Who acquires whom among stand-alone commercial banks and bank holding company affiliates?

Kim Cuong Ly[a*], **Hong Liu**[b], **Kwaku Opong**[b1]

[a] *School of Management, Swansea University, United Kingdom*

[b] *Adam Smith Business School, University of Glasgow, United Kingdom*

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Abstract

This paper presents the difference in the likelihood of being targets or acquirers among stand-alone banks, single-bank holding company (SBHC) affiliates and multi-bank holding company (MBHC) affiliates. Using a sample of U.S. commercial bank data from 1997 to 2012, we find that MBHC affiliates exhibit a greater likelihood of being targets than do stand-alone commercial banks, while stand-alone banks have a greater probability of becoming targets than do SBHC affiliates. Our findings show that MBHC affiliates tend to have a greater likelihood of being acquirers than do SBHC affiliates, which again have a greater probability of being acquirers than do stand-alone banks. Those banks that acquire another bank within the same MBHC structure tend to be smaller and more financially constrained than those banks acquiring outside the same MBHC structure, whereas targets that are acquired by another bank within the same MBHC structure tend to be smaller, higher profitability and capital than targets that are acquired by banks from outside the MBHC structure. Our results suggest that the MBHC parent attempts to discipline distressed, poorly performing and smaller affiliates by involving them in mergers and acquisitions.

Keywords: merger; acquisition; bank holding company affiliates; stand-alone commercial banks

JEL Classification: G20, G21, G34

[1] We extend our appreciation to the conference attendees of the 5th International Conference of the Financial Engineering and Banking Society 2015 and Scottish Doctoral Colloquium in Accounting and Finance 2016. The usual disclaimers apply. Send correspondence to Kim Cuong Ly, Room 229, School of Management, Swansea University, Bay Campus, Fabian Way, Swansea, SA1 8EN, United Kingdom; telephone: (+44) 1792513237; e-mail address: k.c.ly@swansea.ac.uk .

1 Introduction

Since the Riegle-Neal Act was passed in 1994 and became fully effective in 1997, the number of U.S. commercial banks has declined from a peak of 10,452 at the end of 1994 to approximately 5,705 in September 2014[2]. Using a sample of 3,903 takeovers, the pace of extensive mergers in the U.S. banking industry has been impressive, with 3,447 (approximately 88.32%) bank holding company (BHC) affiliates being acquired in contrast with fewer than 500 stand-alone bank acquisitions between 1997 and 2012. Among them, BHC acquirers conducted 3,841 (approximately 98.41%) merger transactions. Moreover, the expansion strategies based on mergers and acquisitions (M&A) with conglomerate targets and conglomerate acquirers have been remarkable during the last two decades. Song (1982) suggests that a different organizational structure indicates a specific organizational ability to implement a specific diversification strategy. The motives behind M&A among stand-alone commercial banks and BHC affiliates, however, have attracted modest attention whether their pattern of diversification is the result of the organizational structure. We attempt to provide more evidence to the literature on conglomerate banking structure in this paper.

Examining the differences in merger strategies of stand-alone banks, single-bank holding company (SBHC) affiliates, and multi-bank holding company (MBHC) affiliates allows us to provide unique insights into these M&A decisions. First, as of 2012, BHC is a group controlled over $15 trillion in total assets, which is more than 95% of all U.S. banking assets (Avraham et al. 2012). On the other hand, the stand-alone commercial bank model is disappearing. To explain the restructuring of the U.S. banking industry, it is important to examine the research on M&A. Second, understanding the reality of the "eat-or-be-eaten" scenario is important with respect to merger waves, where the regime shifts the incentives for M&A transactions (Gorton et al. 2009). Third, the understanding of different acquisition choices to acquire or to be acquired among stand-alone commercial banks and BHC affiliates may provide an implication for the regulators to anticipate the potential of future mergers and to adopt new policies to encourage or ban these M&A deals. Forth, the likelihood of M&As in the banking industry could be motivated by different reasons during the crisis and pre-crisis period. Dam and Koetter (2012) argue that when the consequence of bank risk is revealed, the regulator will declare the bank in distress and may decide the bank either a bailout or an exit in the form of restructuring

[2] The number of banks over these years is obtained from the FDIC Historical Statistics on Banking, https://www.fdic.gov/bank/statistical/stats/2014sep/fdic.html

merger. Hence, this study plays an important role in analysing a reason behind an acquisition in an attempt of preventing either bank failures or the extent of government interventions.

We propose two hypotheses. First, the failing hypothesis posits that distressed firms are more likely to be targets of takeovers (Khatami et al. 2015, Palepu 1986, Hasbrouck 1985, Schwartz 1982). A substantial amount of literature (Peel and Wilson 1989, Pastena and Ruland 1986, Bulow and John 1978, Lee and Barker 1977, Higgins and Schall 1975) further suggests that a merger is a substitute for bankruptcy. Possible explanations suggest that financially distressed target firms tend to be successfully restructured after a merger (Erel et al. 2015, Clark and Ofek 1994) or that the target firm's shareholders could receive more benefits from a merger decision than from a bankruptcy decision (Pastena and Ruland 1986, Clark and Weinstein 1983, Shrieves and Stevens 1979). Furthermore, acquirers find it easier to merge and gain more operating synergies by acquiring risky targets (Bruton et al. 1994, Barney 1991, Harrison et al. 1991, Chatterjee 1986). Therefore, if a distressed firm can generate a greater value as a going concern than through liquidation and if a bidder provides this firm with a special competence, then risky firms are more likely to become targets (Bruton et al. 1994, Israel 1991). As argued by Ly et al. (2015), the structure of SBHCs contributes to the safety of their affiliates through an internal capital market; however, the increasingly complex structure of MBHCs exposes MBHC affiliates to a higher level of bankruptcy than do stand-alone banks. Accordingly, they find evidence that MBHC affiliates tend to have the highest level of insolvency risk, while SBHC affiliates have the least insolvency risk and stand-alone commercial banks have an intermediate level of insolvency risk. Therefore, we postulate that MBHC affiliates tend to have the greatest probability of becoming targets, while SBHC affiliates have the least probability of being acquired and stand-alone commercial banks fall somewhere between.

Second, the probability of SBHC affiliates, MBHC affiliates and stand-alone banks becoming acquirers centres on the fundamental differences in the characteristics of those SBHC and MBHC affiliates that choose to diversify and those stand-alone counterparts that choose to remain focused. From the resource-based perspective of corporate diversification, Martin and Sayrak (2003) indicate that diversified firms may own excess capacity in resources to fund their needs for economic activities compared to focused firms. However, Martin and Sayrak (2003) argue that the potential costs related to diversified business operations determine the benefits of maintaining a specialized entity. Therefore, on the one hand, we argue that SBHC affiliates and MBHC affiliates have more internal resources to enhance their merger activities than do stand-alone banks. On the other hand, stand-alone banks tend to be focused enterprises, thus preventing agency problems. Taken together, our arguments suggest that SBHC and MBHC affiliates are more likely to become acquirers than are stand-alone banks.

We use a sample of U.S. commercial banks between 1997 and 2012 with accounting data obtained from Call Reports and M&A data retrieved from Federal Deposit Insurance Corporation sources to test the two hypotheses. MBHC affiliates tend to exhibit a greater likelihood of being targets than do stand-alone commercial banks, which, in turn, exhibit a greater likelihood of being targets than do SBHC affiliates. Our findings indicate that MBHC affiliates tend to exhibit a greater likelihood of being acquirers than do SBHC affiliates, which, in turn, exhibit a greater likelihood of being acquirers than do stand-alone banks. These two main results support both hypotheses.

According to Park and Hendry (2015), Cox proportional hazard model carries built-in assumption that the effect of a covariate on the hazard rate is constant. If such an effect differs over time, the regression will lead to biased coefficient estimates. Therefore, an increased application of plotting methods and Schoenfeld residual-based nonproportionality tests is recommended to investigate the trends of covariate-specific scaled Schoenfeld residuals over time. If the test reveals that the proportional hazard assumption is violated, Box-Steffensmeier and Zorn (2001) recommend to interact those violating variables with the function of time as a corrective techniques. In this study, hence, we employ Schoenfeld residual-based nonproportionality tests and plotting graphs to detect violations of the proportional hazard assumption and corrective models are included to achieve greater accurate assessment of covariate effects. We find consistent results for the likelihood of targets and acquirers when examining the financial crisis period between 2007 and 2009, splitting samples based on the asset size and analysing the too-big-to-fail issues.

Gertner et al. (1994) argue that conglomeration could be value enhancing. Comparing internal and external capital markets, they argue that conglomerates provide more advantages than do banks to redeploy efficiently those assets that are performing poorly. Therefore, we examine further insights into the motives of MBHCs to engage in M&As within the same structure by conducting three probit model analyses. First, we compare the financial characteristics between acquirers who acquire another bank within the same MBHC structure and acquirers who acquire another bank outside the same MBHC structure. We find that those banks that acquire another bank within the same MBHC structure tend to be smaller and more financially constrained than those banks acquiring a bank from outside the same MBHC structure. Second, we investigate the differences in financial characteristics between targets who are acquired by another bank from the same MBHC structure and targets who are acquired by another bank from outside the same MBHC structure. Our findings suggest that targets that are acquired by another bank within the same MBHC structure tend to be smaller, higher profitability and capital than targets that are acquired by banks from outside the MBHC

structure. Third, we study the determinants of the likelihood of being targets among MBHC affiliates. Our findings suggest that the MBHC parents attempt to discipline distressed, poorly performing, and smaller affiliates by involving them in mergers and acquisitions. Overall, the MBHC parents attempt to replicate the M&A strategy within the MBHCs to reduce transaction costs, to refocus and to increase the overall performances of the MBHCs at the parent level.

