The Entry, Performance, and Risk Profile of De Novo Banks

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Abstract

From 2000 to 2008, 1,042 new community banks were chartered. Despite the largest financial crisis in decades, the vast majority of these new banks either survived or were financially healthy when merged with another bank. In this paper we investigate whether the patterns of community bank de novo formation and failure for this cohort that formed just prior to the recent financial crisis were the same as for new institutions from earlier periods. Similar to previous periods, we find that many of the new banks chartered were in markets that experienced bank mergers or acquisitions, and were large and growing. Consistent with a "life-cycle theory" of de novos, compared with small established banks, recent de novos were financially fragile and failed at higher rates during the crisis. Discrete-time hazards models confirm that failed de novos from the recent period invested heavily in construction and development lending prior to the crisis, similar to the concentrated loan portfolios exhibited by earlier cohorts.

In the period before the recent crisis, 1,042 de novo community bank institutions were chartered, of which 133 eventually failed. In this paper, we investigate whether the reasons for recent de novo entry and failure conform to what has been established in the literature, and whether the recent crisis period failures were similar to or different from those of past crises. In particular, we document recent trends in community bank de novo chartering activity from 2000 to 2008, the years immediately preceding the recent financial crisis. Using vintage analysis, we present characteristics of these de novo banks, including growth, earnings, capital positions, and loan performance, to determine recent de novo attributes at each year of their life cycle. Then we compare differences in financial characteristics among these de novos based on whether they eventually failed, were acquired, or survived.

Previous studies show that de novo entry occurs when economic conditions are favorable, and where merger and consolidation activity reduced the number of banks. For example, Berger et al. (2004) examine entry activity in more than 2,700 local banking markets in the United States for the 1980 to 1998 period, and find that the probability of de novo entry is higher in markets that had experienced mergers or acquisitions in the previous three years, especially those involving large banks. Examining de novos that started in 1997, Moore and Skelton (1998) find that de novos are more likely to start in states that experience rapid population growth, decreased unemployment, with a small number of small banks, and the lowest percentage of bank loans in small-business lending, and for urban markets, where there was less banking competition. For the 1977 to 1988 period, Amel and Liang (1997) find that entry was more likely to occur in large, growing, and urban markets. Similarly, Dunham (1989) finds that de novo entry in New England in the early 1980s was more frequent in states where bank profits were high, and where bank mergers were reducing the number of banks.

DeYoung (1999, 2000, 2003) has developed and written extensively on a "life-cycle" theory of de novo evolution. Studying the 303 new commercial banks chartered in 1985 (DeYoung, 1999), he finds that new banks are unprofitable, but unlikely to fail given their large initial capital cushions. As these banks rapidly grow their assets via lending, their equity cushions decline to similar levels as established banks. While de novos have high capital cushions relative to benchmark banks for their first three years of life, their return on assets (ROA) do not approach established banks until about their 11th year.[1] Therefore, they tend not to fail during their early years of negative profit, but during their subsequent years of positive profit. DeYoung further confirmed this pattern when investigating the long-run (14-year) financial fundamentals and failure patterns for the 1,664 commercial banks chartered between 1980 and 1985 (DeYoung, 2000; DeYoung, 2003). However, this intertemporal pattern varies with economic conditions at the time of start-up, such that de novos' fragility also depends on how their life cycle is positioned relative to the business cycle. De novos chartered just prior to the bank failure period of the late 1980s experienced extreme versions of this life-cycle pattern, whereas those chartered earlier had similar failure patterns as those of established banks.

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[1] For de novos chartered between 1980 and 1994, DeYoung and Hasan (1998) find that it takes nine years on average for these new banks to reach the profit efficiency of established banks.

In addition to weak financial fundamentals and negative external economic conditions, lack of portfolio diversification and reliance on non-core funds were found to contribute to de novo fragility and failure.[2] Looking at banks chartered between 1995 and 2003, Yom (2005) finds that these young banks had greater concentrations than established banks in riskier assets such as commercial and industrial (C&I), construction and development (C&D), and commercial real estate loans. Further, these banks relied more heavily on non-core funds, which are also more likely to be demanded in times of economic stress. Inadequate capital, economic stress, poor management, operating inefficiencies, as well as use of brokered deposits and rapid asset growth were found to contribute to failures of savings and loans de novos operating in the 1980 to 1986 period (Hunter, Verbrugge, and Whidbee, 1996). Gunther (1990) attributes the large number of failures of new Texas banks in the late 1980s to these banks' aggressive strategies, such as concentrating in C&I lending, maintaining low liquidity, and relying heavily on purchased funds.

As in the literature for earlier periods, we find that many community banks chartered in the most recent period were in markets that experienced bank mergers or acquisitions, and were large and growing.[3] However, contrary to earlier new charters, these de novos were formed in less, rather than more, concentrated markets. Consistent with a life-cycle theory of de novos, compared with small established banks, these de novos were financially fragile and took many years to reach maturity, relying more on non-core funding, and failed at higher rates during the recent financial crisis. Discrete-time hazard models confirm that the de novo banks that failed tended to be financially unhealthy and, similar to the concentrated loan portfolios exhibited by earlier cohorts, failed de novos from the most recent period invested heavily in C&D lending. We conclude, therefore, that de novo entry prior to and failure during the most recent crisis were similar in many regards to patterns found in the literature studying de novo banks chartered in 1970s to early 2000s.[4]

From a deposit insurance fund perspective, de novo failures were a relatively minor contributor to the cost of the crisis. To the extent that the formation of new banks is important to the vitality of the community banking sector and to the local economies which they serve, the cost of de novo failures should be weighed against the economic benefits of allowing new banks to be formed. The new banks that failed were relatively small, averaging $216 million in assets.[5] The cost of resolving these new bank failures

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[2] Core deposits are those funds collected by banks from regular customers in their geographic lending market, for example, through savings accounts. These are stable sources of funds that are acquired at relatively predictable costs. Non-core funds, such as federal funds purchased, Federal Home Loan Bank advances, and large time deposits, can be volatile sources of funds that can leave the bank on the basis of small rate differentials.

[3] De novo banks examined in earlier studies include those chartered from the 1970s to the 1990s.

[4] At the same time, how new banks are chartered have changed compared with earlier periods. Before FDICIA, national banks and state member banks were granted Federal Deposit Insurance upon being chartered by the OCC and the Federal Reserve Banks while state nonmember banks needed the FDIC approval of insurance before a state granted a new charter.

[5] Bank balance sheet figures, including assets and total loans and leases, are obtained from regulatory Reports of Condition and Income, also known as "CALL Reports," which are mandated under FFIEC reporting requirements.

was estimated to be $8.9 billion.[6]   As such, these banks represented 27 percent of all failures from 2008 to 2015, but only 14.3 percent of the total costs of failure. In contrast, a single, large institution, IndyMac, had estimated losses exceeding $12 billion. In addition, the remaining de novos have contributed to both maintaining a competitive banking system and to lending to their community. Without the new bank formation that took place from 2000 through 2008, there would have been 634 fewer FDIC-insured institutions as of September 2015, which would have represented a reduction of roughly 10 percent from the actual population of 6,270 institutions at that time. At the end of the third quarter 2015, these 634 institutions held $214 billion in total loans and leases.[7]

These findings suggest that de novo banks' weak performance and high failure rate in early years are balanced against the important roles they play, such as providing local small-business loans and increasing competition by curbing the exercise of market power via entry. To promote de novo banks to become healthy, established institutions, it is important to monitor and supervise effectively their risk-taking behavior and enforce good risk management practices.   While it is beyond the scope of this paper to comprehensively evaluate the benefits of de novos against the costs of their failure, we instead provide context for the most recent crisis period in order to gain understanding in how to support new banks such that they can contribute to the vitality of the community banking sector and the local economies in which they serve.

The paper is organized as follows: Section I presents recent trends in de novo entry and models the determinants of entry. Using vintage analysis, Section II explores several aspects of de novo performance before and during the crisis. Section III uses a discrete-time hazard model to explore which financial characteristics affect recent de novos' probability of failure. Section IV concludes.

1.   De Novo Entry

1.A Recent Descriptive Trends in De Novo Entry

Our study examines the set of traditional de novo institutions that are also community banks. Not all newly chartered institutions are traditional de novo banks. Traditional de novo banks refer to newly formed institutions that have to build their deposit and loan customers from scratch. For instance, existing nonbank financial institutions, such as credit unions, can change charters to become newly chartered commercial banks, but are not de novo institutions for our purposes. This section describes the criteria used to determine when a "new" institution is a "traditional community bank de novo." It then documents the volume and geographic location of these new institutions and their areas of lending specialization.

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[6] Costs of resolution are obtained from the FDIC's Failure Transactions Database.

[7] In comparison, SBA reported $118.8 billion total loans on their balance sheet for fiscal year 2015. https://www.sba.gov/sites/default/files/aboutsbaarticle/Agency_Financial_Report_FY_2015.pdf.

Between 2000 and 2008, 1,341 new institutions were chartered in the United States. Of these new banks, 225 were part of a multibank holding company at inception, which we excluded from the traditional de novo population. Of the remaining institutions, 34 began with a large level of assets (greater than $100 million). Bank-by-bank investigation of these 34 entities indicated that 19 were not traditional de novos. Of the 89 de novo institutions that were not considered a community bank according to the FDIC's research definition[8], we retain 34 that eventually appeared on the community bank list, three years after charter.[9] In total, we identified 1,042 institutions that we consider community bank de novos.

Figure 1 shows total community bank de novos, by year of charter, for these 1,042 institutions. The left axis shows the number of new charters each year, while the right axis shows the share of community bank de novos to total community banks. There are two peaks in community bank de novo chartering activity in our period of study. The first occurred in 2000, with 159 new charters. The second occurred in 2006, with 151 new charters. Figure 1 shows that de novos are typically a small share of existing community banks, never exceeding 2 percent of all community banks in a given year.

Figure 2 shows total de novo charters by year and primary regulator. The majority of community bank de novos are state-chartered and regulated by the Federal Deposit Insurance Corporation (FDIC). In total, 76.5 percent of the de novos in the period were chartered as state nonmember banks. The majority (83.6 percent) of these community bank de novos were headquartered in Metropolitan Statistical Areas (MSAs).[10] Figure 3 shows the share of de novos chartered in our study period, by the nine census regions. The largest share, 32.6 percent (339 banks), was chartered in the South Atlantic, which consists of Delaware, the District of Columbia, Florida, Georgia, Maryland, North Carolina, South Carolina, Virginia, and West Virginia. The Pacific region, consisting of Alaska, California, Hawaii, Oregon, and Washington, had the next largest share, at 15.6 percent (162 banks). New England had the smallest share, with 2 percent (21 banks) community bank de novo charters.

Figures 4 and 5 explore chartering activity by state. Figure 4 shows the location of total charters over the period, by state. The states with the largest volume of de novos were California, Florida, Georgia, and Texas, with 123, 118, 112, and 72 charters, respectively. Figure 5 shows the share of de novos to the total number of community banks at the

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[8] The FDIC defines community banks as those banking organizations with assets less than $1 billion in 2010. For banking organizations above that size threshold, other considerations are employed, such as a loan-to-assets ratio greater than 33 percent, core deposits-to-assets ratio greater than 50 percent, and the number of offices, location, and geographic dispersion of the bank's offices. For the exact definition, see "FDIC Community Banking Study," FDIC, December 2012, https://www.fdic.gov/regulations/resources/cbi/report/cbi-full.pdf.

[9] At inception, a de novo may not yet have the characteristics of a community bank, such as a high loan-to-assets ratio. Of the 34 retained, 32 appeared on the community bank list one year after chartering, another appeared two years after chartering, and one more three years after chartering. The remaining 55 institutions (89 less 34) did not appear on the community bank list even up to five years after chartering.

[10] In comparison, 61 percent of the banks are state nonmember banks and 52 percent are headquartered in MSAs as of December 2008.

beginning of the period. Arizona had the largest share of de novo-to-existing institutions, at 95.5 percent, followed by Nevada (66.7 percent), and California (47.1 percent).

