lower-bound interest rate effects or other post-crisis perceptions.

[31] The only specifications in which the percentage is lower are those that are intended to be lower bounds. These are specifications 8, 9. Specification 8 uses a linear interest rate effect. Specification 9 uses a linear interest rate effect and only a partial interest rate decline (to 1.1%, the lowest pre-crisis interest rate level) in predicting new charters. Specification 10 also predicts a lower percentage decline in entry, but is a less reasonable specification. The specification is built on a somewhat implausible assumption (that prospective entrants are forced to use 12-month lagged profitability determinants, including for interest rates), and also makes an implausible prediction (that, in the short sample, weak profitability determinants caused an entry *increase*).

7. Conclusion

The large, recent decline in new bank charter creation has been noted by industry observers, policy makers, and the public press. Concern has been expressed by some that the decline may be due to burdensome regulation. This paper addresses the hypothesis by investigating the factors that have led to the dramatic decline in new charters. Interest rates are known drivers of banking profitability, and regression results suggest that these rates – plus other non-regulatory influences such as weak banking demand – would have caused approximately 75% or more of the decline in new charters absent any regulatory effect. These non-regulatory effects have been under-emphasized in the popular press.

Our findings do suggest the presence of additional and entry-discouraging factors in the post-crisis period, but it is unclear whether these factors are additional non-regulatory effects, regulatory effects, or both. Our inference on the non-regulatory effect is bounded below, but our inference on the regulatory effect is less precise.

References

Adams, R. & Amel, D. (2007). The effects of past entry, market consolidation, and expansion by incumbents on the probability of entry. Federal Reserve Board Working Paper Series 2007-51

Adams, R., Brevoort, K., & Kiser, E. (2007). Who Competes With Whom? The Case of Depository Institutions. Journal of Industrial Economics, 55(1), 141-167

Amel, D. & Liang, J. (1990). Dynamics of Market Concentration in U.S. Banking. International Journal of Industrial Organization, 8(3), 375-384

Amel, D. & Liang, J. (1997). Determinants of Entry and Profits in Local Banking Markets. Review of Industrial Organization, 12(1), 59-78

Berger, A., Bonime, S., Goldberg, L., & White, L. (2004). The Dynamics of Market Entry: The Effects of Mergers and Acquisitions on Entry in the Banking Industry. Journal of Business, 77(4), 797-834

Berger, A. & Dick, A. (2007). Entry into Banking Markets and the Early-Mover Advantage. Journal of Money, Credit, and Banking, 39(4) 775-807

Boczar, G. (1975). An empirical study of multibank holding company activity in local markets. Atlantic Economic Journal, 3(2), 33-39.

Bresnahan, T. & Reiss, P. (1991). Entry and Competition in Concentrated Markets. Journal of Political Economy, 99(5), 977-1009

Cohen, A. & Mazzeo, M. (2007). Market structure and competition among retail depository institutions. The Review of Economics and Statistics, 89(1), 60-74

Feinberg, R. (2009). Patterns and Determinants of Entry in Rural County Banking Markets" Journal of Industry, Competition and Trade, 9(2), 101-115

Foster, L., Haltiwanger, J., & Syverson, C. (2008). Reallocation, Firm Turnover, and Efficiency: Selection on Productivity or Profitability? American Economic Review, 98(1), 394-425

Group of Ten. (2001, January). Report on Consolidation in the Financial Sector. Retrieved December 21, 2015 from Bank for International Settlements Web site: http://www.bis.org/publ/gten05.htm

Hanweck, G. (1971). Bank Entry into Local Markets: An Empirical Assessment of the Degree of Potential Competition via New Bank Formations," Proceedings of the 30th Annual Conference on Bank Structure and Competition (Federal Reserve Bank of Chicago), 161-72

Jeon, Y. & Miller, S. (2007). Births, Deaths, and Marriages in the U.S. Commercial Banking Industry, Economic Inquiry, 45(2), 324-341

Keeton, W. (2000). Are Mergers Responsible for the Surge in New Bank Charters?" Federal Reserve Bank of Kansas City Economic Review, 85(1), 21-41

Lee, D. & van der Klaauw, W. (2010). An Introduction to the FRBNY Consumer Credit Panel, Federal Reserve Bank of New York Staff Report, 479, 1-16.

