

# **Technological and Regulatory Changes Impact on Bank Failures Following the 2008 Financial Crisis**

**Joseph Trendowski**  
**Valparaiso University**

**Anil Nair**  
**Old Dominion University**

*Regulatory changes (GLBA and IBBEA) allowed banks to operate across state lines and consolidate with investment banks, security firms, and insurance companies. Furthermore, banks were in the middle of a transitional period where many consumers altered their way of conducting business. Consumers were less limited by geographic location and enjoyed greater convenience. This paper examines the 181 US Bank failures that occurred in one calendar year following the 2008 financial crisis. Using survival analysis, banks founded after deregulation experienced lower failure rates as will banks with higher industry concentration and higher environmental munificence.*

## **INTRODUCTION**

The literature on corporate failures is broad; scholars have used different theoretical perspectives to study failures and used different constructs and terms to describe them. Some scholars have examined failure from an external (or deterministic) perspective, while others have studied failures using internal (or choice) perspective (Mellahi & Wilkinson, 2004). The former stream of research is centered on the idea that the industry matters most when it comes to corporate failures. Firms are viewed as being embedded in their environment. External factors impact and constrain the firm so significantly that management has little or no control over the firm's outcome (see Rumelt, 1991; McGahan & Porter, 1997). In contrast to the deterministic stream, another stream of research looks at internal causes of firm failures. Failure is linked to internal inadequacies in dealing with external threats (Mellahi & Wilkinson, 2004). This strategic choice (Child, 1972) perspective argues that managers are not powerless and can ultimately determine whether or not the firm will fail. Managers are viewed as the principal decision makers of the firm (Hambrick & Mason, 1984) and work within external environment constraints. Decision makers are considered more important than the external context.

As Witteloostuijn (1998) pointed out, one of the limitations of failure literature has been that it often takes on either an internal or external approach even though organizations don't mechanically react to environmental forces or exercise unrestricted free will (Hrebiniak & Joyce, 1985). Such a dichotomous approach to the study of failures has been sustained by assumptions that both the theoretical and methodological differences (between the two perspectives) are too insurmountable (Witteloostuijn, 1998) for the two to be merged. Thus, the two schools have evolved independently with little synergy, creating

significant research and theoretical gaps in our understanding of organizational failure (Mellahi & Wilkinson, 2004).

This paper focuses on the failures in the US banking industry in the wake of the great financial crisis (GFC) of 2008. Between 2008 and 2010 the United States endured its third highest rate of bank failures since the founding of the Federal Reserve in 1913. What makes this cluster of failure different is that regulatory and technological changes were simultaneously impacting the market. As the entire US economy is dependent on the banking industry, academics, policy makers, politicians and practitioners have been interested in identifying the causes of these failures (as evidenced by the large number of articles about them in the popular business press). The paper is organized as follows. We briefly describe the literature on corporate failures and develop our hypotheses. Next, we discuss our methodology and results. Finally, we discuss the implications of our findings and suggest directions for future research.

## **RESEARCH ON CORPORATE FAILURES**

Though research on corporate failure is abundant, there is a lack of consensus about its antecedents (Cameron, Sutton & Whetten, 1988; Weitzel & Johnson, 1989). A review of the literature suggests that there appears to be inconsistent use of the term ‘failure’ as well. Various terms such as organizational decline (Whetten, 1980), organizational mortality (Carroll, 1983), organizational death (Freeman et al., 1983), bankruptcy (Sutton & Callahan, 1987), organizational extinction (Zuniga-Vicente & Vicente-Lorente, 2006), and organizational exit (Ross & Staw, 1993; Geroski, Mata, & Portugal, 2010), along with failure have been used in previous studies. It should be noted that some of the aforementioned terms don’t all share the same exact meaning or severity. Terms such as organizational decline, retrenchment, and downsizing are less severe. Even bankruptcy may be considered different due to variations in the types of bankruptcy. Firms that file Chapter 11 bankruptcy in the United States are permitted to remain in control of their business as a debtor in possession, while firms declaring Chapter 7 bankruptcy cease operations and liquidate their assets.