In summary, from 2000 to 2008, there were 1,042 newly chartered community bank de novos, with the majority FDIC-regulated and formed in MSAs. The South Atlantic region had the largest overall share of de novo chartering activity, while the individual states of California, Florida, and Georgia received the most new banks.

1.B Regression Analysis of Recent De Novo Entry

In this section, we model the determinants of de novo entry in local markets from 2000 to 2008 using regression analysis. Similar to earlier studies—Keeton (2000), Seelig and Critchfield (2003), Berger et al. (2004)—we model de novo entry into local areas by controlling for merger and acquisition (M&A) activity, local market conditions, and the financial conditions of existing banks in the local market.

In this analysis, data on bank mergers and acquisitions were acquired from the FDIC's proprietary merger history database, while variables on bank deposits were derived from the FDIC's Summary of Deposits (SOD) data, and bank financial ratios and portfolio shares were obtained from the Report of Condition and Income, also known as the regulatory CALL Report.[11] Statistics for population and income growth were obtained from the Bureau of Economic Analysis, and for house price index growth from the Federal Housing Finance Agency.

The probability of a new bank entry in a county is

$$ENTRY_{it} = \alpha + \beta_1 Merger\ and\ Acquisitions_{i,t-1,t-2,t-3} + X\beta_2 + \varepsilon \qquad (1)$$

The dependent variable, $ENTRY_{it}$, measures whether a new bank's headquarters was formed in county i in year t. We further assume that the error term ε has a standard logistic distribution.

The explanatory variables are measured as the average of the previous three years (*t-3*, *t-2*, and *t-1*) or as of the end of year *t-1*. Two variables are used to measure M&A activities in counties: *Merger Deposits* and *Acquisition Deposits*. *Merger Deposits* is defined as a share of county deposits held by banks involved in mergers (where the charters of the banks involved in the merger are consolidated)*, averaged over the previous three years. *Acquisition Deposits* is defined as the county share of deposits held by banks involved in acquisitions (where the acquired bank retains its own separate charter, but its bank holding company ownership changes), averaged over the previous three years.

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[11] The SOD is collected by the FDIC from banks as of June 30 of each year, and contains branch level geographic and deposit information. The CALL Report is filed quarterly by all banking institutions and contains basic financial information related to banks' balance sheets and income statements.

Mergers and acquisitions can encourage de novo entry when they reduce small-business lending and other banking services locally. This can occur when small banks focused on providing banking services in the local market merge with or are acquired by large banks or distant banks. Small banks tend to specialize in small-business lending and other services that emphasize personal customer contact. Keeton (2000) finds that relationship between entry and mergers is strongest when small banks were taken over by large banks or local banks by distant banks. His findings support that a positive relationship between mergers and entry by de novo banks can be attributed to reductions in small-business lending or other services to customers with preferences for personal contact. Therefore, if mergers and acquisitions result in these services being diminished because large banks are less likely to focus on these types of services, then there is potential for de novo banks to meet these needs.

Mergers and acquisitions can also lead to de novo entry when displaced senior managers of merged or acquired banks start a new bank. Or, instances where individuals repeatedly start new banks with the goal of selling them can result in a positive correlation between mergers and acquisitions and de novo entry.

The impacts of mergers and acquisitions on de novo entry can differ because mergers tend to be more disruptive to a bank than an acquisition (Berger, Bonime, Goldberg, and White, 2004). For instance, mergers can replace the senior managers and board of directors of one of the banks, changing policies and procedures, and integrating financial and accounting systems. Acquisitions, in contrast, typically involve fewer organizational changes. As a result, we expect the estimated coefficients on *Merger Deposits* and *Acquisition Deposits* to be positive, and to potentially differ.

Other variables, **X**, in equation (1) include local market conditions, such as share of deposits owned by large banks, market concentration, market size, recent market growth rate, and financial ratios of existing local banks.

Summary statistics on counties with and without de novo entry are reported in Table 1. The variables in Panel A describe a county's bank market environment and structure. Shares of county deposits held by banks involved in mergers and acquisitions are both higher in counties with de novo entry. For instance, 4.2 percent of county deposits are held by banks involved in mergers in counties with de novo entry, compared with 2.6 percent in counties without de novo entry. Counties with de novo entry have substantially higher deposits held by large banks, higher population, and higher deposits, compared with counties without de novo entry. Moreover, counties with de novo entry have higher population growth, bank deposit growth, state income growth, and House Price Index (HPI) growth compared with those without de novo entry.

The variables in Panel B report the financial ratios of existing banks in a county. These financial ratios are constructed as the deposit-weighted average value of financial ratios for the existing banks, with more than 50 percent of their deposits in the county. For instance, *ROA* refers to a deposit-weighted average ROA ratio of all existing banks in the county with over 50 percent of their deposits in the county.

Panel B shows that in counties with de novo entry, banks with the majority of their deposits in the county have lower average equity and non-performing loans to assets ratios compared with banks in counties without de novo entry. Moreover, banks in counties with de novo entry tend to have higher concentration in both C&D and CRE loans. This finding is consistent with Yom (2005), who found that de novo banks were located in markets where an average bank was more susceptible to a real estate crisis resulting from higher concentration in real estate loans. For instance, the deposit-weighted average C&D loans-to-assets ratio is 9 percent in counties with de novo entry, compared with 4.3 percent in counties without de novo entry. In contrast, there is no statistical difference in average single-family residential loans-to-assets ratio across counties with and without de novo entry.

Table 2 reports the results of the de novo entry regression analysis. Column (1) reports the results supporting the hypothesis that bank mergers and acquisitions increase the probability of de novo entry into the market where mergers and acquisitions occur. The estimated coefficients on *Merger Deposits* and *Acquisition Deposits* are positive and statistically significant. Mergers and acquisitions increasing the probability of subsequent entry is consistent with the earlier studies' findings (Keeton, 2000; Seelig and Critchfield, 2003; Berger, Bonime, Goldberg, and White, 2004).

To evaluate the economic significance of *Merger Deposits* and *Acquisition Deposits* variables on entry, we estimate the change in predicted probability of entry when there are no bank mergers or acquisitions in the county. To approximate the de novo entry probability of an average county, we compute the predicted entry probability using mean values of the explanatory variables. For our sample period, an "average" county has an annual entry probability of 1.64 percent. Calculating the probability of entry when the *Merger Deposits* value is its mean value and comparing that to when the value is zero yields a decrease in entry probability of 0.25 of a percentage point. Thus, when an average county has no mergers, the entry probability is lowered by 15.2 percent. A similar exercise using the *Acquisition Deposits* variable shows that the effect of bank acquisitions on de novo entry is smaller than that of mergers. Calculating the effect of a change in *Acquisition Deposits* from its mean value to zero lowers entry probability by 0.14 of a percentage point, or by 8.5 percent.

The model includes a variable *Large Bank Deposit Share*, which measures the share of deposits owned by large banks ($1 billion or more in assets) in the county. To the extent that large banking organizations focus less on small-business lending and other services that emphasize personal contact, counties with a higher share of large bank deposits should attract de novo entry. However, Column (1) shows that the estimated coefficient on *Large Bank Deposits* is statistically insignificant.

Market concentration, measured by the Herfindahl-Hirschman Index (HHI) on deposits, is negative and statistically significant, indicating that entry probability is higher for

counties with a less concentrated deposit market.[12] This finding is consistent with the presence of barriers to entry.

We include two market size variables: log of county population and log of county deposits. The estimated coefficients on these variables are positive and statistically significant, indicating that de novo banks are attracted to large markets. Conceivably, there is greater demand for services of de novo banks in large markets.

To measure recent market growth, we include the population growth rate, deposit growth rate, state income growth rate, and housing price index growth rate. The estimated coefficients on population growth rate and state income growth rates are positive and statistically significant. This finding is consistent with the theory that de novo entrants are attracted to markets that are growing and expanding, with increasing demand for banking services. Although positive, the estimated coefficients on HPI growth rate and county deposit growth rate are statistically insignificant.

The regression also includes census region dummy variables. The New England region is excluded as the base case. The estimated coefficients on the census region indicators are positive and statistically significant, indicating that the probability of de novo entry in other census regions differs from that in the New England region.[13]

Column (2) of Table 2 expands the model specification by including existing banks' financial ratios, which are deposit-weighted average values of incumbent banks with over 50 percent of their deposits in the county. We include measures of financial health of these local market banks, given that more efficient or financially sound incumbents should make stronger competitors, which is likely to deter entry. On the other hand, strong financial performance of incumbent banks can signal favorable economic conditions, which would encourage entry.

The coefficient on *Nonperforming Loans* is negative and statistically significant, which is consistent with favorable economic conditions in the county and good credit quality customers, which encourages entry. An alternative explanation is that incumbent banks in counties with higher de novo entry concentrate in C&D loans and that interest reserves on these loans keep their nonperforming loans ratios low. Frequently, banks fund an interest reserve upon origination of a C&D loan which is used to pay interest on the loan until the construction and development project is completed. This feature can mask credit problems on C&D loans and result in low nonperforming loans ratios.

The estimated coefficients on the *ROA* and *Equity* are statistically insignificant. Counties where existing banks have high concentration in C&D loans have higher de novo entry. This suggests that investors of new banks are attracted to markets with investment opportunities in C&D loans. At the same time, established banks' high share in C&D loans may be a proxy for growing markets. Established banks' concentration in

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[12] The greater the county's HHI, the more concentrated are its deposits.
[13] The estimated coefficients on the census regional dummies are not reported.

other types of loans, commercial real estate (CRE), single-family residential, and small-business loans do not affect entry probability with statistical significance.

In summary, regression analysis on de novo entry in local markets shows that new bank start-ups are more likely to occur in counties that have had bank mergers or acquisitions. This finding is consistent with the proposition that new banks enter markets to fill in the gap of reduced banking services resulting from mergers or acquisitions. New banks are also more likely to occur in large, growing, and less concentrated markets. Moreover, they are more likely to occur in counties where existing banks have low nonperforming loans and high concentrations in C&D loans.

2. Vintage Analysis of Recent De Novo Bank Performances

In this section, we examine how the recent cohort of de novo banks perform once chartered, especially during and before the crisis. Here, all data presented come from regulatory CALL Reports.

We group de novo banks by the year in which they are chartered, or class, because existing research suggests that newly chartered banks follow a distinct life-cycle pattern.[14] Following literature conventions, Figures 6 through 10 show the median values of financial ratios for each class of de novo banks. These figures also show the median ratios of a benchmark group of banks, which are comparable in size and located in metropolitan areas.[15] We choose as a benchmark small established community banks older than 15 years, with asset sizes less than the asset size of de novo banks at the 95th percentile at each quarter, and headquartered in a metropolitan statistical area. As shown in Section 1, de novo banks are predominantly urban, so the established institutions with which we compared them are located in metropolitan statistical areas.

Figure 6 shows that de novo banks grow rapidly in their first few years. For instance, during their first year of operation, the median one-year asset growth for the de novo bank classes ranged between 169 percent and 246 percent. In comparison, the median growth rate for established banks ranged from 3.8 percent to 6.6 percent during the same period. Growth in the first few years is important for de novo banks' survival and sound performance.[16] With low business volume, these banks are likely to spend disproportionally more on salaries and overhead expenses. To become profitable and viable, these new institutions need to grow and use their facilities and staff efficiently.

De novo banks lack established customer relationships and market recognition. Many of the recent de novo banks had growth aspirations that exceeded the availability of core deposits. To grow, the de novo banks studied here relied heavily on non-core sources of

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[14] See DeYoung (1999, 2000).

[15] The comparison of de novos with small established banks as benchmark is the common practice in the de novo literature. For example, Dunham (1989) compares de novos with commercial banks in the same state with less than $200 million in assets, Hunter and Srinivasan (1990) and Moore and Skelton (1998) with banks with less than $100 million in assets, and DeYoung (1999, 2000) with banks with less than $500 million in assets.