McCord, R. & Prescott, E. (2014). The Financial Crisis, the Collapse of Bank Entry, and Changes in the Size Distribution of Banks. Federal Reserve Bank of Richmond Economic Quarterly, 100(1), 23-50

Rose, J. (1977). The Attractiveness of Banking Markets for De Novo Entry: The Evidence from Texas. Journal of Bank Research, 7(4), 284-93

Seelig, S., & Critchfield, T. (2003). Merger Activity as Determinants of De Novo Entry into Urban Bank Markets. Federal Deposit Insurance Corporation Working paper 2003-01

Siegfried, J., & Evans, L. (1992). Entry and Exit in United States Manufacturing Industries From 1977 to 1982. In D. Audretsch & J. Siegfried (Eds.), Empirical Studies in Industrial Organization: Essays in Honor of Leonard W. Weiss (pp. 253-273). The Netherlands: Kluwer Academic Publishers.

Siegfried, J., & Evan, L. (1994). Empirical Studies of Entry and Exit: A Survey of the Evidence. Review of Industrial Organization, 9(2), 121-155

Stiroh, K., & Strahan, P. (2003). Competitive Dynamics of Deregulation: Evidence from U.S. Banking. Journal of Money, Credit and Banking, 35(5), 801-828

Sutton, J. (1991). Sunk Costs and Market Structure: Price Competition, Advertising, and the Evolution of Concentration. Cambridge: MIT Press.

Table 6A (cont. next p.): Regression Results, Marginal Effects

Short Panel, 1999-

Specification:	(S1)	(S2)	(S3)	(S4)	(S5)	(S6)	(S7)	(S8)	(S9)	(S10)	(S11)
Observation Type	County-Yr	County-Yr	County-Yr	County-Yr	County-Yr	County-Yr	County-Yr	County-Yr	County-Yr	County-Yr	County-Yr
Dep Var	New Chtr	New Chtr	New Chtr	New Chtr	New Chtr	New Chtr	New Chtr	New Chtr	New Chtr	New Chtr	New Chtr
Sample Start	1999	1999	1999	1999	1999	1999	1999	1999	1999	2000	2000
Sample End	2013	2009	2013	2013	2013	2013	2013	2013	2013	2013	2013
Probit Type	ordered	ordered	probit	ordered	ordered	ordered	ordered	ordered	ordered	ordered	ordered
Notes		Stop Sample	Standard Probit	State F.E.	Struct Vars	FE 2009+	FE 2008+	Linear FFR	Linear FFR; partial pred	Lagged Regressors	Forward Regressors
Observations	46,619	34,170	46,619	46,619	45,884	46,619	46,619	46,619	46,619	43,506	43,512
r2_p	0.323	0.285	0.344	0.353	0.325	0.320	0.317	0.321	0.321	0.318	0.314
Coefficient Estimates											
ln_fedfunds	0.0049***	0.0065***	0.0055***	0.0049***	0.0048***	0.0036***	0.0073***			-0.0011	0.0041***
ln_population	0.0147***	0.0198***	0.0174***	0.0152***	0.0141***	0.0146***	0.0146***	0.0147***	0.0147***	0.0134***	0.0153***
%_change_population	0.0012***	0.0016***	0.0016***	0.0003	0.0011***	0.0012***	0.0011***	0.0011***	0.0011***	0.0014***	0.0010***
population_density	-0.0002	-0.0003	-0.0002	0.0001	-0.0002	-0.0002	-0.0002	-0.0002	-0.0002	-0.0002	-0.0002
percapita_income	0.0003***	0.0004***	0.0004***	0.0002**	0.0003***	0.0003***	0.0003***	0.0003***	0.0003***	0.0003***	0.0004***
change_percapita_income	-0.0005	-0.0006	-0.0004	-0.0001	-0.0005	-0.0013***	-0.0014***	-0.0001	-0.0001	0.0003	-0.0009**
unemployment_rate	-0.0006*	-0.0007	-0.0007*	-0.0008**	-0.0007**	-0.0004	-0.0006*	-0.0010***	-0.0010***	-0.0008**	-0.0003
mean_equif_credit_score	-0.0001*	-0.0001*	-0.0001	0.0000	-0.0001	-0.0000	-0.0000	-0.0001*	-0.0001*	-0.0001***	0.0000
mean_credit_inquiries	0.0066***	0.0089***	0.0082***	0.0005	0.0072***	0.0066***	0.0063***	0.0068***	0.0068***	0.0061***	0.0072***
delinquency_rate	-0.4153***	-0.5751***	-0.4654***	-0.3900***	-0.4392***	-0.3078***	-0.1749	-0.4291***	-0.4291***	-0.6815***	0.1815
D_2010+ (DoddFrank passed)	-0.0387***		-0.0482***	-0.0404***	-0.0390***			-0.0471***	-0.0471***	-0.0489***	-0.0444***
D_2009+ (Reform proposed)						-0.0274***					
D_2008+ (Bear/Lehman collapse)							-0.0104***				
D_2002+ (Sarbanes Oxley)	0.0014	0.0018	0.0017	0.0014	0.0014	0.0015	0.0040**	0.0005	0.0005	-0.0023	-0.0009
D_2001+ (Anti-Money Laundering)	-0.0078***	-0.0105***	-0.0101***	-0.0080***	-0.0080***	-0.0093***	-0.0083***	-0.0063***	-0.0063***	-0.0066***	-0.0061***
D_1999+ (Gramm Leach Bliley)											
D_1995+ (Riegle Neal)											
D_1991+ (FDICIA)											
D_1989+ (FIRREA)											
D_1982+ (Garn St Germain)											
D_1980+ (DIDMCA)											
hhi					-0.0081						
percent_deposits_in_smallbanks					-0.0030						
fedfunds (linear)								0.0015***	0.0015***		