The failure literature in the 1980s in strategic management, perhaps due to the dominance of the IO paradigm, focused on external causes. By the 1990s, an increasing number of researchers began to examine internal reasons (perhaps due to the rise of the RBV perspective) for firm failure. Yet, the external perspective continued to enjoy scholarly attention, particularly due to the vibrancy of the population ecology model of organizations. Recently, research has incorporated multiple internal and external perspectives to get a more complete representation of firm failure (see Geroski, Mata, & Portugal, 2010). A more complete list that includes 30 years of failure literature starting from the early 1980s is available from the authors upon request.

This paper aims to extend failure research by viewing failure from internal and external perspectives. Particularly, as we are interested in understanding bank failures during the 2008 financial crisis, rather than adopt a narrow theoretical approach, we cast a broad theoretical net to identify a comprehensive set of factors (that given our analysis of the industry), we believe was associated with failures.

### **Size & Legitimacy**

Within institutional theory, legitimacy is defined as the acceptance of an organization by its external environment (DiMaggio & Powell, 1983; Meyer & Rowan, 1977; Meyer & Scott, 1983), and is a key driver of organizational survival (DiMaggio & Powell, 1983). Legitimacy is a social judgment that is ultimately rendered to the organization by its constituents or stakeholders. Organizations are more likely to survive if they are viewed as legitimate by external constituents of the institutional environment (Baum & Oliver, 1991).

However, in certain industries, some stakeholders have higher standing within the environment to confer legitimacy (Meyer & Scott, 1983; Galaskiewicz, 1985; Baum & Oliver, 1991). In the banking industry, government regulators, who supervise banks (Baum & Oliver, 1991; Galaskiewicz, 1985; Meyer & Scott, 1983), through their licensing offer legitimacy to banking institutions. Besides, historically, in the banking industry, larger banks have typically enjoyed an implicit government guarantee that stems

from their systemic importance (Boyd & Runkle, 1993). If they were to fail, there would be a greater likelihood of *bank-runs* and the banking system itself could lose legitimacy. As a result, even during the 2008 financial crisis, larger banks such as Bank of America and Citigroup received special government assistance in the form of loans, guarantees, or capital injections to avoid failure (Aubuchon & Wheelock, 2010). We argue that large banks, due to their greater legitimacy to the functioning of the banking system, receive assistance from government regulators. Hence, we expect larger banks to be insulated from failure in the wake of the 2008 financial crisis, and propose:

*H1: Larger banks will experience lower failure rates during the financial crisis.*

### **Liability of Age During Technology Shift**

In addition to organizational size, organizational age strongly determines legitimacy (Deephouse, 1996). As organizations grow older, they are more likely to develop stronger exchange relationships with other organizations, become a part of the power hierarchy, and come to have their actions endorsed by powerful collective actors or regulators (Stinchcombe, 1968). Thus, older organizations are likely to be viewed as more legitimate and they will enjoy increased access to public and official resources thus improving their survival chances (Singh, Tucker, & House, 1986). Institutional attachments confer a variety of survival advantages on organizations such as increased stability, social support, legitimacy, access to resources, and invulnerability to questioning (Baum & Oliver, 1991). In most instances, nothing legitimates more than longevity (Deephouse, 1996).

However, in an environment characterized by changes, it could also be a liability. That is, akin to liability of newness (Stinchcombe), we argue that firms may also exhibit a ‘liability of age’, particularly in environment exhibiting rapid or cataclysmic change. Regulatory changes and technology improvements altered the competitive landscape of US banking industry. The banking industry experienced significant changes after the Gramm-Leach-Bliley Act (GLBA) of 1999 eliminated barriers between insurance, banking, and securities industries, thus creating a completely new financial services industry (Yildirim, Kwag, & Collins, 2006). Concurrently, the emergence of the internet has altered the cost structure of many banking services, and how consumers prefer to bank. Internet banking provided cost savings to banks from having fewer staff and physical branches as well as scale effects in bank operations (Shi, Shambare, & Wang, 2008). Internet banking also benefited the customer by providing cost and time savings, reduced dependency on location, quicker responses to complaints and improved services quality (Shi, Shambare, & Wang, 2008). Older, more established banks, with a large number of physical branches faced liability of aging (see Ranger-Moore, 1997). The combined influences of imprinting, inertia, and environmental change render the core technologies of old organizations obsolete (Sorensen & Stuart, 2000). Therefore, we expect that banks launched after 1999 will have a survival advantage over banks launched pre-deregulation.