[16] Arshadi and Lawrence (1987).

funds. Figure 7 shows that although initially de novo banks have lower non-core funds-to-assets ratios, the ratio quickly rises in the early stages of a de novo's life cycle and remains higher than that of established banks.[17]

Figure 8 shows that de novo banks lose money in early years. Even after de novo banks earn positive income, they continue to underperform relative to small established banks, often for many years. For the vintages of de novo banks studied here, their median earnings ratios lag those of small established banks. Especially during the recent crisis, de novo banks earned lower income than established banks. While the earnings of some early cohorts of de novo banks caught up in 2006 and 2007, they deteriorated during the crisis, often more severely than for small established banks. And, the de novo banks of later vintages, specifically those that were chartered at the beginning of the recession or were very young when the recession began, suffered lower earnings than de novo banks of earlier classes. This is consistent with DeYoung (2000), who finds that the performance of de novo banks also depends on the position of their formative years relative to the stage of the business cycle.

Figure 9 shows that de novo banks have very high initial capital-to-assets ratios, with median ratios for de novo bank classes ranging from 48 percent to 77 percent. As these banks grow, their high start-up capital ratios converge quickly to those of established banks. The decline in capital ratios is driven by high growth rates and low earnings in early years.

De novo loan performance measures also exhibit a life-cycle pattern, although the pattern is not as strong as in some other performance measures. Figure 10 shows median non-performing loans-to-assets ratios, by de novo vintage. While the recession figures prominently in the loan performance of all classes, de novo banks typically have low non-performing loan ratios in early years, because a large share of their loan portfolio is unseasoned. After a few years in operation, de novo banks' problem loans begin to increase as their loans season. Of course, strong business cycles can swamp this seasoning effect. Starting in late 2007 and early 2008, de novos experienced a sharp increase in non-performing loans regardless of the charter year. During the crisis, the median non-performing loans ratios for de novo bank classes were worse than those for established banks except for the youngest classes, Classes 2007 and 2008, which had a higher share of unseasoned loans.

In summary, the performance of the most recent cohort of de novo banks is similar to that found for earlier cohorts--de novo banks are financially fragile and take many years to reach full maturity (DeYoung and Hasan, 1998, and DeYoung, 2000). The previous figures generally show that the financial ratios of de novo banks display a distinctive life-cycle pattern, following similar time paths regardless of the year of chartering. They appear sound in early years, with large capital cushions and low levels of non-performing loans. However, financial performance measures deteriorate as they grow their loan

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[17] Non-core funds are specifically defined as a sum of time deposits over $100,000, foreign office deposits, fed funds purchased and securities sold under agreement to repurchase, and other borrowed money.

portfolios and their loans season, with earnings typically remaining below that of established peers.

3.   De Novo Bank Failures, Mergers, and Survivors

3.A De Novo Outcomes

De novo banks studied here were chartered under an economic environment characterized by rapid expansion, followed by a severe recession. In this section, we investigate the outcomes of these fledgling institutions. Data on institution failures and supervisory CAMELS ratings were obtained from proprietary FDIC datasets.[18]

Out of the 1,042 de novo banks chartered between 2000 and 2008, 133 (12.8 percent) failed while 205 (19.7 percent) exited without failing, specifically, via merger or liquidation.[19]   In comparison, 4.9 percent of small established banks exited via failure while 25.3 percent exited without failing. Thus de novo banks' failure exit rate is more than twice the rate of small established banks, while their non-failure exit rate is lower than that of small established banks. De novo banks' higher failure rate is consistent with previous studies, which found that they are financially fragile and more susceptible to failure, especially when business cycle conditions deteriorate.[20] Among 205 non-failure de novo exits, 195 were mergers and 10 were liquidations. Figure 11 shows the number of de novo exits via failure or acquisition each year. De novo failures are concentrated in the crisis period, starting in 2008, with sharp rises from 2009 to 2011. De novo acquisitions are dispersed across 2002 to 2014, with a sharp rise in 2012 and 2013.

Are there differences in financial health across de novo banks with different exit outcomes? We compare their financial health by investigating de novo banks' last CAMELS rating before exit. CAMELS ratings are based on assessments of banks' capital, asset quality, management, earnings, liquidity and market sensitivity, assigned by bank regulators.   The ratings are integer-valued and range from 1 (best) to 5 (worst). Table 3 reports the last composite CAMELS rating of failed, acquired, and liquidated de novo banks. While all 133 failure exits were CAMELS 5 rated, more than half (60.5 percent) of acquisitions were 1 or 2 rated at their last examination. Among liquidations, four banks were 2 rated, while the remaining six were rated 3, 4, or 5, suggesting that de novo banks tend to be poorly performing when they decide to liquidate.

Table 4 lists five states with the highest number of de novo bank failures. Georgia had the highest number of failures with 42 banks, followed by Florida with 23. Illinois, California, and Arizona are the remaining states with 11, 8, and 6 failures, respectively.

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[18] CAMELS ratings stand for: Capital adequacy (C), Asset quality (A), Management quality (M), Earnings (E), Liquidity (L), and Sensitivity to Market Risk (S).

[19] De novo bank outcomes are as of September 2014.

[20] For example, DeYoung (2003) finds that the relationship between external conditions (such as intense competitive rivalry or slow economic growth) and higher failure rates is more systematic for de novo banks than for established banks.

Figure 12 shows de novo failures by census region as a percent of total de novo failures in the United States. More than half (56 percent) of all failed de novo banks are headquartered in the South Atlantic region. In comparison, other regions have substantially lower shares of de novo failures. For instance, the regions with the second largest shares of failed de novos are Mountain and East North Central, with 11 percent each. The disproportionately large share of failed de novos in the South Atlantic region is explained in part by the large share of de novos that were chartered in that region. Figure 13 shows de novo failures by census region, as a percent of total de novos in that region. When measured as a percentage of the total number of de novo banks in the region, the de novo failure rate in the South Atlantic region is 22 percent (compared with 56 percent when the base is all de novos). The South Atlantic region was not only the most active charting region, it also had the highest rate of new charters failing. The three regions with the highest rate of de novos failing remain South Atlantic (22 percent), Mountain (20 percent), and East North Central (16 percent).

Figure 14 shows that 34 percent of the de novo banks that exited via mergers were headquartered in the South Atlantic region. Other regions had substantially lower shares of de novo mergers. The second and third regions with the largest share of merged de novos were the Pacific (17 percent) and West South Central regions (15 percent). Figure 15 shows the number of de novo bank exits via merger in each census region as a percent of the total number of de novo banks in that region. The New England and West South Central regions had the highest percentage, where 33 percent of all de novo banks chartered were merged, followed by the mid-Atlantic (23 percent) and Pacific (21 percent) regions. Figures 13 and 15 show that 5 percent of de novo banks exited via failure and 33 percent exited via mergers in the New England region. In contrast, de novo banks headquartered in the South Atlantic, East North Central and Mountain regions exited via failures at a higher rate than via mergers.

3.B Comparison of Failed, Merged, and Survived De Novo Banks

Next, we group de novo banks into three groups—survived, merged out, and failed—and compare their median financial ratios starting five years prior to exit outcome. For survived banks, the exit period is assumed to be the end of their 29th quarter.[21] Here, as before, bank financial ratios and portfolio shares come from regulatory CALL Reports.

Figure 16 shows that roughly three years prior to exit, the median equity to assets ratio for failed banks started to decline and deviate from those of the other two groups. In their last quarter prior to failure, the median equity ratio was close to zero percent. For the earnings to assets ratio, Figure 17 shows that failed de novos had the highest median ratio five years prior to exit. Roughly three years prior to exit, however, their median earnings ratio began to decline, reaching as low as –6 percent before failure. Figure 18 shows that a rise in the median non-performing loans-to-assets ratio at failed de novos' started three years prior to exit.

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[21] The average age of failed and merged de novos was 29 and 28 quarters, respectively. Hence, we assigned an exit age for survived de novos as 29 quarters.

These figures show that financial deterioration of failed de novos began roughly three years prior to exit. They also show that median financial ratios of survived and merged de novos remained comparable throughout the five-year period. Figures 19 and 20 show that failed de novos relied more heavily on non-core funds and brokered deposits. Last, Figures 21 to 23 show that failed de novos also invested more heavily in C&D loans compared with survived and merged de novos, and that they had lower concentrations in C&I and CRE loans.

3.C Determinants of De Novo Outcomes

What factors determine the different exit outcomes of de novo banks? In this section, we employ Shumway's (2001) discrete-time hazard model to investigate whether the financial characteristics of de novo banks affect their probability of failure.[22]

Summary statistics for the variables used in the hazard model are reported in Table 5, which include measures of de novo banks' financial characteristics, such as equity, income before taxes, non-core funds, non-performing loans-to-assets ratios, and one-year asset growth rate. Also included are measures of the banks' loan portfolio composition, such as C&D, C&I, 1-to-4 family residential, CRE, and small-business loans-to-assets ratios.[23]

Table 5 shows that compared with survived de novo banks, those that failed had lower equity, earnings, and asset growth rate on average. At the same time, failed de novo banks relied more heavily on non-core funds and had higher non-performing loans to assets ratio. In terms of loan concentration, failed de novo banks had higher C&D loans and lower small-business loans-to-assets ratios.

Table 6 reports the estimation results of the hazard models for de novo bank failures. Column (1) shows that de novo banks with higher equity and income before taxes-to-assets ratios were less likely to fail. In contrast, those with higher ratios of non-core funds and non-performing loans to assets were more likely to fail. These results are similar to the findings on established bank failure models.[24] Column (2) reports the results of the model when the loan concentration ratios of de novo banks are added to the model. The estimated coefficients on the financial ratios remain similar. The exception is the estimated coefficient on the non-core funds ratio, which is no longer statistically significant. Among the loan concentration ratios, only the C&D-to-assets ratio is positive and statistically significant.

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[22] Since the likelihood function of a multi-period logit model is equivalent to that of a discrete-time hazard model, Shumway shows that the discrete-time hazard model can be estimated using standard logistic regression estimation method on pooled time series of bank data. The test statistics produced by a logit program need to be adjusted to account for the lack of independence between bank-year observations.
[23] Small-business loans are proxied by C&I loans with original loan amount less than $1 million.
[24] See Cole and Wu (2009) and Wheelock and Wilson (2000).

These results suggest that de novo banks in poor financial health, with lower equity, lower earnings, and higher non-performing loans were more likely to fail. In addition, de novo banks that failed tended to invest more heavily in C&D loans.

4.   Conclusion

Of the 1,042 de novo community bank institutions chartered before the recent crisis, 133 eventually failed. We investigate trends in recent de novo entry and reasons for failure, and compare our results to the patterns and findings of earlier studies, which examine de novo banks chartered between the 1970s and the early 2000s. For de novos chartered between 2000 and 2008, we find—as in earlier periods—that they were more likely to form in markets that experienced bank mergers or acquisitions, and that were large and growing. However, contrary to earlier new charters, de novos of the recent period were formed in less, rather than more, concentrated markets.

Consistent with the life-cycle theory of de novos, these de novos were financially fragile, relied more on non-core funding, and failed at higher rates than small established banks during the recent financial crisis. Discrete-time hazard models confirm that the de novo banks that failed had invested heavily in C&D lending, similar to the concentrated loan portfolios exhibited by earlier cohorts (Yom, 2005).

We conclude that the patterns of distress for the de novos formed prior to the most recent crisis were similar in many ways to those found for de novos of earlier periods. Excessive risk-taking, namely, concentration in riskier types of loans such as C&D and heavy reliance on non-core funds, resulted in these fledgling institutions being vulnerable to periods of economic stress. These findings highlight the importance of sound risk management practices, for example, establishing limits on loan concentration and reliance on non-core sources of funds, at de novo banks. Moreover, the findings provide some guidance to regulators on the indicators to be monitored in evaluation of de novo health and risk management.