Our paper contributes to multiple strands of the literature. First, the M&A literature on banking provides a variety of studies on the motivation for M&A (Mehran and Thakor 2011, Koetter et al. 2007, Amel et al. 2004, Berger et al. 1999, Hadlock et al. 1999, Rose 1995), on the comparison of financial characteristics between acquiring banks and acquired banks (Fried et al. 1999) and on the probability of becoming a target (Wheelock and Wilson 2000, Hannan and Pilloff 2009). We contribute to the M&A literature on the differences with respect to the probabilities of being targets or acquirers among BHC affiliates and stand-alone commercial banks. Specifically, Wheelock and Wilson (2004) examine the constraints on consolidation within the same structure and investigate the regulatory constraints that influence merger activities outside the structure using U.S. bank level data of MBHC banks and non-MBHC banks. This paper extends the study of Wheelock and Wilson (2004) by providing direct evidence and deeper insight into the motivation of MBHCs to engage in M&A within the structure. Second, this study extends the substantial literature that compares stand-alone and BHC affiliates. However, the extant literature primarily focuses on bank performance before and after the acquisition (Pozdena 1988, Mayne 1977, Piper and Weiss 1974, Ware 1973, Talley 1972), on cost efficiency (Yamori et al. 2003, Rose and Scott 1979) and on dividend policy (Mayne 1980).

The remainder of the paper is organized as follows. Section 2 develops the hypotheses, while Section 3 describes the data used and methodologies employed in this study. The empirical results are presented in Section 4, and Section 5 presents conclusions.

2 Hypothesis development

2.1 The probability of becoming a target

The literature has suggested that takeover targets are firms with prior poor performances (Palepu 1986, Hasbrouck 1985, Schwartz 1982) or failing firms (Hirshleifer and Thakor 1992). However, an acquisition of a distressed bank that is attractive both to the distressed firm itself and to the acquirer is based on the probability that a value-increasing acquisition may

materialize and that the division of the synergy gains accrued positively impact both acquirers and targets (Bruton et al. 1994, Israel 1991).

It is well known that distressed firms may not be able to raise equity (Fluck and Lynch 1999) or finance debt (Fluck 1998). In the investigations of firms attempting to recover from their financial constraints, several studies (Jame 1996, Gertner and Scharfstein 1991, Grossman and Hart 1980) have found that distressed firms fail to renegotiate with their debtholders. In the study of a 1960s conglomerate wave, Hubbard and Pahlia (1999) find that distressed target firms seeking financial synergy are involved in the diversification of acquisitions. Therefore, the focus is on the fact that a merger is the best choice for facilitating the financing mechanism that could not be achieved as a stand-alone entity (Erel et al. 2015, Fluck and Lynch 1999).

A substantial number of studies (Peel and Wilson 1989, Pastena and Ruland 1986, Bulow and John 1978, Lee and Barker 1977, Higgins and Schall 1975) further suggests that a merger is a substitute for bankruptcy. Indeed, financially distressed target firms tend to be successfully restructured after a merger (Erel et al. 2015, Clark and Ofek 1994). Similarly, another line of argumentation (Pastena and Ruland 1986, Clark and Weinstein 1983, Shrieves and Stevens 1979) supports merger over bankruptcy as the target firm's shareholders benefit more from a merger because they can retain their shares that hold some positive value. In contrast, the shareholders may receive nothing under a corporate bankruptcy. Therefore, Khatami et al. (2015) conclude that financial constraints of targets play an important role in value creation for both bidders and targets and influence the determinants of a takeover bid.

On the other hand, Pastena and Ruland (1986) argue that the literature treats a merger as an alternative solution to bankruptcy under the assumption that distressed firms are able to identify potential acquirers. In essence, Gorton et al. (2009) provide the definition for positioning acquisitions such that firms position themselves to be perceived as more attractive takeover targets to gain takeover premia. In the study on the success of restructuring, Clark and Ofek (1994) find that acquirers tend to earn higher post-merger returns from restructuring financially distressed targets compared to earnings from restructuring non- distressed targets due to the concessions they are able to gain when acquiring distressed firms.

Among the explanations for why distressed firms are attractive targets to buyers, a prominent explanation advanced by Oster (1990) is the so-called winner's curse, which is an error that acquirers pay more than the future value of the targets. Roll (1986) reasons that acquirers underestimate the cost of enhancing the combined synergies of two firms prior to an acquisition. A possible reason for this, as argued by several studies (Bruton et al. 1994, Barney 1991, Harrison et al. 1991, Dundas and Richardson 1982), is that acknowledging the distressed conditions of the targets provides acquirers a more thorough study in estimating their true

values, thus providing them the chance to avoid the winner's curse. Accordingly, Chatterjee (1986) concludes that acquirers find it easier and gain more operating synergies when acquiring risky targets.

Taken together, on the one hand, the failing hypothesis yields the testable prediction that if a distressed firm can generate a greater value as a going concern than can liquidation and if a bidder should be found to provide these firms with a special competence, then a risky bank is more likely to become a target. On the other hand, as argued by Ly et al. (2015), while the structure of SBHCs contributes to the safety of their affiliates in the internal capital market, the increasingly complex structure of MBHCs exposes MBHC affiliates to a higher level of bankruptcy than that of stand-alone banks. They further find that MBHC affiliates tend to have the highest level of insolvency risk, that SBHC affiliates have the lowest level of insolvency risk, and that stand-alone commercial banks have an intermediate level of insolvency risk. Therefore, we postulate the first hypothesis:

Hypothesis 1*: MBHC affiliates tend to have the greatest probability of becoming targets, while SBHC affiliates exhibit the lowest probability of being acquired and stand-alone commercial banks are somewhere between the two.*

2.2 The probability of becoming an acquirer

As acquisition is an investment decision made by an acquiring firm (Hornstein and Nguyen 2014, Halpern 1982), the probability of being an acquirer among all SBHC affiliates, MBHC affiliates and stand-alone banks centres on the fundamental differences in the characteristics of those SBHC and MBHC affiliates that choose to diversify and those stand-alone counterparts that opt to remain focused.

From the resource-based perspective of corporate diversification, Martin and Sayrak (2003) indicate that diversified firms may own more capacity in resources to fund their needs for economic activities than do focused firms. Indeed, the capital structures of SBHC and MBHC affiliates are richer than those of stand-alone banks because the holding company structure provides the former with funding advantages in the internal capital markets (Baule 2014, Almeida and Wolfenzon 2006, Khanna and Yafeh 2005), while stand-alone banks are not able to borrow as much as they need due to the imperfect external capital market (Deloof 1998, Hoshi et al. 1991). With a rich internal resource, SBHC and MBHC banks have the capacity to do a better job of project selection, or so-called winner picking, and thus enhance their value (Stein 1997, Weston 1970, Freixas et al. 2007) as compared to stand-alone banks. Dahl and Shrieves (1989) argue that acquisitions made by BHCs may contribute to an efficient

reallocation of the surplus capital to other banks under the imperfect condition that limits the size of the capital and the access to the capital in the capital market.

Similar to the advantage of the superior internal resource mechanism, Teece (1982) emphasizes the distinctive capabilities of conglomerates in evaluating investment opportunities. Teece (1982) finds that the capabilities of conglomerates enhance their assessment of acquisition candidates. Hence, Bouzgarrou and Navatte (2013) conclude that family firms outperform non-family firms in M&A. However, to disentangle the organizational forms of the MBHC from SBHC, Rangan et al. (1989) argue that MBHCs may be preferred over SBHCs as a vehicle for diversification strategies at higher output levels because the former can achieve higher cost efficiency than can the latter.

On the other hand, Haunschild (1993) suggests that the parents are motivated to engage in conglomerate acquisitions as a conglomeration allows them to offset a poorly performing business with a better performing business (Amihud and Lev 1981). In fact, Hughes et al. (1999) and Deng and Elyasiani (2008) find evidence that MBHCs tend to operate over greater geographic distances when acquiring other banks.

In defence of conglomerates, as postulated by Williams (1975), however, there is an optimal trade-off between the breadth of information (conglomerates) and the depth of expertise (specialized firms). Martin and Sayrak (2003) argue that the potential costs related to diversified business operations determine the benefits of maintaining a specialized entity. The opponents of corporate diversification propose that the root of the problem is a managerial agency problem. If a diversified structure reflects agency problems between the parent and the managers of the subsidiaries, an internal capital market may provide SBHC and MBHC affiliates with a greater opportunity to over invest (Ferris et al. 2003, Perotti and Gelfer 2001, Rajan et al. 2000, Scharfstein and Stein 2000, Shin and Stulz 1998). However, Martin and Sayrak (2003) argue that a diversified structure makes it difficult to overcome agency problems. In related studies, Lang and Stulz (1994) find that diversified firms demonstrate poor performance prior to conglomeration, while Hyland and Diltz (2002) and Mueller (1969) further provide evidence that poorly performing conglomerate firms tend to adopt a merger strategy to acquire the related growth opportunities. Based on the fundamental argument regarding the cost of diversification incurred by agency problems, stand-alone banks prefer to stay focused rather than to expand their structure via M&A. Thus, we posit that:

Hypothesis 2*: SBHC and MBHC affiliates are more likely to be acquirers than are stand-alone banks.*

3 Data and methodology

3.1 Data sample

Berger et al. (1995) suggest that BHC structure has been advantageous since the Riegle-Neal Insterstate Banking and Branching Efficiency Act of 1994 deregulated interstate branching regulation. Stiroh (2000) states that 83% of the U.S. banking assets were held by BHCs as of year-end 1997. Since the Riegle-Neal Act was passed in 1994 and became fully effective in 1997, M&A opportunities have accelerated consolidation in the U.S. banking industry. Therefore, our yearly account data of commercial banks are from 1997 to 2012. Accounting data are retrieved from Call Reports while M&A data are accessed from Federal Deposit Insurance Corporation sources.