*H2: Banks founded after the Gramm-Leach-Bliley Act will be better prepared to adapt to changing technology thus having lower failure rates.*

### **Industry Concentration**

One of the industry forces that determine firm performance (and thus survivability) is the level of competition within the industry (Porter, 1987). Rivalry within banking industry is influenced by antitrust enforcement that prevents mergers of non-failed banks that would significantly increase the concentration of local banking markets (Wheelock, 2011). Thus, rivalry in the banking industry is largely driven by entry and exit of firms (Perotti & Suarez, 2002).

Typically, greater industry concentration leads to less competition and greater profits (Scherer & Ross, 1990), thus a less concentrated banking sector is more prone to lower profits and failures during financial crisis (Allen & Gale, 2000). Advantages of a highly concentrated banking market are two-fold. First, concentrated banking systems may enhance market power and boost profits (Porter, 1979). As high profits provide a “buffer” against adverse shocks and increase the charter or franchise value of the bank,

it reduces banking sector fragility. Second, it is easier (for regulators) to monitor relatively few banks compared to many banks in a segmented system. Consequently, bank supervision will be more effective and bank fragility will be less pronounced in a highly concentrated banking system. Hence, we propose:

*H3: Higher local industry concentration will lower bank failure rates during the financial crisis regardless of geographic diversification.*

### **Impact of Local Economy**

Bank performance is strongly influenced by the robustness of its local economy (Kim & Miner, 2007). In several respects, the geographic patterns of post-2008 U.S. bank failures have been similar to the 1930s bank crisis (Temin, 1976) and the 1980s/1990s bank crisis (Hanc, 1997). Even though most branching restrictions were removed nearly two decades ago, the regional patterns of bank failures indicate that many banks remain vulnerable to local economic shocks (Aubuchon & Wheelock, 2010).

In the early years of the financial crisis, failure rates were higher in states with the largest declines in personal income and gross state product as well as the largest increases in unemployment rates. States experiencing the largest declines in housing price (see Lu & Whidbee, 2013) and highest rates of mortgage delinquency were facing the greatest number of bank failures. These were also the same states that had the largest number of subprime mortgage and greatest increase in housing prices prior to the crisis. Therefore, bank failures during this economic crisis are expected to mirror the local economic conditions. Hence,

*H4: Higher environmental munificence in a region will be associated with lower bank failure rates during the financial crisis.*

### **Geographic Diversification**

As a result of The Riegle-Neal Interstate Banking and Branch Efficiency Act (IBBEA), banks which were once limited geographically were now able to expand their borders (Aguirregabiria, Clark & Wang, 2016). The advantage of expansion is that the dispersion of banking activities lessens the dependence on the home market (Emmons, Gilbert, & Yaeger, 2004). An adverse situation in one locale may have minimal impact in another. The trend is that US Banks are becoming larger. They can spread their operations across multiple markets, providing diversification benefits (Morgan & Samolyk, 2003). The restrictions lifted by BBEA initially improved economic conditions, bank performance and efficiency leading to a positive effect on bank stability (Dick, 2008). Geographic diversification has also indicated a positive effect on bank risk as well (Liang and Rhoades, 1988; Trendowski & Rustambekov, 2017). As a result, many recent studies have found a positive relationship between diversification and profitability (Elsas, Hackenthal, & Hotzhauser, 2010; Filson & Olfati, 2014; Goetz, Laeven, & Levine, 2016). Due to the higher profitability, it's likely that banks risk of failure will decrease when expanding into multiple markets (Emmons, Gilbert, & Yaeger, 2004).

This financial crisis occurred in an environment in sharp contrast to the 1930s and 1980s/1990s crises when technological and geographical restrictions had limited expansion for banks. Those banks that chose not to diversify geographically were likely to fail when local market conditions worsened. Hence, we propose:

*H5: Geographic Bank Diversification will be positively associated with survivability following the financial crisis.*

## METHODOLOGY

The federal government had created the Troubled Assets Relief Program (TARP) program to curb the financial crisis. TARP gave the US Treasury purchasing power of \$700 billion to buy up mortgage backed securities (MBS) from institutions across the country to create liquidity and open up the money markets. Since TARP was used to prevent bank failure, firms that received any TARP funds were omitted from our analysis. Likewise, banks that were voluntarily merged or acquired were not part of this analysis. The list of failed banks was gathered from the FDIC database. If a bank was no longer in existence and appeared on the FDIC list of failed banks it was considered a failed bank for the analysis. Using these criteria, we identified 181 bank failures occurring between June 30, 2009 and June 29, 2010. Following Hambrick and D'Aveni (1988) and D'Aveni (1989), we also created a database of matched survivor banks. We also collected data on the 27 bank failures between 2000 and 2007 to compare failures during the crisis with the pre-crisis period. This period was significant as it followed the GLBA of 1999. From 2000 through 2007, no more than 11 bank failures occurred in any given year. In fact, 2005 and 2006 saw no bank failures at all. To test our hypotheses, we use the unobserved hazard rate of bank failures (Kim & Miner, 2007).