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Table 1. Descriptive Statistics on De Novo Entry

	Entry[1]			No Entry	
	Mean	**STD**		**Mean**	**STD**
A. Bank Market Environment and Structure					
Merger Deposits[2]	4.2***	4.0		2.6	3.6
Acquisition Deposits[3]	2.7***	2.7		1.9	3.2
Large Bank Deposit Share	68.4***	23.9		36.8	31.7
Herfindahl-Hirschman Index	0.2***	0.1		0.3	0.2
Population, County	709,246 ***	1,235,501		73,262	176,120
Bank Deposits, County	16,104,698	37,047,347		1,172,712	5,577,288
Population Growth	1.5***	1.6		0.5	1.7
Deposit Growth	7.8***	13.6		4.5	14.2
State Income Growth	3.1***	2.1		2.5	2.1
House Price Index Growth	1.3***	2.6		0.8	2.2
B. Bank Financial Ratios					
ROA, County	1.1	0.8		1.1	0.8
Equity, County	9.7***	2.8		10.5	3.2
Non-performing Loans, County	1.1***	0.9		1.5	1.2
C&D, County	9.0***	8.1		4.3	5.6
CRE, County	16.1***	8.4		11.5	7.6
Single Family Residential, County	20.5	12.7		19.9	12.5
Small-business Loans, County	6.8***	4.1		7.8	4.9

[1]Entry refers to a de novo bank branch formation in a county. The sample includes de novo bank branch formations from 2000 to 2008.
[2]Deposits at merged-out banks.
[3]Deposits at acquired banks.
*** Mean value at counties with de novo entry are significantly different from that in counties without de novo entry at the 1% level.

Table 2. De Novo Entry Logistic Regression Model[1]

Variable	Entry	
Intercept	-18.44***	-18.67***
Merger Deposits[2]	0.07***	0.07***
Acquisition Deposits[3]	0.05***	0.05***
Large Bank Deposit Share	-0.002	-0.005*
Herfindahl-Hirschman Index	-1.17**	-0.93*
Log of Population, County	0.51***	0.56***
Log of Deposits, County	0.55***	0.53***
Population Growth	0.15***	0.13***
Deposit Growth	0.001	0.001
State Income Growth	0.05**	0.05**
House Price Index Growth	0.01	0.02
ROA, County		0.07
Equity, County		-0.01
Nonperforming Loans, County		-0.18***
C&D, County		0.03***
CRE, County		-0.003
Single Family Residential, County		0.01
Small-business Loans, County		-0.01
Likelihood Ratio	2495***	2301***
Regional Dummies	Yes	Yes
Number of Observations		

[1]Entry refers to a de novo bank branch formation in a county. The sample includes de novo bank branch formations from 2000 to 2008.
[2]Deposits at merged-out banks.
[3]Deposits at acquired banks.
*** indicates statistical significance at 1%, ** indicates statistical significance at 5%, and * indicates statistical significance at 10%.

Table 3. Last CAMELS Rating of De Novo Banks, Before Exit*

Last Rating	Failures	Acquisitions		Liquidations	
1		14	(7.2%)		
2		104	(53.3%)	4	(40.0%)
3		41	(21.0%)	1	(10.0%)
4		22	(11.3%)	3	(30.0%)
5	133 (100%)	12	(6.2%)	2	(20.0%)
No rating		2	(1.0%)		
Total	**133**	**195**		**10**	

*De Novo outcomes and CAMELS ratings are as of September 2014.

Table 4. Five States With Highest Number of De Novo Bank Failures*

STATE	FAILURES	(PERCENT)	MERGERS	(PERCENT)	SURVIVED	(PERCENT)
GA	42	(38%)	13	(12%)	56	(50%)
FL	23	(19%)	25	(21%)	71	(60%)
IL	11	(27%)	4	(10%)	26	(63%)
CA	8	(7%)	26	(21%)	89	(72%)
AZ	6	(29%)	2	(9%)	13	(62%)

*De Novo outcomes and CAMELS ratings are as of September 2014.

Table 5. Descriptive Statistics for Variables Used in Failure Hazards Models

Variable[1]	Failed			Survived	
	Mean (%)	STD (%)		Mean (%)	STD (%)
Equity	7.2***	5.3		11.6	4.6
Income Before Taxes	-2.9***	2.9		-0.1	1.7
Non-core Funds	32.9***	11.4		26.0	11.1
Non-performing Loans	6.5***	4.8		1.3	2.1
One-year Asset Growth	14.6***	37.7		30.5	45.5
C&D Loans	19.5***	11.9		9.5	8.8
1-to-4 Family Residential Loans	14.7	10.3		16.1	11.3
CRE Loans	24.7	10.7		24.7	11.8
Small-business Loans	7.2***	6.1		8.7	6.3

[1]One-year asset growth rate is annual change in total assets in percentage. The remaining variables are ratios scaled by total assets in percentage.

*** The failed bank means are significantly different from the survived bank means at the 1% level.

Table 6. Failure Hazards Models

Variable	Failure	
Intercept	-3.41***	-4.38***
Equity	-0.18***	-0.19***
Income Before Taxes	-0.21***	-0.25**
Non-core Funds	0.03**	0.03
Nonperforming Loans	0.23***	0.19***
One-year Asset Growth	0.01	0.003
C&D Loans		0.09***
1-to-4 Family Residential Loans		0.01
CRE Loans		0.003
Small-business Loans		-0.02
Likelihood Ratio	330***	409***
Number of Observations	1,012	1,012

*** indicates statistical significance at 1%, ** indicates statistical significance at 5%, and
* indicates statistical significance at 10%.

Figure 1. Total and Share of Community Bank De Novos, by Charter Year
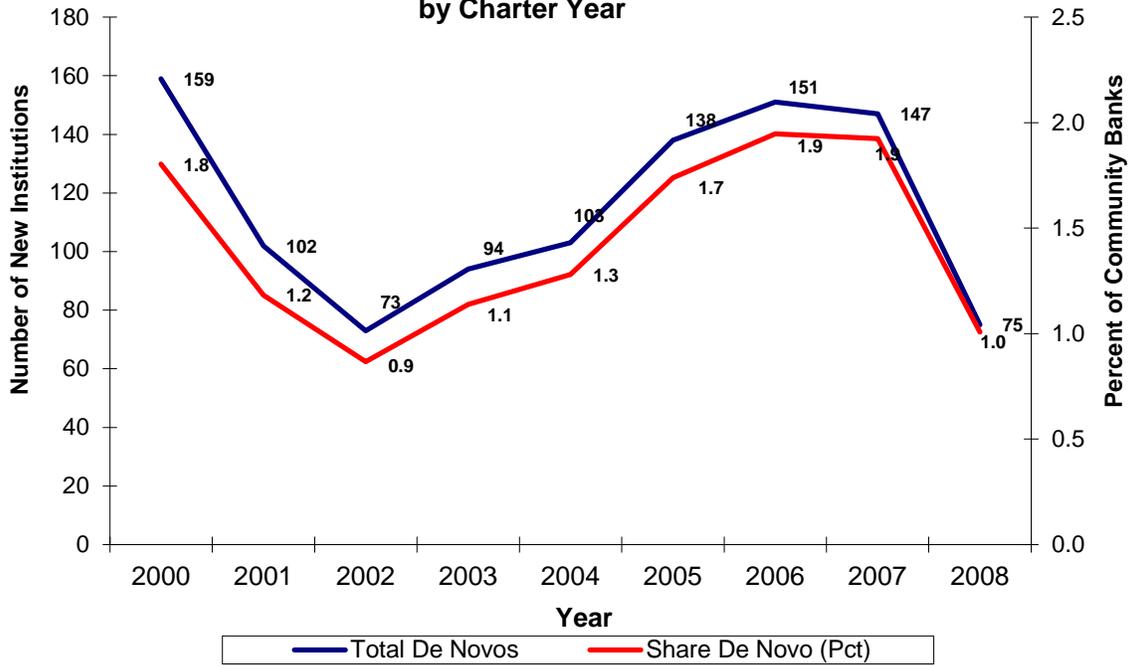
Figure 2. De Novos, by Regulator and Charter Year
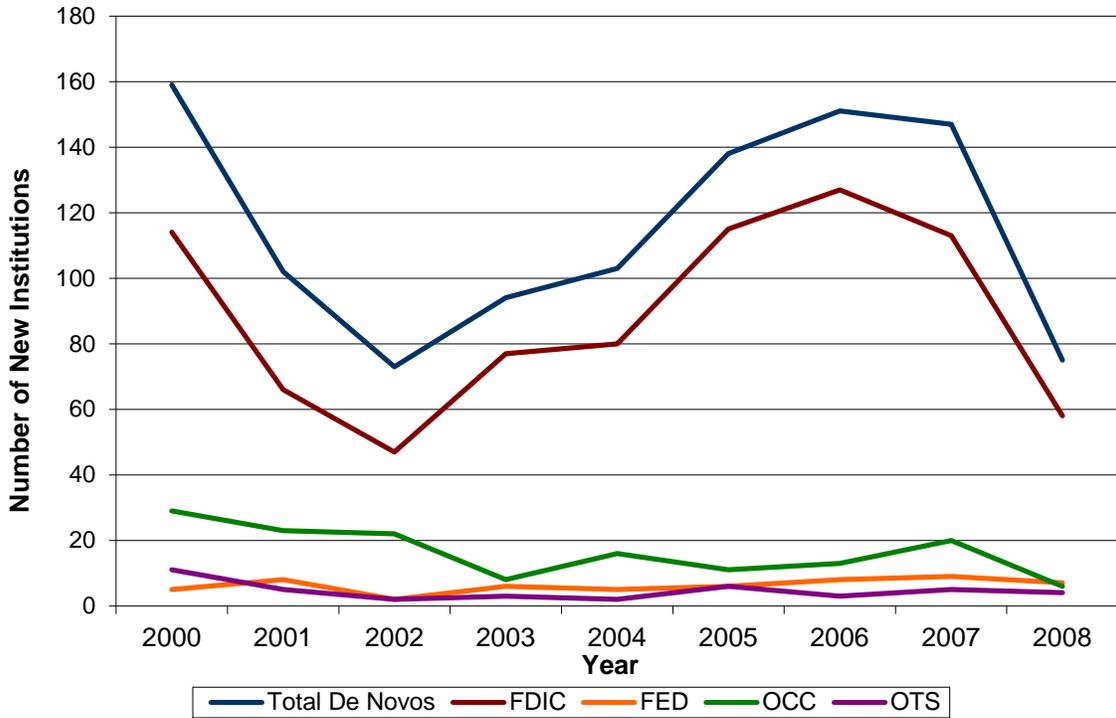
Figure 3. 2000-2008 De Novos by Census Region

Pacific
(AK, CA, HI, OR, WA), 162
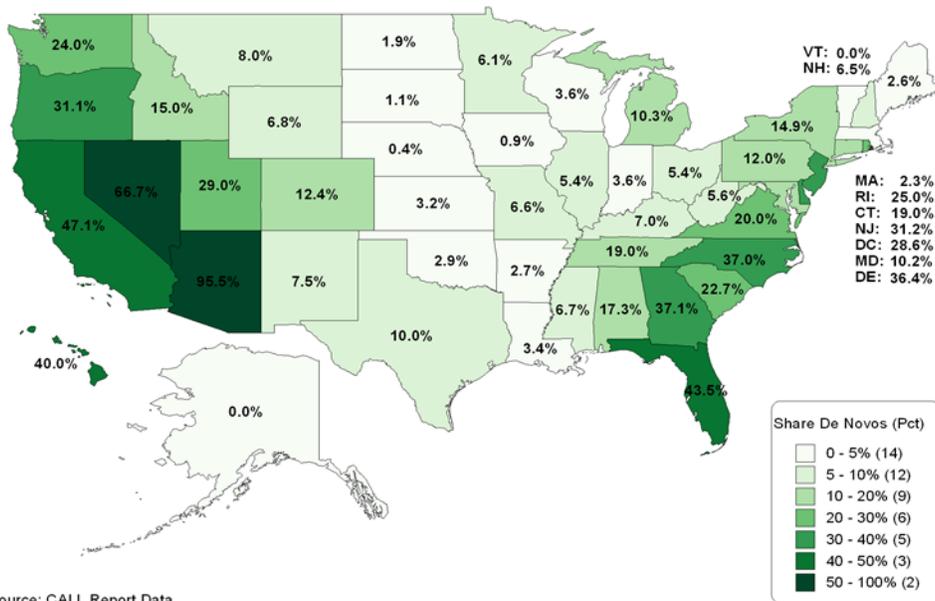
New England
(CT, ME, MA, NH, RI, VT), 21