*** p<0.01, ** p<0.05, * p<0.1

Table 6B: Regression Results, Marginal Effects

Long Panel, 1976-

Specification:	(L1)	(L2)	(L3)	(L4)	(L5)	(L6)	(L7)	(L8)	(L9)	(L10)	(L11)
Observation Type	County-Yr	County-Yr	County-Yr	County-Yr	County-Yr	County-Yr	County-Yr	County-Yr	County-Yr	County-Yr	County-Yr
Dep Var	New Chtr	New Chtr	New Chtr	New Chtr	New Chtr	New Chtr	New Chtr	New Chtr	New Chtr	New Chtr	New Chtr
Sample Start	1976	1976	1976	1976	1976	1976	1976	1976	1976	1976	1976
Sample End	2013	2009	2013	2013	2013	2013	2013	2013	2013	2013	2013
Probit Type	ordered	ordered	probit	ordered	ordered	ordered	ordered	ordered	ordered	ordered	ordered
Notes		Stop Sample	Standard Probit	State F.E.	Struct Vars	FE 2009+	FE 2008+	Linear FFR	Linear FFR; partial pred	Lagged Regressors	Forward Regressors
Observations	117,944	105,492	117,944	117,944	116,061	117,944	117,944	117,944	117,944	114,831	114,855
r2_p	0.247	0.232	0.264	0.277	0.249	0.246	0.245	0.246	0.246	0.249	0.241
Coefficient Estimates											
ln_fedfunds	0.0067***	0.0074***	0.0080***	0.0068***	0.0068***	0.0046***	0.0086***			0.0016	0.0059***
ln_population	0.0163***	0.0181***	0.0194***	0.0165***	0.0178***	0.0163***	0.0163***	0.0163***	0.0163***	0.0163***	0.0166***
%_change_population	0.0036***	0.0041***	0.0045***	0.0023***	0.0037***	0.0036***	0.0036***	0.0037***	0.0037***	0.0041***	0.0035***
population_density	-0.0003***	-0.0003**	-0.0003*	0.0002**	-0.0003***	-0.0003***	-0.0003***	-0.0003***	-0.0003***	-0.0002**	-0.0003***
percapita_income	0.0006***	0.0006***	0.0008***	0.0008***	0.0006***	0.0006***	0.0006***	0.0006***	0.0006***	0.0005***	0.0006***
change_percapita_income	0.0008**	0.0009**	0.0009**	0.0003	0.0008**	0.0003	0.0003	0.0012***	0.0012***	0.0013***	-0.0009**
unemployment_rate											
mean_equif_credit_score											
mean_credit_inquiries											
delinquency_rate											
D_2010+ (DoddFrank passed)	-0.0528***		-0.0672***	-0.0539***	-0.0544***			-0.0686***	-0.0686***	-0.0647***	-0.0572***
D_2009+ (Reform proposed)						-0.0383***					
D_2008+ (Bear/Lehman collapse)							-0.0183***				
D_2002+ (Sarbanes Oxley)	0.0018	0.0019	0.0021	0.0012	0.0017	0.0014	0.0041*	-0.0013	-0.0013	0.0006	-0.0022
D_2001+ (Anti-Money Laundering)	-0.0098***	-0.0109***	-0.0131***	-0.0107***	-0.0099***	-0.0109***	-0.0096***	-0.0099***	-0.0099***	-0.0142***	-0.0075***
D_1999+ (Gramm Leach Bliley)	0.0072***	0.0080***	0.0091***	0.0063***	0.0073***	0.0072***	0.0071***	0.0072***	0.0072***	0.0073***	0.0078***
D_1995+ (Riegle Neal)	0.0169***	0.0189***	0.0213***	0.0161***	0.0171***	0.0178***	0.0167***	0.0173***	0.0173***	0.0187***	0.0188***
D_1991+ (FDICIA)	-0.0186***	-0.0208***	-0.0235***	-0.0184***	-0.0192***	-0.0203***	-0.0174***	-0.0186***	-0.0186***	-0.0226***	-0.0207***
D_1989+ (FIRREA)	-0.0105***	-0.0118***	-0.0118***	-0.0103***	-0.0108***	-0.0106***	-0.0106***	-0.0103***	-0.0103***	-0.0098***	-0.0111***
D_1982+ (Garn St Germain)	0.0042***	0.0046***	0.0047**	0.0037**	0.0044***	0.0032**	0.0053***	0.0073***	0.0073***	0.0024*	0.0036**
D_1980+ (DIDMCA)	-0.0030*	-0.0032*	-0.0044**	-0.0041**	-0.0032*	-0.0016	-0.0045***	-0.0061***	-0.0061***	-0.0007	-0.0002
hhi					0.0172***						
percent_deposits_in_smallbanks					0.0015						
fedfunds (linear)								0.0011***	0.0011***		