Table 1 reports the distribution of acquirers and targets. As shown in Panel A of Table 1, the number of MBHC affiliates being targets holds the highest proportion of total targets (3,903), which includes stand-alone banks (456), SBHC affiliates (1,017) and MBHC affiliates (2,430) (11.68%, 26.06%, 62.26%, respectively). The acquirers reported in Panel A of Table 1 are counted by the number of M&A transactions conducted to acquire a certain type of target. It indicates that acquirers who are MBHC affiliates take the largest proportion of transactions at 80.84%, or 3,159 out of 3,903 M&A deals. Panel B shows the distribution of 1,124 acquirers within the same MBHCs, while Panel C presents the distribution of 1,865 targets within the same MBHCs.

Table 2 reports descriptive statistics for target and acquirer samples. In the last column, the letters "a", "b" and "c" indicate a significant difference between the means of each pair at the 1% level as follows: \ (i) SBHC affiliates and stand-alone banks, (ii) MBHC affiliates and stand-alone banks and (iii) MBHC affiliates and SBHC affiliates. As indicated in the last column of Table 2, most variables exhibit significantly different means for the three pairs.

Regarding the target sample, MBHC affiliates are riskier than are stand-alone banks and SBHC affiliates. SBHC and MBHC affiliates are larger, have a lower level of capital, exhibit a larger proportion of OBS items, real estate loans, multi-family mortgages, and are more cost efficient than stand-alone banks. MBHC affiliates are larger, have higher levels of capital, real estate loans, and multi-family mortgages, however, lower deposit and liquidity, and are more cost efficient than SBHC affiliates.

With respect to the acquirer sample, SBHC affiliates tend to have higher Z-scores than do MBHC affiliates, which, in turn, have higher Z-scores than do stand-alone banks. SBHC affiliates are smaller, hold lower capital resources and liquidity. However, they have higher

proportions of deposits, real-estate loans and multi-family mortgages than do stand-alone banks. MBHC affiliates are larger, have less capital and higher real estate loans and multi-family mortgages but lower deposit and liquidity values than do stand-alone banks. MBHC affiliates are larger, have less in deposits, lower real estate loan values and low liquidity, but are more likely to be involved in OBS activities and more cost efficient than SBHC affiliates.

Appendix A presents the correlation matrix for variables used in the study. In general, there are no high correlations between/among explanatory variables.

3.2 Cox proportional hazards model

We employ Cox (1972) proportional hazard duration models with time-varying covariates to examine the likelihood of banks being targets or acquirers during the period from 1997 to 2012. The survival analysis approach is typically appropriate for this empirical analysis because the sequential nature of the data is taken into account and it can cope with censoring and incorporate time-variant covariates (Holmen and Nivorozhkin 2007). Our two events are mutually exclusive as the choice of being acquired or being an acquirer cannot occur simultaneously. This method is applicable to the modelling of survival time as the time to be acquired or to acquire may vary based on the eventual outcome for a specific period. Following Hannan and Pilloff (2009) and Wheelock and Wilson (2000), this relationship is presented as follows:

$$h_i(t|X_i(t)) = h_0(t)\exp(X_i(t)\beta)$$

where h_j is the hazard function of bank *i* and h_0 is an unspecified baseline hazard. The expression $\exp(X_i(t)\beta)$ is the systematic part of the hazard function, where $X_i(t)$ defines the vector of covariates applying to bank *i* and β denotes the coefficient vector.

In our context, we work with two distinct hazard rates corresponding to the two types of acquisitions, namely, target and acquirer, by three types of commercial banks, namely, stand-alone banks, SBHC affiliates and MBHC affiliates, according to two proportional hazard models:

$$Target_i = \alpha_1 SBHC\_affiliate_i + \alpha_2 MBHC\_affiliate_i + \alpha_3 X_{it} + \varepsilon_{it} \quad (1)$$

$$Acquirer_i = \beta_1 SBHC\_affiliate_i + \beta_2 MBHC\_affiliate_i + \beta_3 X_{it} + \pi_{it} \quad (2)$$

where SBHC_affiliate equals 1 if banks are SBHC affiliates, and 0 otherwise. MBHC_affiliate equals 1 if the banks are MBHC affiliates, and 0 otherwise. ε_{it} and π_{it} denote the error terms.

The effects of the explanatory variables X_{it} are incorporated by allowing the hazard function to be influenced proportionally by the covariates as follows:

In the investigation of the likelihood of being targets, we use Z-score, , equity/assets, size, deposits, OBS activities, cost-to-income ratio, real estate loans, multi-family mortgages and liquidity. Z-score is equal to equity/assets plus ROA divided by standard deviation of ROA. The standard deviation of ROA is calculated at the four-year rolling time. A substantial literature suggests that distressed firms are more likely to become takeover targets (Khatami et al. 2015, Palepu 1986, Hasbrouck 1985, Schwartz 1982). Hence, it is predicted that banks with lower Z-scores are more likely to become targets. Following Pasiouras et al. (2007), for this study, we adopted capital strength as measured by equity to total assets. Moore (1996) argues that banks with a lack of capital strength tend to attract acquirers who are able to inject capital into the acquired banks. Therefore, we expect that banks holding lower capital resources are more likely to be targets.

Bank size is defined as the natural logarithm of total assets. Wheelock and Wilson (2004) suggest that the probability of involvement in mergers increases with bank size. Deposit refers to the ratio of deposits to total assets and thus captures the composition of the bank's liabilities. While banks find it costly to issue new capital (Myers and Majluf 1984), acquiring banks absorb deposit sources held by potential targets (Wheelock and Wilson 2004) by cross-selling to newly acquired local depositors (Rieker 2006). Wheelock and Wilson (2004) find that an increase in deposits increases the chance of being acquired.

The OBS is calculated by OBS items divided by total assets. Hannan and Pilloff (2009) suggest that the degree to which banks engage in OBS activities may affect their probability of being acquired. Cost-to-income ratio, which is defined as the operating expense or non-interest expense divided by the operating income, is the proxy for capturing operating efficiency management (Wheelock and Wilson 2000). They argue that the likelihood of acquisition declines with cost inefficiency. Cole and Fenn (2008) argue that real estate loans is the main factor of bank failures, therefore, we control the ratio of real estate loans to total assets in our study in an attempt to capture its mediation effect in the association of bank failure and M&As. As argued by Diamond and Rajan (2005), liquidity and solvency problem can interact and become the cause of banking crises, hence, it is important to control for liquidity in this study. Liquidity proxy is the ratio of liquid assets to total assets in which liquid assets contain cash, available-for-sale securities and Federal funds sold.

The same set of control variables is employed in the analysis for the likelihood of being acquirers. The synergy and internalization hypothesis (Asimakopoulos and Athanasoglou 2013, Eun 1996) suggests that acquisition is motivated by the acquirer's desire to redeploy the

combined assets or to acquire and internalize the operating synergies obtained from the target, such as larger economies of scale to generate synergistic gains. However, Masulis et al. (2007) argue that large banks are more entrenched and more likely to engage in value-reducing acquisitions. The contradictory view of the synergy and internalization hypothesis predicts that capital-starved banks are more likely to be acquirers. Additionally, the efficient management hypothesis (Hannan and Pilloff 2009, Roll 1986, Manne 1965, Marris 1963) offers an opposite prediction, that is, that cost-efficient banks tend to be acquirers.

4 Empirical results

4.1 The likelihood of being targets

4.1.1 Main findings

By employing the Cox model, one should be aware as to whether the model's proportional hazard assumption that independent variables are proportional over time is met. Box-Steffensmeier and Zorn (2001) argue that the violation of such an assumption may produce biased and inefficient estimates. Following Box-Steffensmeier and Zorn (2001), we deal with such an issue by first identifying violating variables after running the original model and then re-estimating the model again with the inclusion of interaction terms between each of violating variables and the log of time. These interaction terms take into account the nonproportional effects of those violating variables, resulting in a better-specified model and greater accuracy in assessing covariate effects. The results are interpreted by using the corrected model.