Mid-Atlantic
(NJ, NY, PA), 97

East N. Central
(IL, IN, MI, OH, WI), 90

West N. Central
(IA, KS, MN, MO, NE, ND, SD), 75

Mountain
(AZ, CO, ID, MT, NV, NM, UT, WY),
76

West S. Central
(AR, LA, OK, TX), 91

East S. Central
(AL, KY, MS, TN), 90

South Atlantic
(DE, DC, FL, GA, MD, NC, SC, VA,
WV), 339
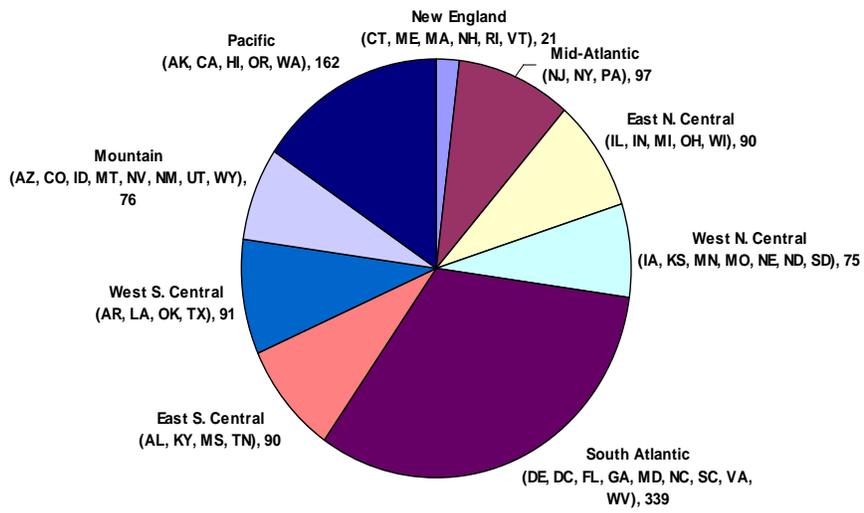
Figure 4. Total De Novos, 2000–2008
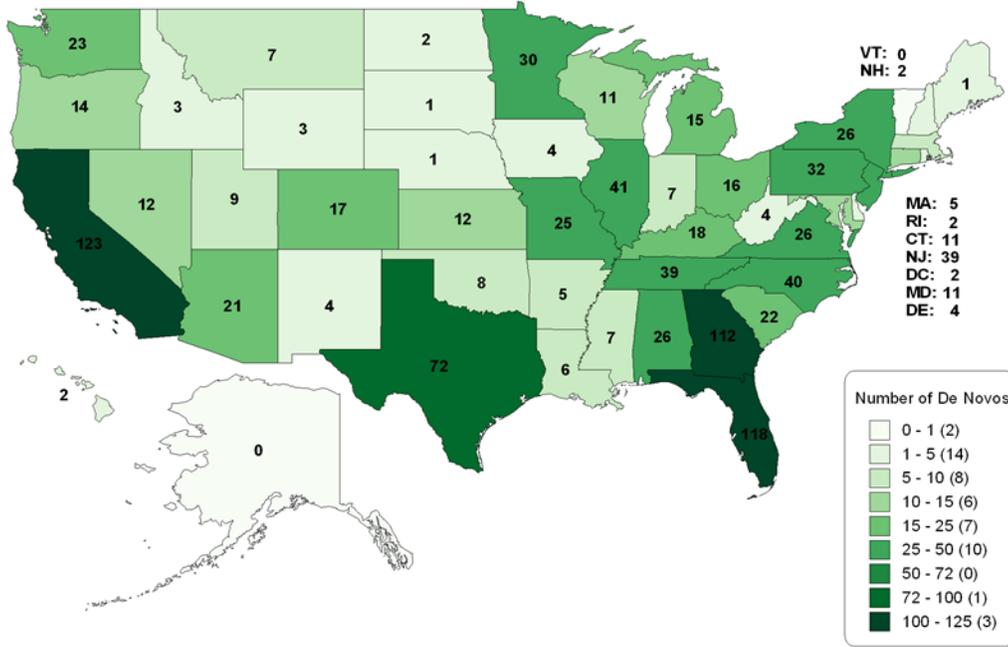
Source: CALL Report Data

Figure 5. Total De Novos (2000–2008) to Community Banks in 2000

Source: CALL Report Data

23

Figure 6. Median One-Year Asset Growth Rates, by De Novo Charter Year

Legend:
- Asset growth_2000
- Asset growth_2001
- Asset growth_2002
- Asset growth_2003
- Asset growth_2004
- Asset growth_2005
- Asset growth_2006
- Asset growth_2007
- Asset growth_2008
- Small Established Banks
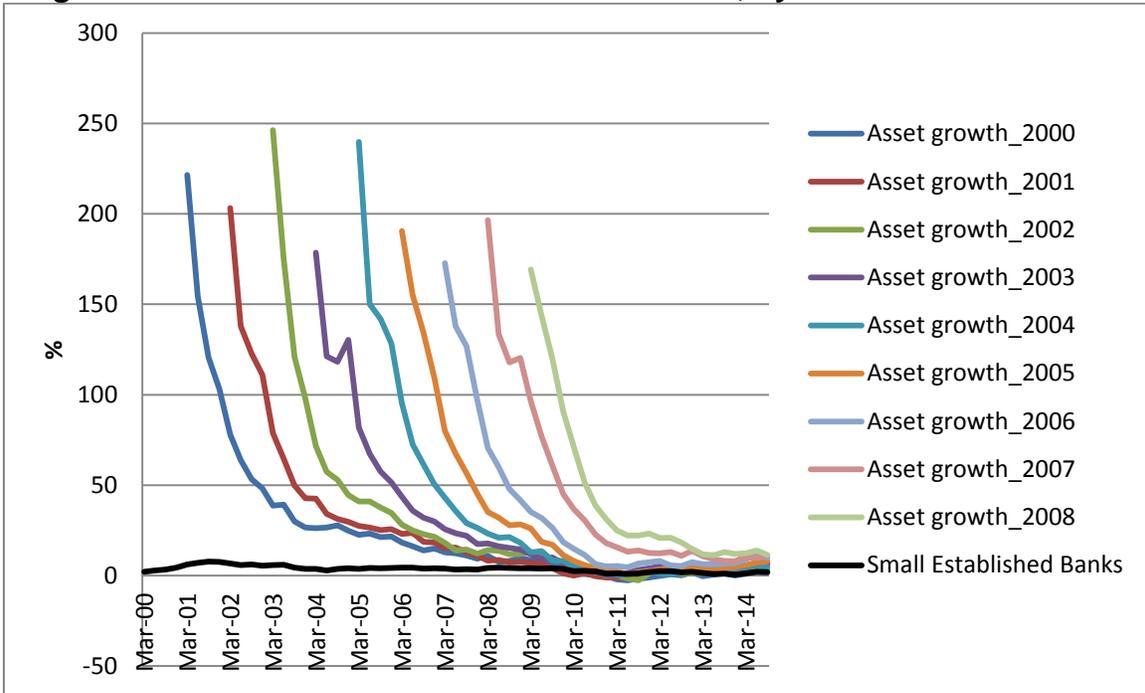
Figure 7. Median Non-core Funds-to-Assets Ratios, by De Novo Charter Year