## VARIABLES

### Control Variable

In our analysis, we use *Return on assets (ROA)* as a control variable. As a measure of bank performance, ROA shows how efficient a bank is at converting dollars spent to dollars earned. As with many intra-industry examples, it provides a benchmark for firm performance since competing firms often have similar structures. In banking specifically, ROA is regularly used since most assets will have a carrying value that is close to the actual market value. The data on ROA was collected using the FDIC database.

### Independent Variables

*Size.* Size was measured as the total deposits the bank had nationwide.

*Age.* The age of a bank was obtained from the FDIC database. Chronological age was calculated by using the firm founding date. The age used for the analysis was the age of the firm on June 30<sup>th</sup> 2009.

*Concentration Ratio.* The concentration ratio measures the extent of the market controlled by the largest firms in the industry. The concentration ratio was calculated using the market share for the four largest banks.

*Munificence.* Local unemployment rate was used as a proxy for bank environment munificence. When there is high unemployment, the average consumer is less likely to take out a new loan or pay back an existing loan. Unemployment figures (from US Department of Labor) were collected for the metropolitan area that the bank was headquartered in for the month that the bank failed.

*Diversification.* Diversification was measured as the ratio of the number of deposits outside of the home market to the total number of deposits. A bank that is well diversified geographically will have a lower percentage of total deposits in the home market.

All firm level data were obtained from the FDIC database.

## DATA ANALYSIS

### Matching process

Our initial data collection yielded 181 US Bank failures following the financial crisis of 2008. We lagged the collection period to 2009 to allow for crisis effects to unfold. For comparative purposes (See Hambrick & D'Aveni, 1988) we matched each bank failure with a paired survivor. Similar to D'Aveni (1989), we matched firms based on size and environment. More specifically, we utilized home state of operation and total deposits for pairing purposes.

## Analysis

Survival analysis was used to estimate the unobserved hazard rate of bank failure (Kim & Miner, 2007). This method uses all information provided by right-centered cases, and avoids biases that logistic regression could display (Allison, 1984). Parametric estimates of a hazard rate require assumptions about the effect of time on the occurrence of the events of interest (Kim & Miner, 2007) which is bank failure in this case. The hazard model controls for each bank's period at risk. It is important to control for the fact that some banks fail immediately while others fail over time. Static models fail to control for each firm's period at risk. Unlike static models, hazard models can incorporate macroeconomic variables that are the same for all firms at a given point in time (Shumway, 2001). Finally, hazard models also incorporate time-varying covariates, or explanatory variables that change with time. Time, in this study, is length of survival during the period of excessive bank failures. The clock was started on June 30<sup>th</sup>, 2007 which is two calendar years before the sample period. This date was selected because (a) June 30<sup>th</sup> is the date when FDIC institutions report their financial data (b) 2007 was the last year with less than 10 bank failures; and (c) Failures began increasing towards the end of 2008, making analyzing the entire year problematic. We also ran a second hazard model to examine bank failures prior to the crisis. The hazard models (Cox regression) were run using SPSS, a statistical program, to test the hypotheses.

Though the total number of failed banks in the analysis was 181, the number of failed banks with complete data that existed for more than 5 years was 125. The data was examined for outliers and influence points using Cook's distance and standardized residuals. Following Hosmer and Lemeshow (2000), standardized residuals greater than 3.0 or less than -3.0 were omitted from the analysis. Similarly, cases with Cook's distance greater than 1.0 were also omitted reducing the total sample of cases to 228. Each dataset was tested for multicollinearity by running collinearity statistics in SPSS. Multicollinearity problems exist with a variance inflation factor (VIF) above 5 (O'Brien, 2007). There was no problems with multicollinearity as all VIFs were low; between 1 and 2 with a mean VIF score of 1.476.