Table 3 reports the main results from the Cox proportional hazard estimation model (1). A negative (positive) coefficient indicates that an explanatory variable is related to a decrease (increase) in the acquisition hazard, defined as the likelihood of being acquired, given that it has not been acquired until the observed point in time. As indicated in Model (1), the negatively significant coefficient for SBHC_affiliate (-0.11) in the first column of Table 3 suggests that SBHC affiliates are less likely to be acquired than are stand-alone banks. We also find a positive and significant coefficient for MBHC_affiliate (1.58), indicating that MBHC affiliates are more likely to be acquired than are stand-alone banks. These results are consistent with our first hypothesis and are also consistent with the finding of Ly et al. (2015) that MBHC affiliates tend to have the highest level of insolvency risk, SBHC affiliates have the least insolvency risk, and stand-alone commercial banks demonstrate an intermediate level of insolvency risk. SBHC affiliates can access less restricted funds in the internal capital market established by their

parent (Houston and James 1998, Houston et al. 1997) in contrast to stand-alone banks. Moreover, efficient internal capital market models suggest that diversification creates value (Rajan et al. 2000). Diversification at the parent level enhances SBHCs' ability to obtain better external financing deals to enrich the internal financing available to their subsidiaries (Khanna and Palepu 2000), thereby increasing the ability of the parent to relieve financial difficulties faced by their affiliates. Hence, SBHC affiliates have lower insolvency risk than stand-alone banks, all else being equal.

In the wake of deregulation, BHCs have become more organizationally complex over the past two decades in terms of the number of separate legal affiliates and their geographic locations (Avraham et al. 2012). On the one hand, complexity theory argues that agency problems between the managers of the MBHC's parent and affiliates in the organizational hierarchy structure decrease the investment efficiency of subsidiaries (Rajan et al. 2000, Scharfstein and Stein 2000). On the other hand, complexity theory suggests that organizations employing a complex adaptive system model (Anderson 1999, Arthur 1996, Cheng and Van de Ven 1996) behave in a manner whereby each subsidiary bank competes with the others for internal resources (Frankel 2013). Complexity theory, hence, centres on the limited ability of the parent equitably provide resources for all of its subsidiaries as BHCs adopt increasingly complex structures due to diversification (Kahn and Winton 2004, DeYoung 2003, Hughes et al. 1999). Therefore, MBHC affiliates have higher insolvency risk than stand-alone banks.

The general picture that emerges from this analysis is that risky firms are more likely to be takeover targets (Palepu 1986, Hasbrouck 1985, Schwartz 1982). If a distressed firm can generate a greater value as a going concern than can liquidation, and if a bidder is able to provide this firm with a special competence, then a merger is a good substitute for bankruptcy (Peel and Wilson 1989, Pastena and Ruland 1986, Bulow and John 1978, Lee and Barker 1977, Higgins and Schall 1975)**.** Overall, MBHC affiliates tend to exhibit a greater likelihood of being targets than do stand-alone commercial banks, which, in turn, have a greater likelihood of being targets than do SBHC affiliates[3].

The positive sign of size (0.11) suggests that acquirers tend to acquire larger banks, a finding that is consistent with Eun (1996), who finds that acquisition is motivated by the acquirer's desire to redeploy the combined assets or acquire and internalize the operating synergies. Our results indicate that deposit, multi-family mortgages and liquidity increase the likelihood of becoming targets. Banks with a higher proportion of deposits are more likely to be acquired, whereas the acquiring banks would absorb the deposit sources held by the potential

[3] We employ three different methods, Poisson, Kaplan-Meier and Standard Mortality Ratio for robustness checks and all the results hold. This evidence can be provided upon the request.

targets (Wheelock and Wilson 2004). We find that banks with higher proportion of real estate loans are less likely to become targets, demonstrating that acquirers may not find interest in acquiring banks with risky real estate loan portfolio. This finding is consistent with the conclusion of Wheelock and Wilson (2000) that banks owning suspect loans measured by high ratio of real estate loans to total asset are less likely to become targets.

Table 4 reports the results of Schoenfeld residual-based nonproportionality tests from models obtained from Table 3. ρ indicates the estimated correlation between scaled Schoenfeld residuals and ln(Time). Columns with $\chi 2$ and *p*-value report the confidence that we will reject the null hypothesis that the hazard ratio of the covariate is constant over time. More specifically for Model (1) column 3, *p*-values of size (0.00), cost-to-income (0.00), real estate loans (0.09) and liquidity (0.05) suggest that size, cost-to-income, real estate mortgages and liquidity do not have a proportional influence on the likelihood of being targets. The global test of model (1) shows that non-proportionality is present.

Appendix B1 supplements the relative graphical approach for model 1 of Table 3 by plotting the scaled Schoenfeld residuals against ln(time)[4]. Each plot contains the fitted line and a lowness smooth line to facilitate observations of residuals' trends. Box-Steffensmeier and Zorn (2001) document that if a variable is proportional, the two lines are supposed to be close to each other and the average values of residuals should be zero throughout any point of time. One can observe that this pattern is generally true for most of variables apart from size, cost-to-income and real estate mortgages. The negative slope at the end of the line is observed for size, by contrast positive ones are observed for cost-to-income and real estate mortgages. The negative (positive) slope implies a tendency to overpredict (underpredict) its effect in the earlier duration and underestimate (overestimate) them in later years.

The re-estimate of the interactive model is presented in Model 2 of Table 3 column 2. Doing so provides a complete and accurate picture of the true effect of these variables on the hazard over the duration. Consistent with earlier results reported for Model 1 in Table 3, we can see that SBHC affiliates are less likely to be acquired than are stand-alone banks while MBHC affiliates are more likely to become targets than their stand-alone counterparts.

Jackson et al. (2014) document that the standard approach for fitting the Cox proportional hazard model is based on the censoring assumption. Following Foster and Jones (2001), we plot the cumulative Cox-Snell residuals to evaluate the general fit of the Cox model. They suggest that cumulative Cox-Snell residuals that resemble a (censored) sample from a standard exponential distribution should lie on a 45^0 line if there is a correctly fitted model. Appendix

[4] To save space, plots of scaled Schoenfeld residuals from other models are not reported.

B2 yields cumulative Cox-Snell residuals obtained from Model (1) of Table 3. It can be seen that the model provides a fairly good fit as the residuals lie close to the 45^0 line. Therefore, random censoring is not a concern in our model.

4.1.2 Financial crisis 2007-2009

As our data sample covers the financial crisis period between 2007 and 2009, one may suspect whether our M&A results are due to the probability of failure during the crisis. We examine this by first dropping all observations from 2007 to 2009 and then re-estimated the model by focusing on the remainder of the sample. Similar findings are found as reported Model (3) and (4) of Table 3. Hence, the probability of bank failure during the crisis does not affect our main finding.

4.1.3 Asset size class and too-big-to-fail

Gong and Jones (2013) find that there is a three-tiered bailout policy in which government rescues a bank with large systemic impact ('too-big-to-fail'). The policy is optimal if the government randomizes bailout for moderate-impact banks ('constructive ambiguity') and may not rescue banks with minimal systemic consequences ('too small to save'). Their evidence shows that size matters when studying bank failure. In this section, we re-examine the likelihood of being targets across different size classes and attempt to provide more insight into the too-big-to-fail issues associated with M&A.

Following Berger and Bouwman (2009), we split the sample by asset size into three sub-samples: (i) less than $1 billion, (ii) between $1 billion and $3 billion and (iii) larger than $3 billion. As presented in Model (5)-(10) in Table 3, similar findings of positive and significant MBHC_affiliate coefficients are found across different asset size classes, suggesting that MBHC affiliates tend to have higher likelihood of being targets than stand-alone banks regardless of their bank size. However, the results of SBHC_affiliate coefficients are insignificant in Model (7)-(10) for the medium and large asset class, indicating that SBHC affiliates and stand-alone banks are equally likely to be acquired when they are larger than $1 billion. Putting forward argument of Gong and Jones (2013), one possible reason can be that when systemic impacts of SBHC affiliates and stand-alone banks become larger, they tend to receive government intervention, causing indifferent likelihood of being targets among of them.

Acharya et al. (2013) argue that large banks are less likely to fail due to government's implicit subsidies. As our story lies in the association between the probability of failure and M&As, we attempt to bring too-big-to-fail issue into our empirical analysis and provide some novel findings. Following Acharya et al. (2013), we generate a dummy variable Size90 equal to 1 if banks are in the top 90th percentile in term of asset size and 0 otherwise to represent too-big-to-fail effect. We incorporate the interaction term of Size90*SBHC_affiliate and Size90*MBHC_affiliate into our main model. Our findings in Model (11)-(12) in Table 3 shows that the interaction term of Size90*SBHC_affiliate and Size90*MBHC_affiliate are not statistically significant, implying that there is no difference of too-big-to-fail effects across bank groups.

4.2 The likelihood of being acquirers

4.2.1 Main findings

Table 5 reports the findings for the likelihood of being acquirers. Models (1), (3), (5), (8) and (10) are original models whereas model (2), (4), (6), (9) and (11) are their corrected model, respectively. It should be noted that model (7) met the proportional hazard assumption; hence, there is no need for model replacement. The same test for nonproportionality was implemented as before and is reported in Table 6.

As indicated in Model (1) and (2) of Table 5, we find that the coefficients of both SBHC_affiliate and MBHC_affiliate are positive and significant (0.54 and 2.02, respectively), indicating that both SBHC and MBHC affiliates are more likely to be acquirers than stand-alone banks[5]. These findings are consistent with our conjecture that with more internal resources (Stein 1997, Weston 1970) and capabilities to assess acquisition candidates (Teece 1982), diversified firms may own excess capacity in resources to fund their needs for economic activities and increased capabilities to evaluate expansion opportunities than does a focused firm. However, Martin and Sayrak (2003) argue that the potential costs related to diversified business operations determine the benefits of maintaining a specialized entity. Therefore, stand-alone commercial banks attempt to stay focused by reducing their likelihood of becoming targets. Our evidence leads to the conclusion that MBHC affiliates tend to possess a greater likelihood of being acquirers than do SBHC affiliates, which, in turn, have a greater likelihood of being acquirers than do stand-alone banks.