Legend:
- Noncore funds_2000
- Noncore funds_2001
- Noncore funds_2002
- Noncore funds_2003
- Noncore funds_2004
- Noncore funds_2005
- Noncore funds_2006
- Noncore funds_2007
- Noncore funds_2008
- Small Established Banks
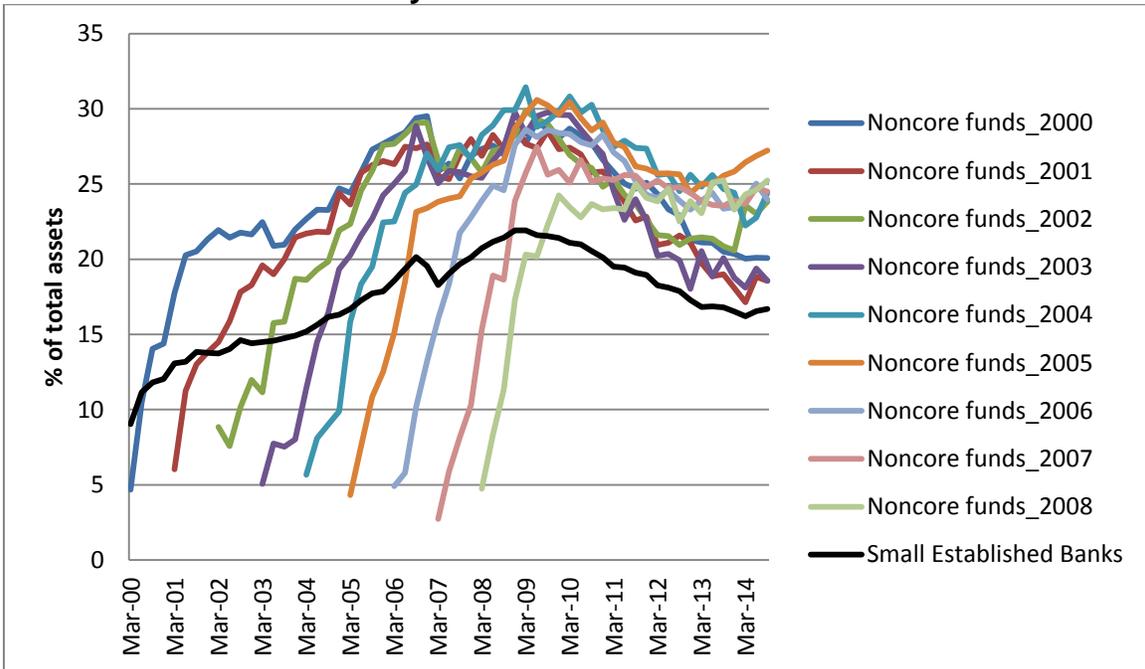
Figure 8. Median Income Before Taxes-to-Assets Ratio, by De Novo Charter Year
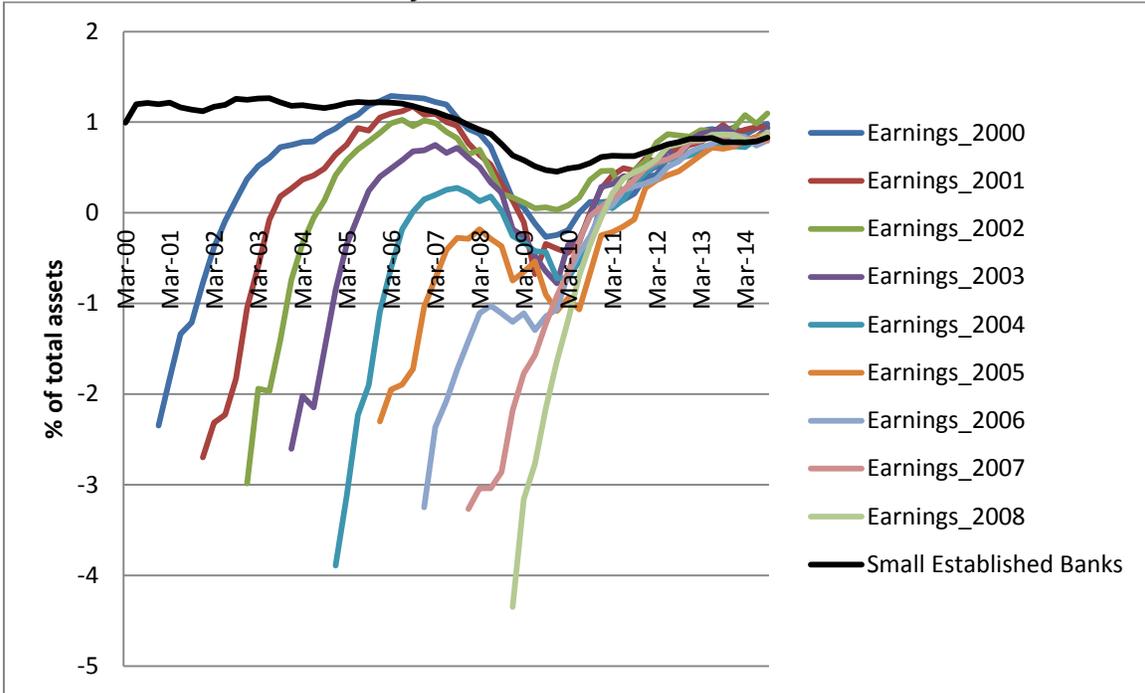
Figure 9. Median Equity-to-Assets Ratios, by De Novo Charter Year
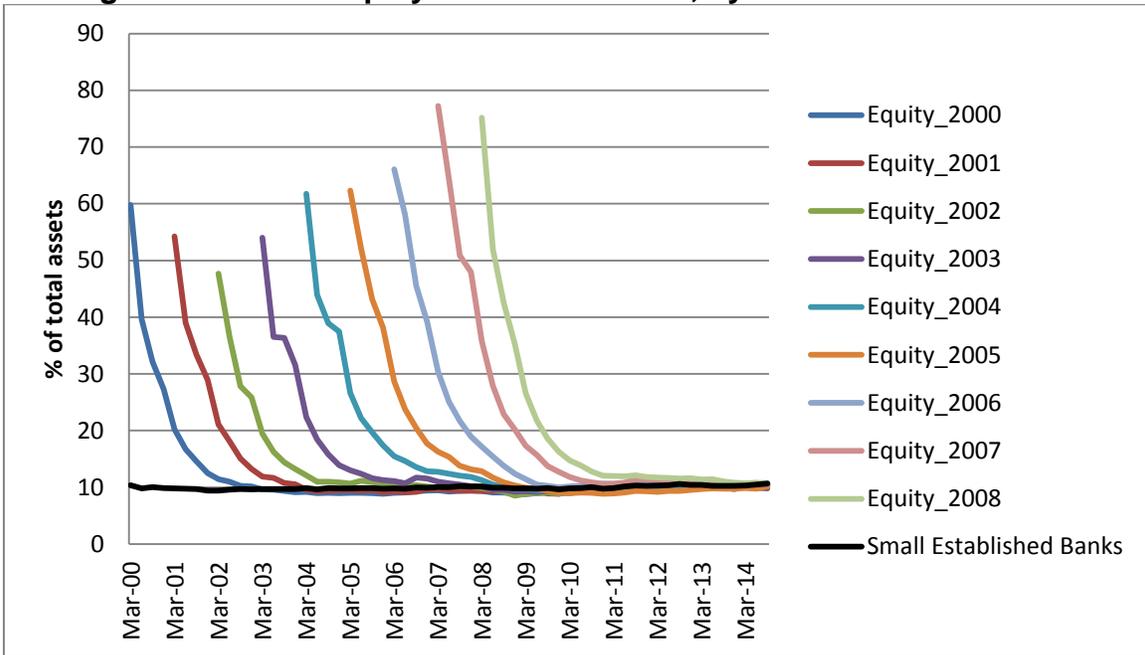
Figure 10. Median Non-performing Loans-to-assets Ratios, by De Novo Charter Year
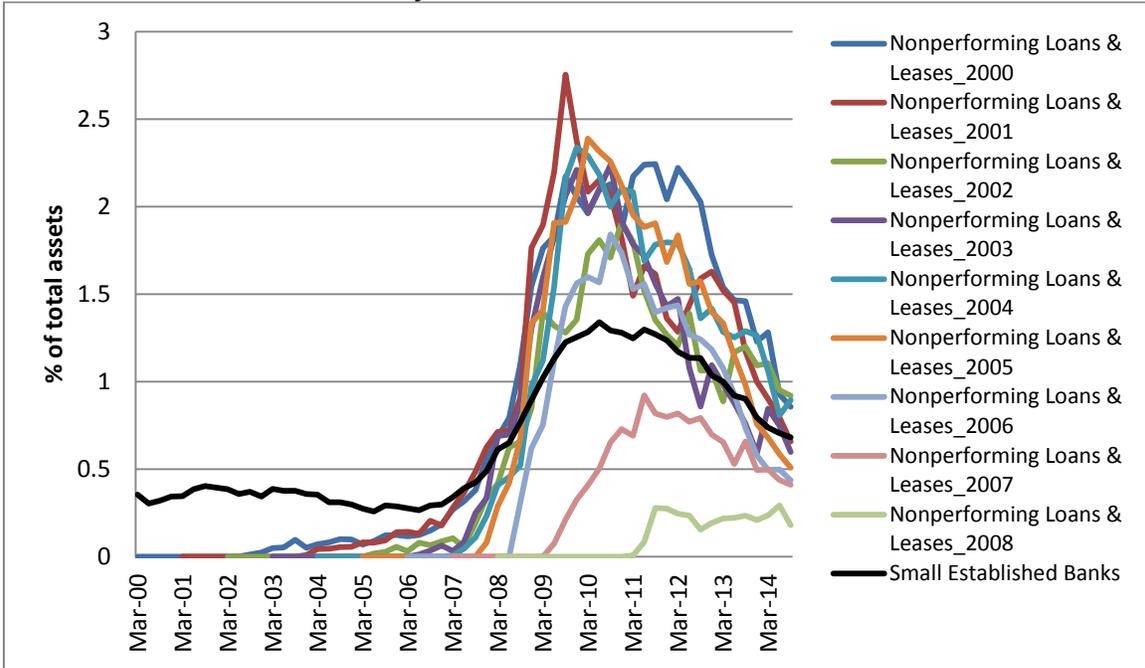
Figure 11. Number of De Novo Bank Failures and Acquisitions, by Year
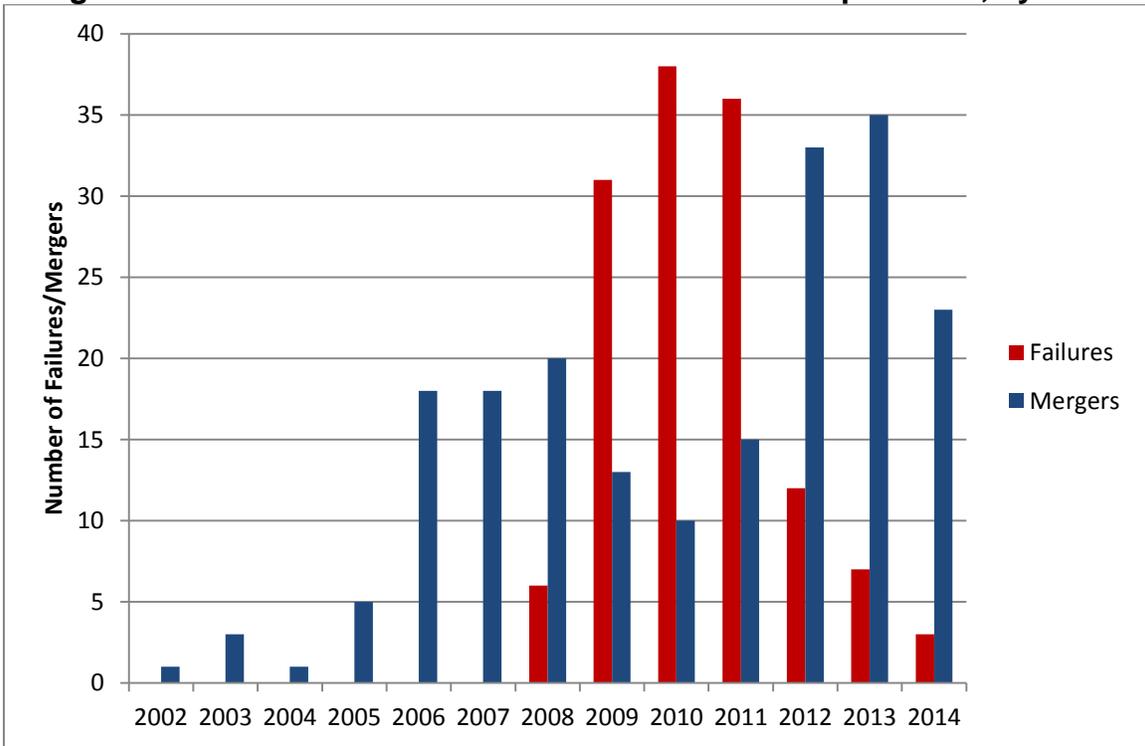
Figure 12. De Novo Failures in Each Region, as Percent of Total De Novo Failures