*** p<0.01, ** p<0.05, * p<0.1

Table 7: Model Predictions

A. Short Panel, 1999-

Specification:	(S1)	(S2)	(S3)	(S4)	(S5)	(S6)	(S7)	(S8)	(S9)	(S10)	(S11)
Observation Type	County-Yr	County-Yr	County-Yr	County-Yr	County-Yr	County-Yr	County-Yr	County-Yr	County-Yr	County-Yr	County-Yr
Dep Var	New Chtr	New Chtr	New Chtr	New Chtr	New Chtr	New Chtr	New Chtr	New Chtr	New Chtr	New Chtr	New Chtr
Sample Start	1999	1999	1999	1999	1999	1999	1999	1999	1999	2000	2000
Sample End	2013	2009	2013	2013	2013	2013	2013	2013	2013	2013	2013
Probit Type	ordered	ordered	probit	ordered	ordered	ordered	ordered	ordered	ordered	ordered	ordered
Notes		Stop Sample	Standard Probit	State F.E.	Struct Vars	FE 2009+	FE 2008+	Linear FFR	Linear FFR; partial pred	Lagged Regressors	Forward Regressors
Model Predictions											
[A] 2006 (Actual = 145)	136.16	136.19	108.77	137.3	136.11	126	148.75	134.59	134.59	103.83	138.38
[B] 2013 wo D_2010+	34.17	34.77	31.41	42.42	34.87	48.36	20.95	64.92	72.05	105.24	42.18*
[C] % decline wo D_2010+ (1-[B]/[A])	75%	74%	71%	69%	74%	62%	86%	52%	46%	-1%	70%
[D] 2006 w D_2010+	8.72		7.25	7.97	8.78	19.23	77.73	4.23	4.23	1.69	6.95
[E] % decline from D_2010+ (1-[D]/[A])	94%	.	93%	94%	94%	85%	48%	97%	97%	98%	95%