[5] We applied similar robustness analyses and all the results are consistent in Poisson, Kaplan-Meier and Standard Mortality Ratio. The evidence can be provided upon the request.

Appendix C1 supplements the relative graphical approach for model 1 of Table 5 by plotting the scaled Schoenfeld residuals against ln(time)[6]. Most of lines through the residuals are constant over time except size and OBS, indicating that the agreement between the observed covariate and the proportional hazard assumption is fairly good. Appendix C2 illustrates cumulative Cox-Snell residuals obtained from Model (1) of Table 5. It suggests a fairly fit of the Cox model in the likelihood of being acquirers. Again, our model met the censoring condition.

4.2.2 Financial crisis 2007-2009

This section focuses on the sample that excludes the bank-year observations from 2007 to 2009. Model (3) and (4) in Table 5 report the finding in terms of the financial crisis 2007-2009. We find that SBHC_affiliate and MBHC_affiliate coefficients are still positive and statistically significant at 1% level. Hence, we can conclude that there are no different reasons for M&A between the crisis and normal period.

4.2.3 Asset size class and too-big-to-fail

This section reports the results of the likelihood of being acquirers across different asset size classes and too-big-to-fail issue. As shown in Model (6), (7)[7] and (9), all the findings are consistent across asset size. Model (10) and (11) of Table 5, interaction term of Size90*SBHC_affiliate and Size*MBHC_affiliate are insignificant, suggesting that the likelihood of being acquirers are not influenced by the implicit subsidies.

4.3 The motivation of M&As occurred within the same MBHC structure

The neo-classical theory for mergers contends that conglomerates reallocate inefficiently used assets via M&A and create operating synergies from new acquisitions (Maksimovic and Phillips 2002). Similar to the neo-classical theory, the auction theory, as modelled by Giliberto and Varaiya (1989), argues that if an acquirer is part of an MBHC, the acquirer will be better able to utilize the failed bank's charter than will a non-MBHC counterpart. In fact, from Panels C and A in Table 1, respectively, we observe that 1,865 out of 2,318 MBHC affiliate targets (80.45%) were acquired by 1,124 MBHC affiliates within the same MBHC structure. Our

[6] To save space, plots of scaled Schoenfeld residuals from other models are not reported.
[7] Model 7 passes the Schoenfeld residual-based nonproportionality test, so no corrected model is included.

observation suggests that there is a high tendency for MBHC affiliates to become targets or acquirers within the structure.

To ascertain why banks conduct M&A within the same MBHC structure, we consider the issue from two different angles and conduct two probit model analyses. First, we compare the financial characteristics between acquirers who acquire another bank within the same MBHC structure (acquirers_within hereafter) and acquirers who acquire another bank outside the same MBHC structure (acquirers_outside hereafter). For this analysis, we focus on data of MBHC affiliates who are acquirers acquiring another bank within and outside the same MBHC structure. We code acquirers_within as 1 at the time when a bank acquires another bank from the same MBHC structure, and 0 otherwise, and acquirers_outside as 1 at the time when a bank acquires another bank from outside the same MBHC structure, and 0 otherwise.

Second, we examine the differences in the financial characteristics between targets who are acquired by another bank from the same MBHC structure (targets_within hereafter) and targets who are acquired by another bank from outside the same MBHC structure (target_outside hereafter). For this analysis, we focus on data of MBHC affiliates who are targets being acquired by another bank within and outside the same MBHC structure. We code targets_within as 1 at the time when a bank is acquired by another bank from the same MBHC structure, and 0 otherwise, and targets_outside as 1 at the time when a bank is acquired by another bank from outside the same MBHC structure, and 0 otherwise.

Our main financial characteristics are insolvency risk, ROA, capital ratio and bank size. Insolvency risk is measured by Z-score, which is calculated as ROA plus equity/assets divided by the standard deviation of the return on asset. The standard deviation of the return on asset is calculated at the four-year rolling time. ROA is profitability. Capital ratio is total equity divided by total assets. Size is logarithm of total asset. Tables 7 and 8 report results for the two above probit analyses, respectively.

As indicated in Table 7, the coefficients on equity/assets and size are both negative and significant at the 1% level, indicating that acquirers_within are more financially constrained and smaller than are acquirers_outside, indicating their limited ability to expand into outside targets. This finding is consistent with the view that larger banks tend to be acquirers (Wheelock and Wilson 2004, Andrade et al. 2001). Given that capital plays an important role in determining the successful outcome of the acquisition contest (Morellec and Zhdanov 2008, Villalonga and Anita 2005), MBHC affiliates with superior capital resources tend to have greater ability to expand outside the structure.

Table 8 indicates that within targets are smaller with higher ROA and capital than outside targets. In fact, Rodrigues et al. (2012) argue that the probability of being targets is influenced by acquirers who hold private information. Teece (1982) emphasizes that a conglomerate enhances the assessment of acquisition candidates as the inside acquirers exploit information concerning the targets that is not available to outside acquirers (Halpern 1982). Dutordoir et al. (2014) argue that asymmetric information may be higher for smaller targets and that information asymmetry related to the stand-alone value of targets restricts the abilities of acquirers to assess the combined values. Therefore, smaller targets_within have limited capacity to position themselves as attractive takeover targets from outsiders (Gorton et al. 2009). An observed higher ROA and capital of within targets could be the reason suggested by Eun (1996) that acquirers prefer to internalize the operating synergies obtained from the targets.

4.4 Which banks are acquired within the MBHC

Gertner et al. (1994) argue that conglomeration could be value enhancing. Comparing internal and external capital markets, they argue that conglomerates provide more advantages than do banks to efficiently redeploy poorly performing assets. Therefore, the MBHC parent regards M&A as an optimal solution to reduce the probability of default and increase debt capacity (Weston and Halpern 1983). The key issue examined in this section is to determine the types of banks that are acquired within the MBHCs.

In this section, we study data of MBHC affiliates who are acquired by another bank from the same MBHC structure (targets hereafter) and those MBHC affiliates who are not acquired by another bank from the same MBHC structure (non-targets hereafter). We code a bank as 1 when it is acquired by another bank from the same MBHC structure, and 0 otherwise. We then study the determinants of the likelihood of being this target within the same MBHC structure using probit analysis. Our main financial characteristics are insolvency risk, ROA, equity/assets and bank size. Insolvency risk is measured using the Z-score, which is calculated as the ROA plus equity/assets divided by the standard deviation of the ROA. The standard deviation of the ROA is calculated at the four-year rolling time. ROA is profitability. Equity/assets are the total equity divided by total assets. Size is the logarithm of total asset. Table 9 reports our results.

As indicated in the first column of Table 9, targets are more financially constrained than are non-targets. The MBHC parent tends to let financially distressed affiliates become targets to increase the holding company's excess value (Billett and Mauer, 2003). From an internal capital market perspective, there is a tendency for the MBHC parent to divest financially

distressed affiliates to reduce the cross-subsidization inside the internal capital market (Meyer et al., 1992). This finding is consistent with the failing hypothesis that financially distressed banks are more like to be acquired (Peel and Wilson 1989, Pastena and Ruland 1986, Bulow and John 1978, Lee and Barker 1977, Higgins and Schall 1975).

Significantly negative coefficients of ROA and size indicate that targets perform more poorly and are smaller than are the non-targets. These findings suggest that the motive of the MBHC parent is to discipline poorly performing and smaller affiliates to centralize certain operations within a holding company organization, improve efficiency and achieve cost reductions.

Overall, our findings lead to a firm conclusion that is consistent with evidence provided by Koetter et al. (2007), that is, banks with relatively bad financial profiles tend to be acquired. Firms choose to merge within the same organization to reduce transaction costs as the cost of doing so is less than the costs associated with using the market (Coase 1937), diversifying the corporation, refocusing (Campa and Kedia 2002) and increasing internal efficiency (Villalonga and Anita 2005, Andrade et al. 2001, Shleifer and Vishny 1989). Therefore, the MBHC parent's attempt to replicate the M&A strategy inside the MBHC to reduce transaction costs, refocus, and increase the overall performance of the MBHC at the parent level.

5 Conclusion

The U.S. banking industry has experienced rapid consolidation with conglomerate targets and conglomerate acquirers over the past two decades. This paper uses U.S commercial bank data from 1997 to 2012 and the Cox proportional hazards model to study the likelihood of being targets or acquirers among stand-alone banks, SBHC affiliates, and MBHC affiliates. We find that MBHC affiliates tend to exhibit a greater likelihood of being targets than do stand-alone commercial banks, which demonstrate a greater likelihood of being targets than do SBHC affiliates. On the other hand, our findings show that MBHC affiliates tend to exhibit a greater likelihood of being acquirers than do SBHC affiliates, which, in turn, demonstrate a greater likelihood of being acquirers than do stand-alone banks. Our results are consistent with our two main hypotheses. Therefore, we conclude that failing banks tend to seek M&A for survival, whereas SBHC and MBHC affiliates that choose to diversify by M&A and the stand-alone counterparts choose to maintain their specialized structures.