Mountain (AZ, CO, ID, MT, NV, NM, UT, WY) 11%

New England (CT, ME, MA, NH, RI, VT) 1%

Mid-Atlantic (NJ, NY, PA) 6%

West South Central (AR, LA, OK, TX) 2%

Pacific (AK, CA, HI, OR, WA) 8%

East North Central (IL, IN, MI, OH, WI) 11%

East South Central (AL, KY, MS, TN) 1%

West North Central (IA, KS, MN, MO, NE, ND, SD) 4%

South Atlantic (DE, DC, FL, GA, MD, NC, SC, VA, WV) 56%
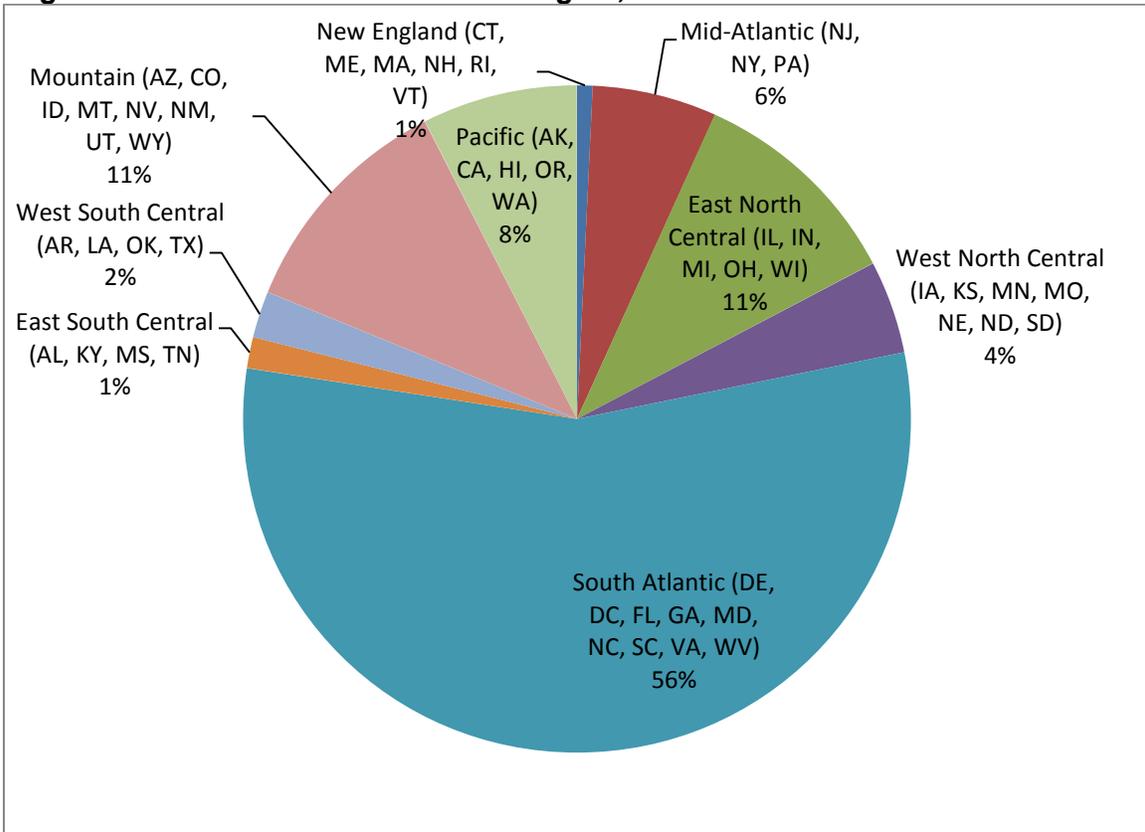
Figure 13. De Novo Failures as Percent of Total De Novos, by Region
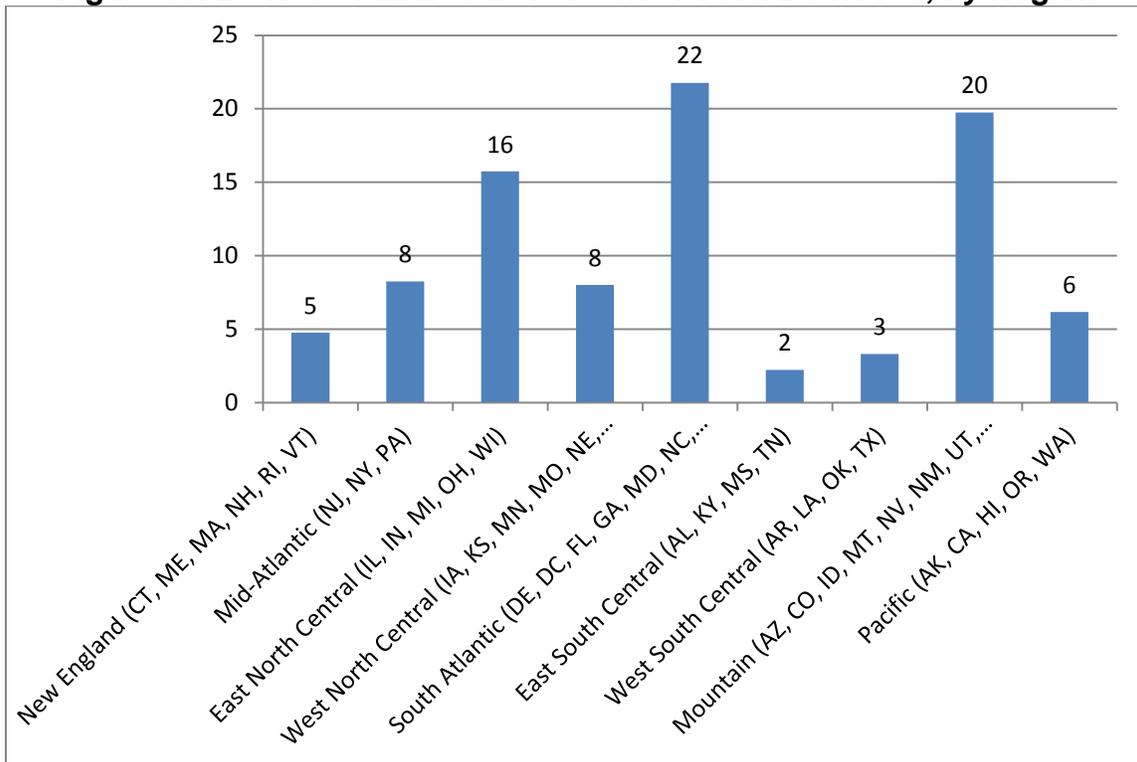
Figure 14. De Novo Acquisitions in Each Region, as Percent of Total De Novo Acquisitions
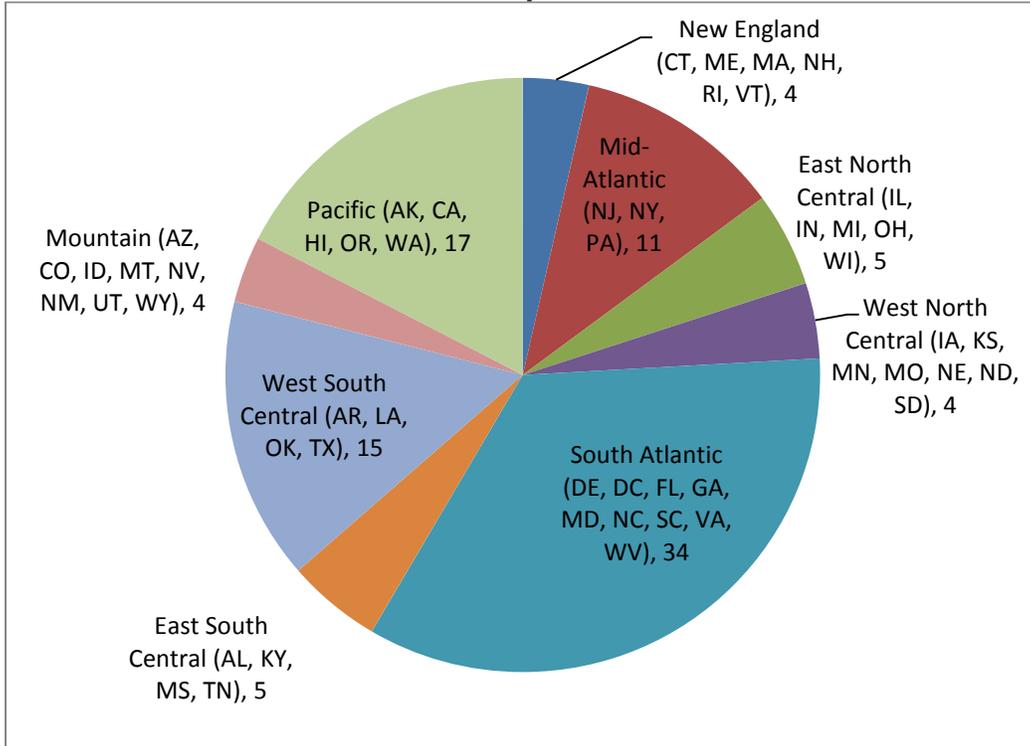
Figure 15. De Novo Acquisitions, as Percent of Total De Novos, By Region
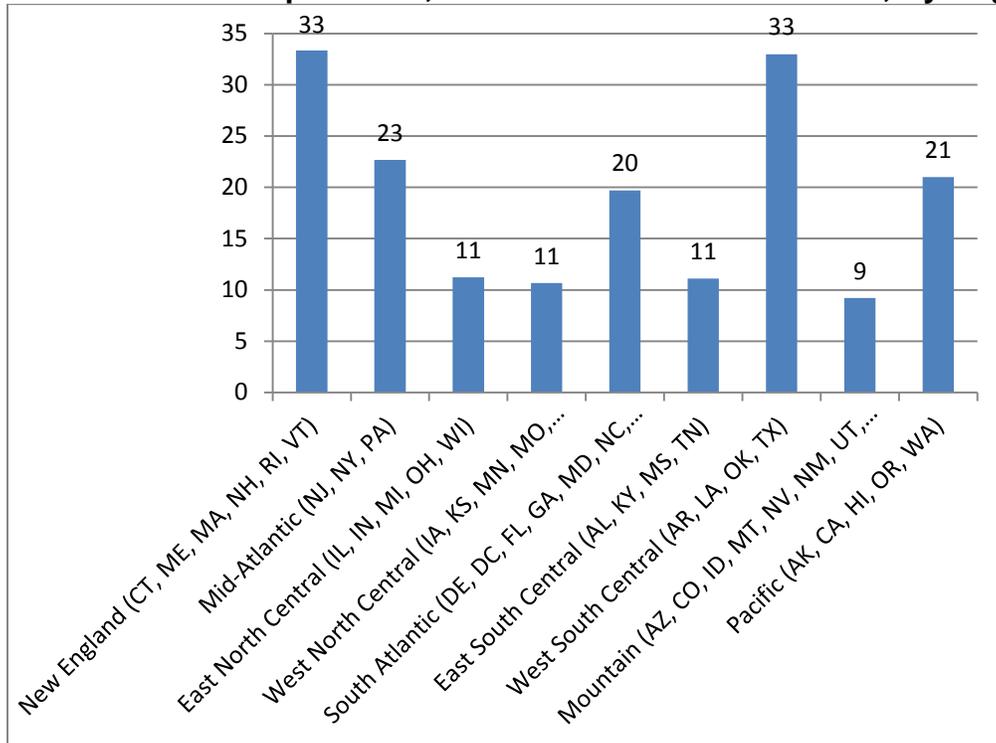
Figure 16. Median Equity Ratio for Failed, Merged, and Survived De Novos
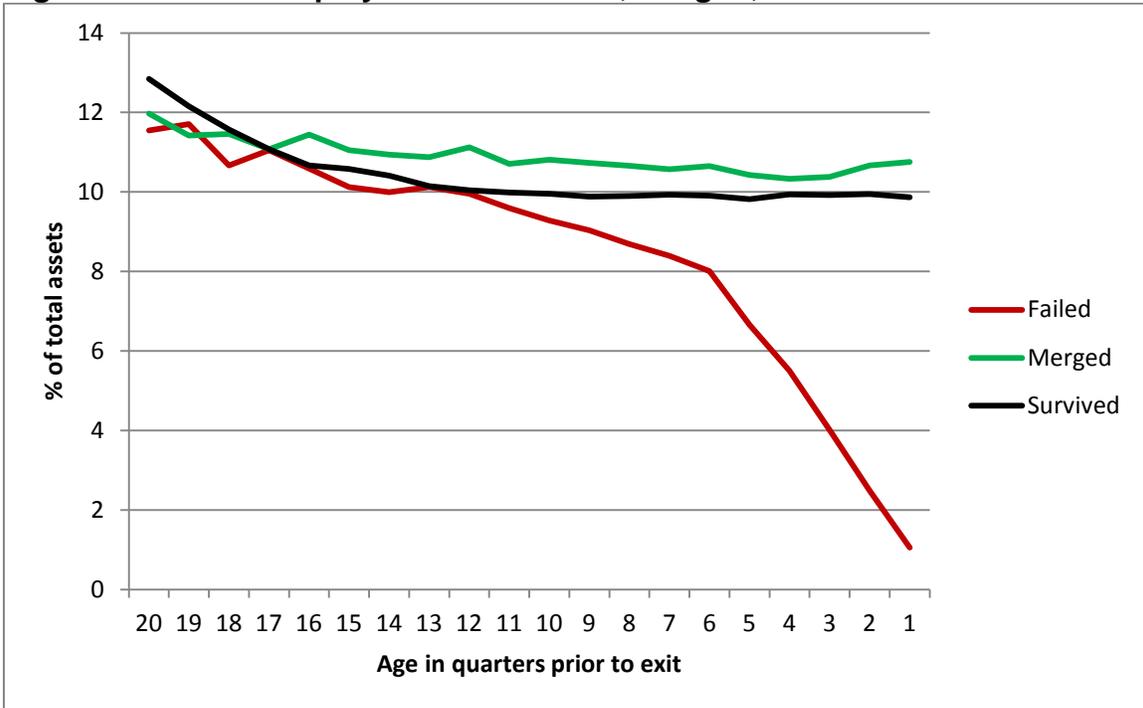
Figure 17. Median Earnings Ratio for Failed, Merged, and Survived De Novos

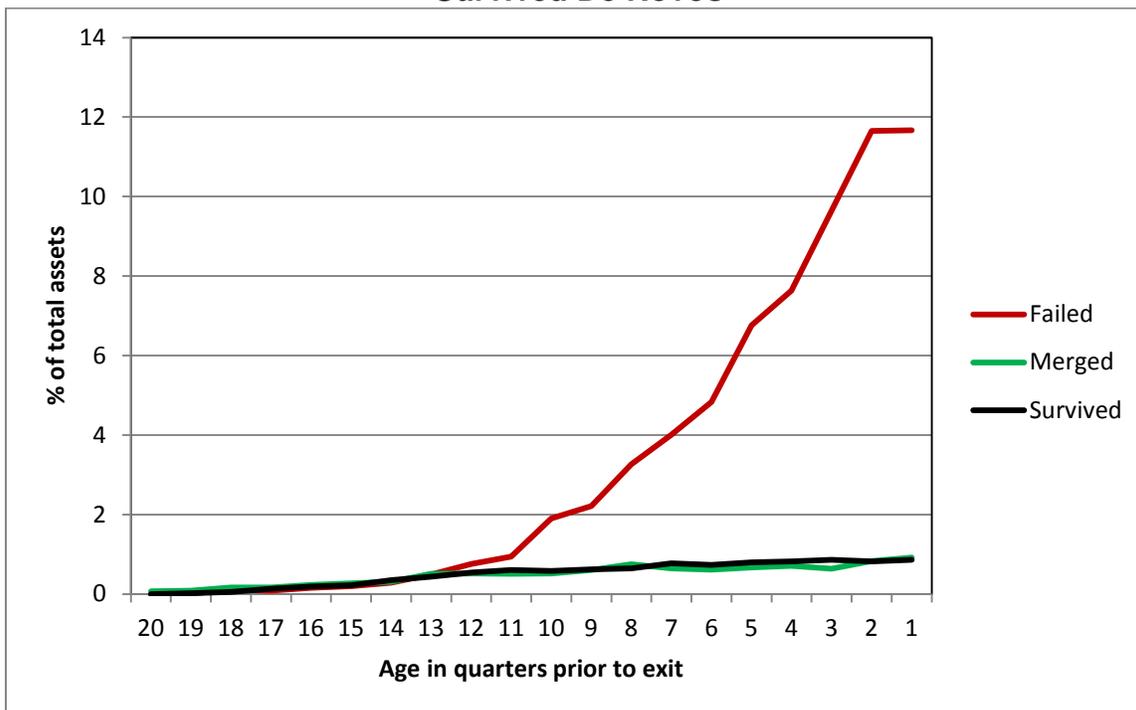**Figure 18. Median Non-performing Loans Ratio for Failed, Merged, and Survived De Novos**