## DISCUSSION

Hypothesis 1 tested if bank size attributed to their survivability. As expected, larger banks were more likely to survive than smaller banks (in the pre-crisis period). Liability of smallness (Aldrich & Auster, 1986) suggests that small banks do not perform as well as large banks and have higher failure rates because they incur problems raising capital, attracting and retaining highly skilled workers, and having higher administrative costs. The average size of banking institutions has grown nearly 250% in the past 10 years. Regulatory changes have produced large conglomerate banks that have become a one stop shop for financial services. Larger organizations are assumed to have more resources, better managerial skills and closer interorganizational relationships that presumably enhance the organizations capacity to withstand significant environmental changes (Freeman et al., 1983). Large size almost always lowers failure rates (Ranger-Moore, 1997). However, this was not the case during the financial crisis. The hazard model found that organizational size didn't significantly influence failure rates during the financial crisis. This finding can be attributed to TARP. The largest failing banks received assistance, and therefore could not fail. As we excluded from our dataset banks that had received TARP funds, some of the value in bank size was inevitably lost.

Banks founded after 1999 had lower failure rates ( $p < .085$ ) during the crisis (in support of hypothesis 2). Selection processes typically favor older, more reliable organizations resulting in a decline in failure rates with age (Stinchcombe, 1965). Deregulation in the late 1990s created opportunities for incumbent firms to introduce new products and enter new geographic markets. When a firm engages in a new activity for the first time, it needs to establish internal and external norms, new roles for organization members, standard operating procedures, and new patterns for interacting (Shane & Foo, 1999). As Shane and Foo (1999) suggest, firms that engage in new activities are more likely to fail as their members must learn new roles and establish routines and procedures. Older banks that had achieved legitimacy pre-deregulation had subsequently lost it as the industry structure changed and consumers required more services. The constant evolution of the banking industry after the regulatory changes diminished longevity

advantages that older banks had enjoyed. Hypothesis 2 tested whether banks born after deregulation enjoyed survival advantages. The results show that younger banks, founded between 2000 and 2005 were more likely to survive during the financial crisis. Newer institutions didn't have to contend with old routines, and thus enjoyed survival advantages.

Hypothesis 3 tested the impact of local industry concentration on bank failure. The results suggest that concentration was not significantly associated with failure during the financial crisis, but was significant prior to it. Higher industry concentration generally leads to greater profits (Scherer & Ross, 1990) which should lead to increased survival (that is H3). The results support H3 in the pre-crisis period. Banking markets with higher concentration had fewer failures prior to the financial crisis. Given the banking industry's active merging policy and restrictive entry policy (Suarez & Perotti, 2002) high concentration puts banks in better position to compete.

Hypothesis 4 tested the impact that local market munificence had on failure rates. As expected, the economic downturn increased failure rates in local economies that were severely impacted. When the local economy is suffering, all businesses in that economy suffer – including banks – thus increasing failure rates. The reason that local market munificence was not significant prior the economic crisis was because local economies were relatively stable across the United States. Variation in economic distress was minimal between 2000 and 2007. By the time the financial crisis was underway, there was a much larger disparity between stable and unstable markets. When local economies began to fail during the financial crisis, bank failures ultimately followed.

Hypothesis 5 tested the relationship between geographic diversification and bank failure. Geographic diversification was not associated with bank failure rates. It is likely that our exclusion of banks that received TARP funds limited variance in bank diversification in our pool and influenced the result. Generally small banks are often not well diversified (Kohler, 2015; Neely & Wheelock, 1997). Even though geographic diversification reduces overall bank risk (Liang & Rhoades, 1988) and likelihood of failure (Emmons, Gilbert, & Yeager, 2004), many small banks lack the capacity or desire to expand. Future studies could examine if the results are different if analysis are run with a dataset that included banks receiving TARP funds.

## **CONCLUSION**

In conclusion, we note that different factors were associated with bank failures prior to and after the financial crisis. It was found that both internal and external factors were associated with bank failures. In the pre-crisis era, bank failures were associated with size and local market concentration; larger size and higher concentration led to lower failure rates. In contrast, bank failures in the post financial crisis years were related to bank founding date and the state of local economy. Furthermore, a preliminary analysis of the finding that banks launched after the 1990s deregulation had lower failure rates suggests that technologies such as ATM networks and online banking may have helped level the playing field for smaller and newer banks.

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