Those banks that acquire another bank within the same MBHC structure tend to be smaller and more financially constrained than those banks that acquire another bank outside the same MBHC structure, whereas targets that are acquired by another bank within the same MBHC structure tend to be smaller with higher profitability and capital than the targets that are

acquired by another bank from outside the same MBHC structure. Our results suggest that the MBHC parent attempts to discipline distressed, poorly performing and smaller affiliates by engaging them in mergers and acquisitions. Overall, the MBHC parents attempt to replicate the M&A strategy inside the MBHC to reduce transaction costs and refocus and increase the overall performance of the MBHC at the parent level.

Our study contributes to our understanding of the restructuring of the U.S. banking industry and explains why the stand-alone bank model is disappearing. In addition, we provide the regulators with new information on different acquisition decisions among stand-alone banks and BHC affiliates and offer implications when anticipating future merger waves and adopting new policies for merger activities.

Table 1

Distribution of acquirers and targets

Panel A: Distribution of acquirers and targets across three types of banks							
Targets	Acquirers						Total
	Stand-alone banks		SBHC affiliates		MBHC affiliates		
	N	Percent	N	Percent	N	Percent	
Stand-alone banks	36	7.89%	204	44.74%	216	47.37%	456
SBHC affiliates	18	1.77%	374	36.77%	625	61.46%	1,017
MBHC affiliates	8	0.33%	104	4.28%	2,318	95.39%	2,430
Total	*62*		*682*		*3,159*		*3,903*
Panel B: Distribution of acquirers within the same MBHC structure							
Total	*1,124*						
Panel C: Distribution of targets within the same MBHC structure							
Total	*1,865*						

Note: Table reports the number of targets and acquirers for each type of banks from 1997 to 2012. Panel A displays distribution of targets and acquirers across three types of banks, including stand-alone banks, SBHC affiliates and MBHC affiliates. In panel A, it is noted that acquirers are counted by the number of M&A transactions to acquire a certain type of targets. Panel B and C present the number of acquirers and targets within the same MBHC structure, respectively.

Table 2
Summary statistics

Variable	All banks			Stand-alone banks			SBHC affiliates			MBH
	Obs	Mean	Std	Obs	Mean	Std	Obs	Mean	Std	Obs
						Target sample				
Z-score	22,677	67.35	64.08	3,338	69.93	73.85	7,821	70.25	66.92	11
Size	22,677	11.73	1.39	3,338	11.16	1.06	7,821	11.63	1.27	11
Equity/ assets	22,677	0.1	0.04	3,338	0.11	0.04	7,821	0.09	0.03	11
Deposit	22,677	0.83	0.1	3,338	0.85	0.09	7,821	0.85	0.07	11
OBS	22,677	0.02	0.03	3,338	0.01	0.02	7,821	0.02	0.02	11
Cost-to-income	22,677	0.88	0.76	3,338	1.14	1.06	7,821	0.92	0.72	11
Real estate loans	22,677	0.39	0.17	3,338	0.37	0.18	7,821	0.39	0.16	11
Multi- family mortgages	22,677	0.17	0.11	3,338	0.14	0.11	7,821	0.16	0.11	11
Liquidity	22,677	0.29	0.15	3,338	0.29	0.15	7,821	0.29	0.14	11
						Acquirer sample				
Z-score	20,166	72.95	66.77	1,174	64.64	69.36	11,128	74.68	69	7
Size	20,166	12.77	1.48	1,174	11.77	1.34	11,128	12.79	1.33	7
Equity/ assets	20,166	0.1	0.03	1,174	0.12	0.05	11,128	0.09	0.02	7
Deposit	20,166	0.81	0.09	1,174	0.81	0.13	11,128	0.82	0.07	7
OBS	20,166	0.02	0.03	1,174	0.02	0.02	11,128	0.02	0.03	7
Cost-to-income	20,166	0.94	0.79	1,174	1.05	0.95	11,128	0.99	0.81	7
Real estate loans	20,166	0.42	0.16	1,174	0.37	0.2	11,128	0.44	0.15	7
Multi- family mortgages	20,166	0.15	0.09	1,174	0.13	0.11	11,128	0.16	0.09	7
Liquidity	20,166	0.27	0.13	1,174	0.29	0.16	11,128	0.27	0.12	7

Note: This table provides summary of statistics for target and acquirer sample. It describes number of observations, means and standard deviations on banks, SBHC-affiliated banks and MBHC-affiliated banks. Z-score equals to (return on assets + capital ratio) / Standard deviation of return on asset. four-year rolling time. Size is logarithm of total asset. Equity/assets are total equity divided by total assets. Deposit ratio is total deposits divided by to by total assets. Cost-to-income ratio is non-interest expense divided by operating income. Real estate loans are the ratio of real-estate loans to total a family mortgages to total assets. Liquidity is the ratio of liquid assets to total assets. . In the last column, the letter "a", "b" and "c" indicates a significa respectively as follows: (i) SBHC affiliates and stand-alone banks; (ii) MBHC affiliates and stand-alone banks; (iii) MBHC affiliates and SBHC affi

Table 3
Cox proportional hazard estimations for the likelihood of being targets: the U.S. banking industry

Variable	**Main finding**		**Crisis 2007-2009**		**Asset size**			
					< $1 billion		$1 - $3 billion	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
SBHC_affiliate	-0.11*	-0.13**	-0.11*	-0.13**	-0.16***	-0.17***	0.70	0.65
	(0.06)	(0.06)	(0.07)	(0.07)	(0.06)	(0.06)	(0.54)	(0.53)
MBHC_affiliate	1.58***	1.61***	1.52***	1.66***	1.58***	1.61***	1.98***	1.93***
	(0.05)	(0.06)	(0.06)	(0.09)	(0.05)	(0.06)	(0.53)	(0.52)
Z-score	-0.00***	-0.00***	-0.00***	-0.00***	-0.00***	-0.00***	-0.00	-0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Size	0.11***	0.15***	0.07***	0.11***	0.11***	0.24***	1.04***	0.99***
	(0.01)	(0.03)	(0.02)	(0.03)	(0.02)	(0.04)	(0.20)	(0.20)
Equity/ assets	0.21	0.44	-0.38	-0.03	-0.32	-0.16	-0.93	-12.97
	(0.57)	(0.59)	(0.65)	(0.64)	(0.63)	(0.66)	(2.24)	(5.45)
Deposit	0.90***	0.65***	0.27	0.29	0.91***	0.63***	0.39	0.44
	(0.19)	(0.20)	(0.21)	(0.21)	(0.22)	(0.23)	(0.57)	(0.57)
OBS	0.19	0.82	1.69**	1.70**	0.34	0.98	4.97***	4.55***
	(0.64)	(0.68)	(0.73)	(0.71)	(0.80)	(0.84)	(1.85)	(1.84)
Cost-to-income	0.03*	-0.17***	0.01	-0.18***	0.04**	-0.14***	-0.28**	-0.28**
	(0.02)	(0.05)	(0.02)	(0.05)	(0.02)	(0.05)	(0.11)	(0.12)
Real estate loans	0.22*	-0.55**	0.39**	-0.55**	0.22	-0.95***	-1.14*	-4.08*
	(0.13)	(0.27)	(0.16)	(0.24)	(0.15)	(0.25)	(0.60)	(0.95)
Multi- family mortgages	0.43**	0.35*	-0.02	0.00	0.42**	0.30	3.14***	3.19***
	(0.18)	(0.19)	(0.21)	(0.21)	(0.19)	(0.21)	(0.77)	(0.78)
Liquidity	0.78***	1.21***	0.70***	0.77***	0.82***	0.84***	1.06*	1.15*
	(0.13)	(0.29)	(0.15)	(0.15)	(0.14)	(0.15)	(0.62)	(0.63)
Size90								
Size90 x SBHC_affiliate								
Size90 x MBHC_affiliate								
ln(time) x MBHC_affiliate				-0.11**				
				(0.05)				

Table 3
Cox proportional hazard estimations for the likelihood of being targets: the U.S. banking industry

Variable	**Main finding**		**Crisis 2007-2009**				**Asset size**	
					< $1 billion		$1 - $3 billion	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ln(time) x Size		-0.04***		-0.03*		-0.11***		
		(0.01)		(0.02)		(0.02)		
ln(time) x Equity/assets								7.56*
								(2.78)
ln(time) x Deposit								
ln(time) x OBS								
ln(time) x Cost-to-income		0.11***		0.11***		0.10***		
		(0.02)		(0.02)		(0.02)		
ln(time) x Real estate loans		0.52***		0.68***		0.82***		1.99*
		(0.15)		(0.13)		(0.12)		(0.54)
ln(time) x Multi- family mortgages								
ln(time) x liquidity		-0.28						
		(0.17)						
No of targets	3,903	3,903	2,897	2,887	3,505	3,505	196	196
No of banks	10,847	10,847	10,212	10,212	10,439	10,439	805	805
No of observations	114,740	114,740	86,056	86,056	107,835	107,835	3,932	3,932