Figure 19. Median Non-core Funds for Failed, Merged, and Survived De Novos
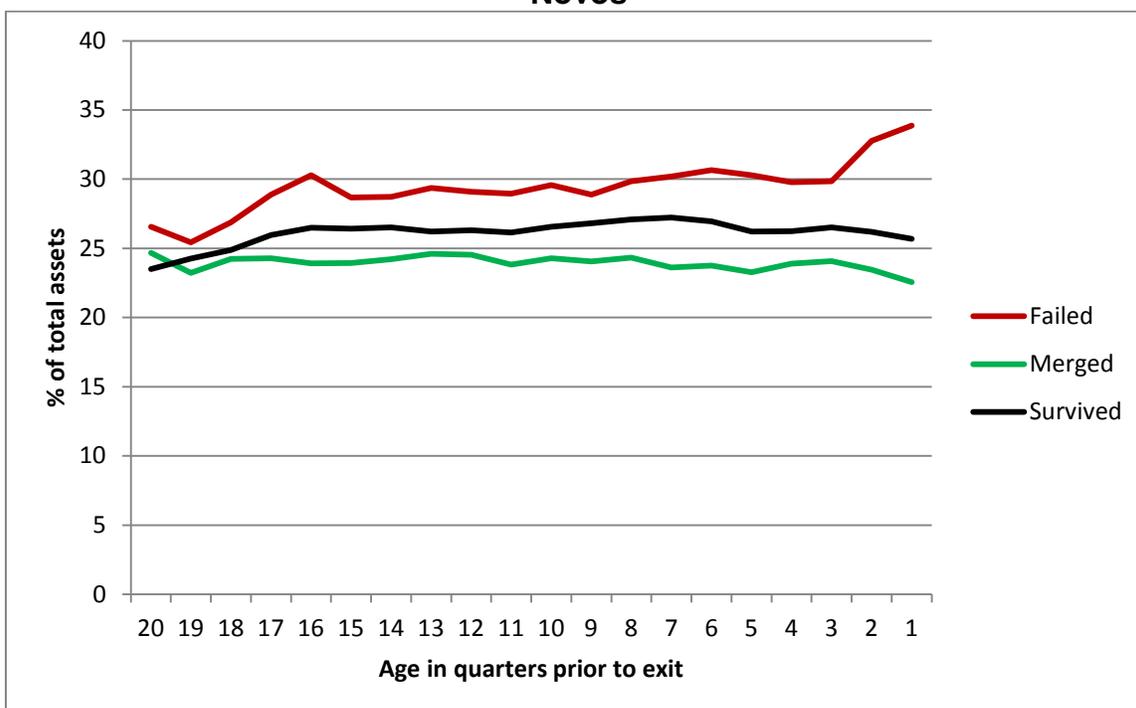
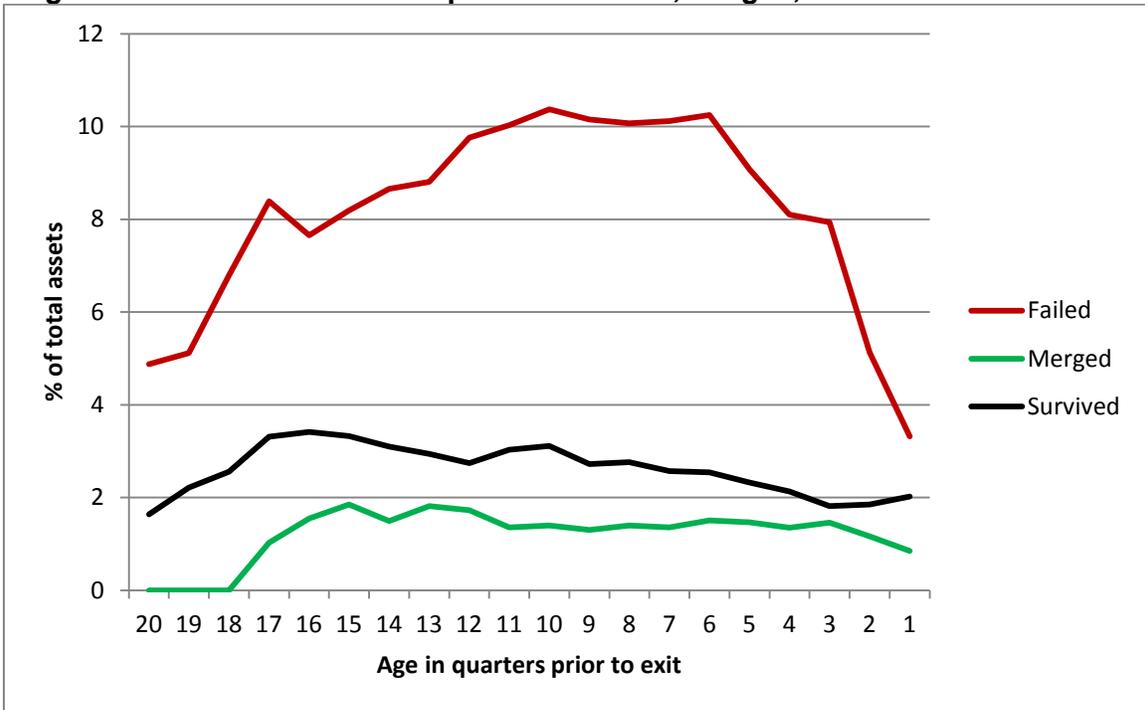**Figure 20. Median Brokered Deposits for Failed, Merged, and Survived De Novos**

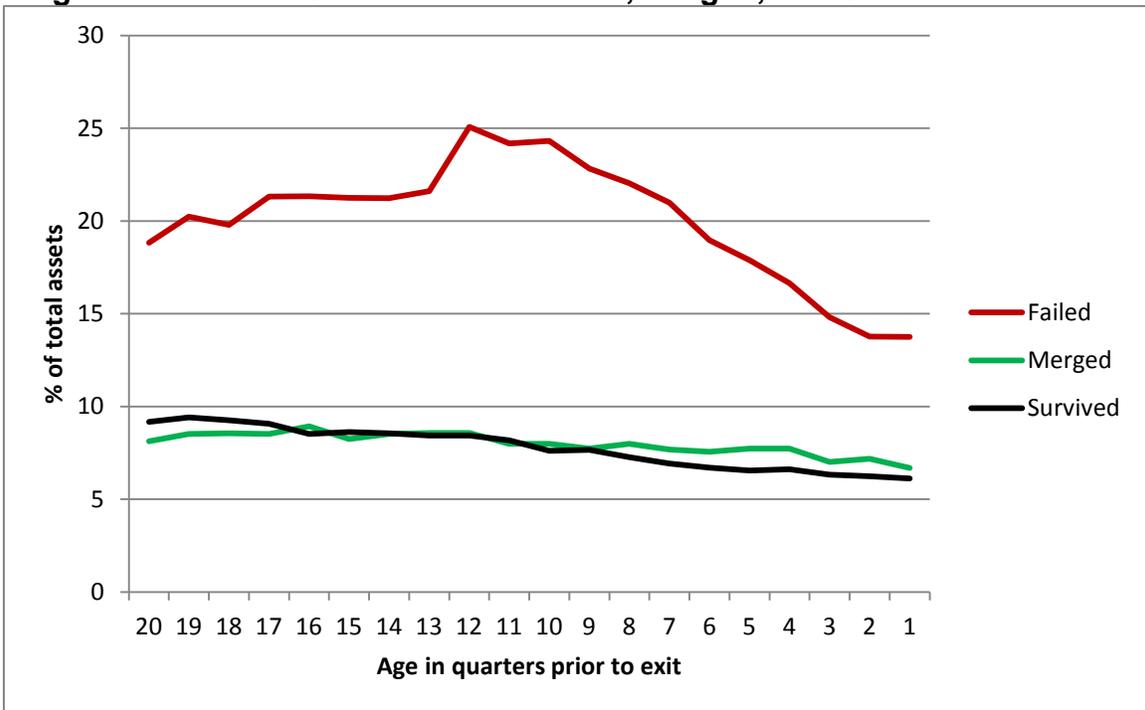**Figure 21. Median C&D Loans for Failed, Merged, and Survived De Novos**

Figure 22. Median C&I (<$1 million) for Failed, Merged, and Survived De Novos
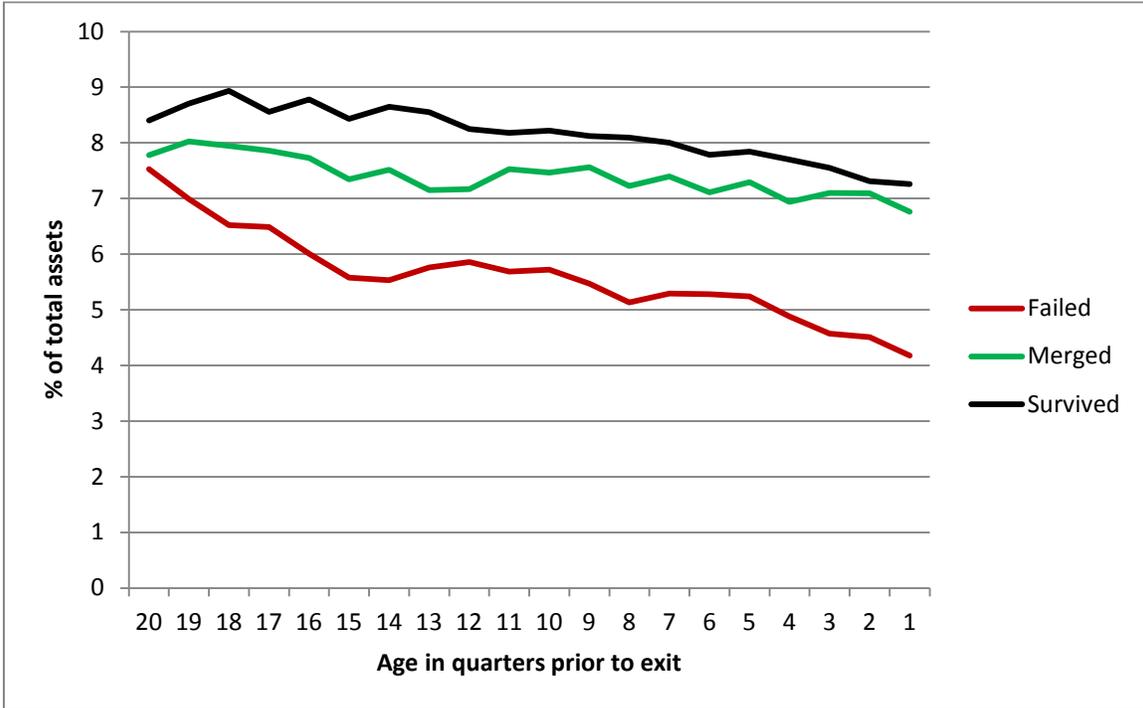

Figure 23. Median CRE Loans for Failed, Merged, and Survived De Novos