B. Long Panel, 1976-

Specification:	(L1)	(L2)	(L3)	(L4)	(L5)	(L6)	(L7)	(L8)	(L9)	(L10)	(L11)
Observation Type	County-Yr	County-Yr	County-Yr	County-Yr	County-Yr	County-Yr	County-Yr	County-Yr	County-Yr	County-Yr	County-Yr
Dep Var	New Chtr	New Chtr	New Chtr	New Chtr	New Chtr	New Chtr	New Chtr	New Chtr	New Chtr	New Chtr	New Chtr
Sample Start	1976	1976	1976	1976	1976	1976	1976	1976	1976	1976	1976
Sample End	2013	2009	2013	2013	2013	2013	2013	2013	2013	2013	2013
Probit Type	ordered	ordered	probit	ordered	ordered	ordered	ordered	ordered	ordered	ordered	Ordered
Notes		Stop Sample	Standard Probit	State F.E.	Struct Vars	FE 2009+	FE 2008+	Linear FFR	Linear FFR; partial pred	Lagged Regressors	Forward Regressors
Model Predictions											
[A] 2006 (Actual = 145)	142.6	142.55	108.18	144.08	143.55	134.22	159.65	122.68	122.68	96.99	145.72
[B] 2013 wo D_2010+	34.79	35.17	31.22	39.99	36.11	52.74	28.17	84.07	89.16	84.77	46.8*
[C] % decline wo D_2010+ (1-[B]/[A])	76%	75%	71%	72%	75%	61%	82%	31%	27%	13%	68%
[D] 2006 w D_2010+	7.17		5.94	7.57	7.07	16.59	63.71	1.95	1.95	1.66	7.22
[E] % decline from D_2010+ (1-[D]/[A])	95%	.	95%	95%	95%	88%	60%	98%	98%	98%	95%

* In S11 and L11, 2012 predictions are used instead of 2013 predictions. 2013 predictions are not possible since 2014 demographic data are not available.

Appendix A

Selected Requirements to Apply for a New State Bank Charter

	Initial Capital			
	Statutory Requirement	Approximate Average	Min. # of Directors	Application Fee
Median	$1,500,000	$7,500,000	5	$3,000
Min	$0	$1,000,000	1	$0
Max	$10,000,000	$30,000,000	7	$25,000
Alabama	$800,000	$4,000,000	5	$25,000
Alaska	$2,000,000	$4,000,000	5	$2,000
Arizona	N/A	N/A	5	$10,000
Arkansas	$1,000,000	$6,000,000	3	$8,000
California	N/A	$20,000,000	5	$5,000
Colorado	N/A	N/A	3	$0
Connecticut	$5,000,000	$5,000,000	1	$15,000
Delaware	$750,000	$2,500,000	5	$6,900
District of Columbia	$6,000,000	$12,000,000	5	$3,000
Florida	$8,000,000	$10,000,000	5	$7,500
Georgia	$3,000,000	$8,000,000	5	$20,000
Hawaii	$5,000,000	N/A	5	$500
Idaho	$375,000	$5,000,000	5	N/A
Illinois	N/A	N/A	5	$1,000
Indiana	N/A	$12,000,000	3	$0
Iowa	$5,000,000	$5,000,000	5	$1,500
Kansas	$250,000	N/A	5	$0
Kentucky	$2,500,000	$3,000,000	5	$7,500
Louisiana	$500,000	$5,000,000	5	$1,500
Maine	$100,000	N/A	5	$2,000
Maryland	$1,500,000	$10,000,000	5	$10,000
Massachusetts	N/A	$8,000,000	7	$5,000