Note: The table presents the likelihood of being targets between (i) SBHC affiliates and stand-alone banks; (ii) MBHC affiliates and stand-alone banks otherwise. MBHC_affiliate equals 1 if banks are MBHC affiliates and 0 otherwise. Z-score equals to (return on assets + capital ratio) / Standard deviati calculated at four-year rolling time. Size is logarithm of total asset. Equity/assets are total equity divided by total assets. Deposit ratio is total deposits divi by total assets. Cost-to-income ratio is non-interest expense divided by operating income. Real-estate loans are the ratio of real-estate mortgage to tota mortgage to total assets. Liquidity is the ratio of liquid assets to total assets. Size90 is a dummy variable equal to 1 if a given bank's size is in the top 90t and Size90*MBHC_affiliate are included to investigate too-big-to-fail issues. Heteroscedasticity-robust standard errors, corrected for clustering at the b (6), (8), (10) and (12) are adjusted for nonproportionality in the original models by interacting ln(Time) with violating variables. ***, ** and * denote 1%

Table 4

Results of Schoenfeld residual-based nonproportionality tests - The likelihood of being targets

	From Model (1)			From Model (3)			From Model (5)			From Model (7)		
	ρ	χ^2	*p*-value	ρ	χ^2	*p*-value	ρ	χ^2	*p*-value	ρ	χ^2	*p*-value
SBHC_affiliate	-0.02	1.63	0.20	-0.03	2.31	0.13	-0.02	1.85	0.17	0.11	2.55	0.11
MBHC_affiliate	0.02	2.38	0.12	-0.04	5.65	0.02	0.02	2.33	0.13	0.11	2.63	0.10
Z-score	-0.02	1.37	0.23	0.01	0.29	0.59	0.00	0.06	0.80	-0.05	1.15	0.28
Size	-0.06	13.28	0.00	-0.04	4.67	0.03	-0.08	25.20	0.00	0.00	0.00	0.95
Equity/ assets	0.02	1.84	0.17	-0.01	0.34	0.56	0.01	0.44	0.51	0.12	3.71	0.05
Deposit	-0.01	0.30	0.58	-0.02	0.98	0.32	0.00	0.00	0.95	-0.11	1.39	0.24
OBS	0.00	0.04	0.84	-0.02	0.91	0.34	-0.01	0.60	0.44	-0.05	0.40	0.53
Cost-to-income	0.07	19.06	0.00	0.07	13.92	0.00	0.07	17.94	0.00	0.09	1.88	0.17
Real estate loans	0.03	2.80	0.09	0.05	6.75	0.40	0.05	8.92	0.003	0.19	7.11	0.01
Multi- family mortgages	0.00	0.02	0.89	-0.01	0.71	0.24	-0.01	0.21	0.65	-0.09	2.01	0.16
Liquidity	-0.03	3.73	0.05	-0.02	1.35	0.24	-0.01	0.62	0.43	-0.04	0.33	0.57
Size90												
Size90 x SBHC_affiliate												
Size90 x MBHC_affiliate												
Global Test		89.13	0.00		53.57	0.00		94.88	0.00		24.65	0.01

Note: This table reports Schoenfeld residual-based test for the possibility of nonproportionality in the findings of the likelihood of being targets. Results a
specification. ρ presents the estimated correlation between scaled residuals and ln(time). χ^2 and *p*-value report the confidence to reject the null hypothe
over time.

Table 5
Cox proportional hazard estimations for the likelihood of being acquirers: the U.S. banking industry

Variable	**Main finding**		**Crisis 2007-2009**		**Asset size**		
					< $1 billion		$1 - $3 billion
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
SBHC_affiliate	0.55***	0.54***	0.54***	0.54***	0.46***	0.46***	1.14**
	(0.12)	(0.12)	(0.13)	(0.13)	(0.13)	(0.13)	(0.54)
MBHC_affiliate	2.02***	2.02***	1.98***	1.97***	1.99***	1.99***	2.11***
	(0.12)	(0.12)	(0.12)	(0.12)	(0.12)	(0.12)	(0.53)
Z-score	0.00***	0.00***	0.00***	0.00***	0.00**	0.00**	0.00***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Size	0.48***	0.58***	0.48***	0.57***	0.64***	0.85***	1.49***
	(0.03)	(0.04)	(0.03)	(0.04)	(0.04)	(0.06)	(0.20)
Equity/ assets	-3.36***	-3.43***	-2.85***	-2.95***	-2.81***	-2.87***	-5.00*
	(0.95)	(0.96)	(1.01)	(1.03)	(1.03)	(1.03)	(2.55)
Deposit	0.79***	0.84***	0.72**	0.76**	0.20	0.18	0.80
	(0.30)	(0.30)	(0.32)	(0.32)	(0.34)	(0.33)	(0.63)
OBS	-2.46**	-9.79***	-2.08*	-9.56***	-1.79	-14.77***	-1.63
	(1.07)	(2.04)	(1.10)	(2.11)	(1.39)	(3.33)	(2.22)
Cost-to-income	-0.13***	-0.13***	-0.16***	-0.17***	-0.13***	-0.13***	-0.62***
	(0.04)	(0.04)	(0.05)	(0.05)	(0.04)	(0.04)	(0.15)
Real estate loans	0.31	0.31	0.37*	0.35	-0.56**	-0.47**	-0.24
	(0.20)	(0.20)	(0.22)	(0.22)	(0.23)	(0.23)	(0.53)
Multi- family mortgages	-1.57***	-1.56***	-1.80***	-1.77***	-1.15***	-1.26***	0.74
	(0.29)	(0.30)	(0.32)	(0.32)	(0.33)	(0.33)	(0.75)
Liquidity	-0.43**	-0.41*	-0.53**	-0.50**	-0.77***	-0.73***	-0.70
	(0.22)	(0.22)	(0.23)	(0.23)	(0.23)	(0.23)	(0.60)
Size90							
Size90 x SBHC_affiliate							
Size90 x MBHC_affiliate							
ln(time) x Zscore							
ln(time) x Size		-0.73***		-0.06***		-0.14***	
		(0.02)		(0.02)		(0.04)	
ln(time) x Equity/ assets							

Table 5
Cox proportional hazard estimations for the likelihood of being acquirers: the U.S. banking industry

Variable	Main finding		Crisis 2007-2009		Asset size		
					< $1 billion		$1 - $3 billion
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
ln(time) x OBS		4.97***		5.53***		7.88***	
		(1.19)		(1.31)		(1.79)	
ln(time) x Real estate loans							
ln(time) x Multi- family mortgages							
ln(time) x Size90 x MBHC_affiliate							
No of acquirers	1,325	1,325	1,166	1,166	1,143	1,143	214
No of banks	10,032	10,032	9,957	9,957	9,696	9,696	785
No of observations	94,553	94,553	77,882	77,882	91,587	91,587	3,107

Note: The table presents the likelihood of being targets between (i) SBHC affiliates and stand-alone banks; (ii) MBHC affiliates and stand-alone b
otherwise. MBHC_affiliate equals 1 if banks are MBHC affiliates and 0 otherwise. Z-score equals to (return on assets + capital ratio) / Standard de
calculated at four-year rolling time. Size is logarithm of total asset. Equity/assets are total equity divided by total assets. Deposit ratio is total deposits
by total assets. Cost-to-income ratio is non-interest expense divided by operating income. Real-estate loans are the ratio of real-estate mortgage to
mortgage to total assets. Liquidity is the ratio of liquid assets to total assets. Size90 is a dummy variable equal to 1 if a given bank's size is in the top
and Size90*MBHC_affiliate are included to investigate too-big-to-fail issues. Heteroscedasticity-robust standard errors, corrected for clustering at the
(9) and (11) are adjusted for nonproportionality in the original models by .0interacting ln(Time) and violating variables. ***, ** and * denote 1%, 5%

Table 6
Results of Schoenfeld residuals nonproportionality tests - The likelihood of being acquirers

	From Model (1)			From Model (3)			From Model (5)			From Model (7)		
	ρ	$\chi 2$	*p*-value	ρ	$\chi 2$	*p*-value	ρ	$\chi 2$	*p*-value	ρ	$\chi 2$	*p*-value
SBHC_affiliate	-0.03	1.34	0.25	-0.03	1.22	0.27	-0.03	1.16	0.28	-0.1	1.01	0.32
MBHC_affiliate	-0.02	0.49	0.48	-0.04	1.91	0.17	-0.02	0.28	0.59	0	0.19	0.67
Z-score	0.02	0.4	0.53	0.017	0.28	0.59	0.01	0.12	0.73	-0.1	0.36	0.55
Size	-0.08	9.03	0.00	-0.06	4.67	0.03	-0.08	8.86	0.00	-0.1	1.82	0.18
Equity/ assets	0.02	0.77	0.38	0.041	1.9	0.17	0.03	0.77	0.38	0.03	0.27	0.61
Deposit	-0.03	0.82	0.36	-0.02	0.55	0.46	-0.01	0.06	0.81	0.08	1.11	0.29
OBS	0.11	15.1	0.00	0.119	16	0.00	0.11	14.5	0.00	-0.1	2.38	0.12
Cost-to-income	0.04	1.75	0.19	0.037	1.63	0.2	0.04	1.59	0.21	0.06	0.63	0.43
Real estate loans	0.04	1.39	0.24	0.036	1.05	0.31	0.01	0.05	0.82	0.13	2.63	0.1
Multi- family mortgages	0.01	0.11	0.73	-0.01	0.03	0.87	0.02	0.57	0.45	-0.1	2.63	0.39
Liquidity	0.03	0.95	0.33	0.025	0.61	0.44	0.02	0.3	0.58	-0.1	0.73	0.46
Size90												
Size90 x SBHC_affiliate												
Size90 x MBHC_affiliate												
Global Test		89.13	0.00		26.64	0.00		28.32	0.00		15.6	0.16

Note: This table reports Schoenfeld residual-based test for the possibility of nonproportionality in the findings of the likelihood of being acquirers. Resu
time specification. ρ presents the estimated correlation between scaled residuals and ln(time). $\chi 2$ and *p*-value report the confidence to reject the null h
constant over time.