Michigan	N/A	$10,000,000	5	$1,750
Minnesota	$250,000	$8,000,000	5	$2,000
Mississippi	$2,000,000	N/A	5	$2,500
Missouri	N/A	N/A	5	$1,500
Montana	N/A	N/A	3	$1,500
Nebraska	$875,000	$2,000,000	5	$2,500
Nevada	$5,000,000	$25,000,000	7	$4,500
New Hampshire	$250,000	$1,000,000	5	$0
New Jersey	$500,000	$6,000,000	5	$5,000
New Mexico	$500,000	$4,000,000	5	$1,000
New York	$1,200,000	$30,000,000	5	$12,500
North Carolina	$3,000,000	$12,000,000	5	$3,000
North Dakota	$100,000	$2,000,000	3	$2,500
Ohio	$10,000,000	N/A	5	N/A
Oklahoma	$2,000,000	$8,000,000	5	$0
Oregon	$1,500,000	$10,000,000	5	$2,500
Pennsylvania	$77,500	$6,000,000	5	$2,000
Puerto Rico	$6,000,000	N/A	3	$3,000
Rhode Island	$3,000,000	N/A	N/A	
South Carolina	N/A	N/A	N/A	$10,000
South Dakota	$600,000	N/A	5	$7,500
Tennessee	N/A	N/A	5	$20,000
Texas	$3,000,000	$10,000,000	5	$10,000
Utah	$0	$10,000,000	3	$2,500
Vermont	$250,000	$10,000,000	3	$5,000
Virginia	$4,000,000	$8,000,000	5	$10,000
Washington	N/A	N/A	5	$3,000
West Virginia	$4,000,000	$7,000,000	5	$5,000
Wisconsin	N/A	$5,000,000	5	$5,000
Wyoming	$600,000	$5,000,000	5	$15,000

Source: Conference of State Bank Supervisors, data as of 2010.

Appendix B
Major Banking Regulation

Year	Regulation	Description
1978	International Banking Act	US regulations apply to foreign banks with US branches, including requiring deposit insurance and no interstate branching.
1980	Depository Institutions Deregulation and Monetary Control Act	Banks may pay interest on transaction accounts; no limits on time deposit interest rate. Thrifts may perform some activities previously limited to commercial banks and invest in non-mortgage assets. All deposits up to $100,000 now insured.
1982	Garn-St Germain Depository Institutions Act	Thrifts may perform more commercial bank activities, including commercial loans. FDIC powers to help undercapitalized banks expanded.
1987	Competitive Equality Bank Act	Recapitalized the Federal Savings and Loan Insurance Corporation. Categorized all FDIC-insured institutions as "banks" and required them to follow banking regulations.
1989	Financial Institutions Reform, Recovery, and Enforcement Act (FIRREA)	Meant to stabilize thrift industry. Closed accounting loopholes used by thrifts, increased capital requirements and restricted junk bond purchases. Made FDIC the deposit insurer of thrifts, abolished current regulator, and created the Office of Thrift Supervision as the federal regulator of thrifts.
1991	Federal Deposit Insurance Corporation Improvement Act (FDICIA)	Recapitalized FDIC after failure of 1,150 banks; allowed FDIC to intervene earlier with troubled banks. Allowed FDIC to borrow from the Treasury. Required annual on-site regulatory visits, and required banks to report the fair market value of their assets.
1995	Riegle-Neal Interstate Banking and Branching Efficiency Act	Allowed nationwide interstate banking. Caused an increase in banking mergers as BHCs acquired banks in neighboring states.

1999	Gramm-Leach-Bliley Financial Services Act	Repealed the Glass-Steagall Act's prohibition on the affiliation of commercial and investment banks. Included tighter controls on the privacy of customer information at banks. Reduced the frequency of examinations related to Community Reinvestment Act (anti-redlining law) compliance.
2001	International Money Laundering Abatement and Financial Anti-Terrorism Act of 2001	Made it harder to bank anonymously in the U.S. Required banks to have anti-money laundering programs and increased the penalties for money laundering.
2002	Sarbanes-Oxley Act	Increased penalties for publicly-traded companies, including banks, that provide false financial information in reports; CEO must certify report.
2006	Financial Services Regulatory Relief Act	Reduced various regulatory requirements: Made time between examinations longer for banks with between $250 and $500 million in assets (now equal to that for banks with <$250 million) and reduced required reporting on loans made to bank insiders. Allowed the Fed to pay interest on reserves held at the Fed.
2008	Emergency Economic Stabilization Act	Established TARP, which allowed the government to purchase $700 billion in "troubled assets" from banks.
2010	Dodd-Frank Act	Allowed the Financial Stability Oversight Council (which includes members from the Treasury and the Fed) to require banks to increase capital. Required banks to have a plan in case of insolvency. Prohibited banks from investing in hedge funds. Created the Consumer Financial Protection Bureau.