Table 7

Probit model analysis: acquirers_within versus acquirers_outside

	(1)	(2)	(3)	(4)
Z-score$_{t-1}$	0.00			
	(0.00)			
ROA$_{t-1}$		-0.06		
		(0.08)		
Equity/ assets$_{t-1}$			-4.99***	
			(1.53)	
Size$_{t-1}$	-0.22***	-0.22***	-0.24***	-0.22***
	(0.04)	(0.04)	(0.04)	(0.04)
Deposit$_{t-1}$	-0.30	-0.33	-0.76	-0.30
	(0.47)	(0.47)	(0.49)	(0.47)
OBS$_{t-1}$	1.28	1.17	1.04	1.26
	(1.30)	(1.30)	(1.28)	(1.29)
Cost-to-income$_{t-1}$	-0.06	-0.09	-0.03	-0.06
	(0.10)	(0.11)	(0.10)	(0.10)
Real estate loans$_{t-1}$	-0.35	-0.38	-0.45	-0.35
	(0.39)	(0.39)	(0.39)	(0.39)
Multi- family mortgages$_{t-1}$	1.01*	1.02*	0.85	1.02*
	(0.53)	(0.54)	(0.54)	(0.54)
Liquidity$_{t-1}$	0.06	0.04	-0.07	0.07
	(0.37)	(0.38)	(0.38)	(0.37)
Constant$_{t-1}$	3.49***	3.64***	4.72***	3.50***
	(0.71)	(0.73)	(0.81)	(0.71)
Year fixed effects	Yes	Yes	Yes	Yes
Pseudo R^2	0.074	0.075	0.082	0.075
Number of observations	1,368	1,368	1,368	1,368

Note: This table reports the results of a probit model analysis for the difference in financial characteristics between acquirers who acquirer another bank within the same MBHC structure (acquirer_within hereafter) and acquirers who acquire another bank outside the same MBHC structure (acquirer_outside hereafter), including Z-score, ROA, equity/assets and size. This analysis focuses on data of MBHC affiliates who are acquirers acquiring another bank within and outside the same MBHC structure. We code acquirers_within as 1 at the time when a bank acquires another bank from the same MBHC structure and 0 otherwise, and acquirers_outside as 1 at the time when a bank acquires another bank from outside the same MBHC structure and 0 otherwise. Z-score equals to (return on assets + capital ratio) / Standard deviation of return on asset. Standard deviation of return on asset is calculated at four-year rolling time. ROA is return on asset. Equity/assets are total equity divided by total assets. Size is logarithm of total asset. Deposit ratio is total deposits divided by total assets. OBS is off-balance-sheet activities divided by total assets. Cost-to-income ratio is non-interest expense divided by operating income. Real-estate loans are the ratio of real-estate mortgage to total assets. Multi-family mortgages are the ratio of multi-family mortgages to total assets. Liquidity is the ratio of liquid assets to total assets. We include year fixed effects in all specifications. Standard errors are clustered at the bank level and reported in the parentheses. The results for time fixed effects are not reported in the table. ***,** and * denote 1%, 5% and 10% significant level, respectively.

Table 8

Probit model analysis: targets_within versus targets_outside

	(1)	(2)	(3)	(4)
Z-score$_{t-1}$	0.00			
	(0.00)			
ROA$_{t-1}$		0.09*		
		(0.05)		
Equity/ assets$_{t-1}$			2.28**	
			(1.02)	
Size$_{t-1}$	-0.05*	-0.06*	-0.04	-0.05*
	(0.03)	(0.03)	(0.03)	(0.03)
Deposit$_{t-1}$	-0.66*	-0.57	-0.27	-0.65*
	(0.35)	(0.36)	(0.39)	(0.35)
OBS$_{t-1}$	1.06	1.03	1.11	1.03
	(1.18)	(1.18)	(1.19)	(1.18)
Cost-to-income$_{t-1}$	-0.03	0.01	-0.04	-0.03
	(0.05)	(0.06)	(0.05)	(0.05)
Real estate loans$_{t-1}$	-0.94***	-0.89***	-0.93***	-0.94***
	(0.29)	(0.29)	(0.29)	(0.29)
Multi- family mortgages$_{t-1}$	1.55***	1.56***	1.71***	1.56***
	(0.36)	(0.36)	(0.36)	(0.36)
Liquidity$_{t-1}$	-0.09	-0.09	-0.09	-0.09
	(0.28)	(0.28)	(0.28)	(0.28)
Constant$_{t-1}$	1.94***	1.76***	1.22**	1.96***
	(0.53)	(0.54)	(0.60)	(0.53)
Year fixed effects	Yes	Yes	Yes	Yes
Pseudo R^2	0.049	0.050	0.051	0.049
Number of observations	2,075	2,075	2,075	2,075

Note: This table reports the results of a probit model analysis for the difference in financial characteristics between targets who are acquired by another bank from the same MBHC structure (targets_within hereafter) and targets who are acquired by another bank from outside the same MBHC structure (targets_outside hereafter), including Z-score, ROA, equity/assets and size. This analysis focuses on data of MBHC affiliates who are targets being acquired by another bank within and outside the same MBHC structure. We code targets_within as 1 at the time when a bank is acquired by another bank from the same MBHC structure and 0 otherwise, and targets_outside as 1 at the time when a bank is acquired by another bank from outside the same MBHC structure and 0 otherwise. Z-score equals to (return on assets + capital ratio) / Standard deviation of return on asset. Standard deviation of return on asset is calculated at four-year rolling time. ROA is return on asset. Equity/assets are total equity divided by total assets. Size is logarithm of total asset. Deposit ratio is total deposits divided by total assets. OBS is off-balance-sheet activities divided by total assets. Cost-to-income ratio is non-interest expense divided by operating income. Real-estate mortgages are the ratio of real-estate mortgage to total assets. Multi-family mortgages are the ratio of multi-family mortgages to total assets. Liquidity is the ratio of liquid assets to total assets. We include year fixed effects in all specifications. Standard errors are clustered at the bank level and reported in the parentheses. The results for time fixed effects are not reported in the table. ***,** and * denote 1%, 5% and 10% significant level, respectively.

Table 9

Probit model analysis: targets_within versus targets_outside

	(1)	(2)	(3)	(4)
Z-score	-0.00***			
	(0.00)			
ROA		-0.14***		
		(0.03)		
Equity/ assets			-0.29	
			(0.78)	
Size	-0.28***	-0.29***	-0.29***	-0.28***
	(0.02)	(0.02)	(0.02)	(0.02)
Deposit	-0.68***	-0.89***	-0.75***	-0.69***
	(0.26)	(0.27)	(0.28)	(0.26)
OBS	5.57***	5.76***	5.72***	5.73***
	(0.91)	(0.92)	(0.91)	(0.91)
Cost-to-income	-0.08**	-0.10***	-0.05	-0.05
	(0.03)	(0.04)	(0.03)	(0.03)
Real estate loans	-0.16	-0.20	-0.13	-0.12
	(0.26)	(0.26)	(0.26)	(0.26)
Multi- family mortgages	1.58***	1.57***	1.51***	1.52***
	(0.32)	(0.33)	(0.33)	(0.32)
Liquidity	0.59***	0.63***	0.59***	0.59***
	(0.22)	(0.22)	(0.22)	(0.22)
Constant	3.41***	3.71***	3.39***	3.29***
	(0.39)	(0.42)	(0.47)	(0.39)
Year fixed effects	Yes	Yes	Yes	Yes
Pseudo R^2	0.122	0.120	0.117	0.116
Number of observations	20,390	20,390	20,390	20,390

Note: This table reports the results of a probit model analysis to examine the determinants of the likelihood of being targets within the same MBHC structure, including Z-score, ROA, equity/assets and size. This analysis studies data of MBHC affiliates who are acquired by another bank from the same MBHC structure and those MBHC affiliates who are not acquired by another bank from the same MBHC structure. We code a bank as 1 when it is acquired by another bank from the same MBHC structure, and 0 otherwise. Z-score equals to (return on assets + capital ratio) / Standard deviation of return on asset. Standard deviation of return on asset is calculated at four-year rolling time. ROA is return on asset. Equity/assets are total equity divided by total assets. Size is logarithm of total asset. Deposit ratio is total deposits divided by total assets. OBS is off-balance-sheet activities divided by total assets. Cost-to-income ratio is non-interest expense divided by operating income. Real-estate loans are the ratio of real-estate mortgage to total assets. Multi-family mortgages are the ratio of multi-family mortgages to total assets. Liquidity is the ratio of liquid assets to total assets. We include year fixed effects in all specifications. Standard errors are clustered at the bank level and reported in the parentheses. The results for time fixed effects are not reported in the table. ***,** and * denote 1%, 5% and 10% significant level, respectively.

APPENDIX A

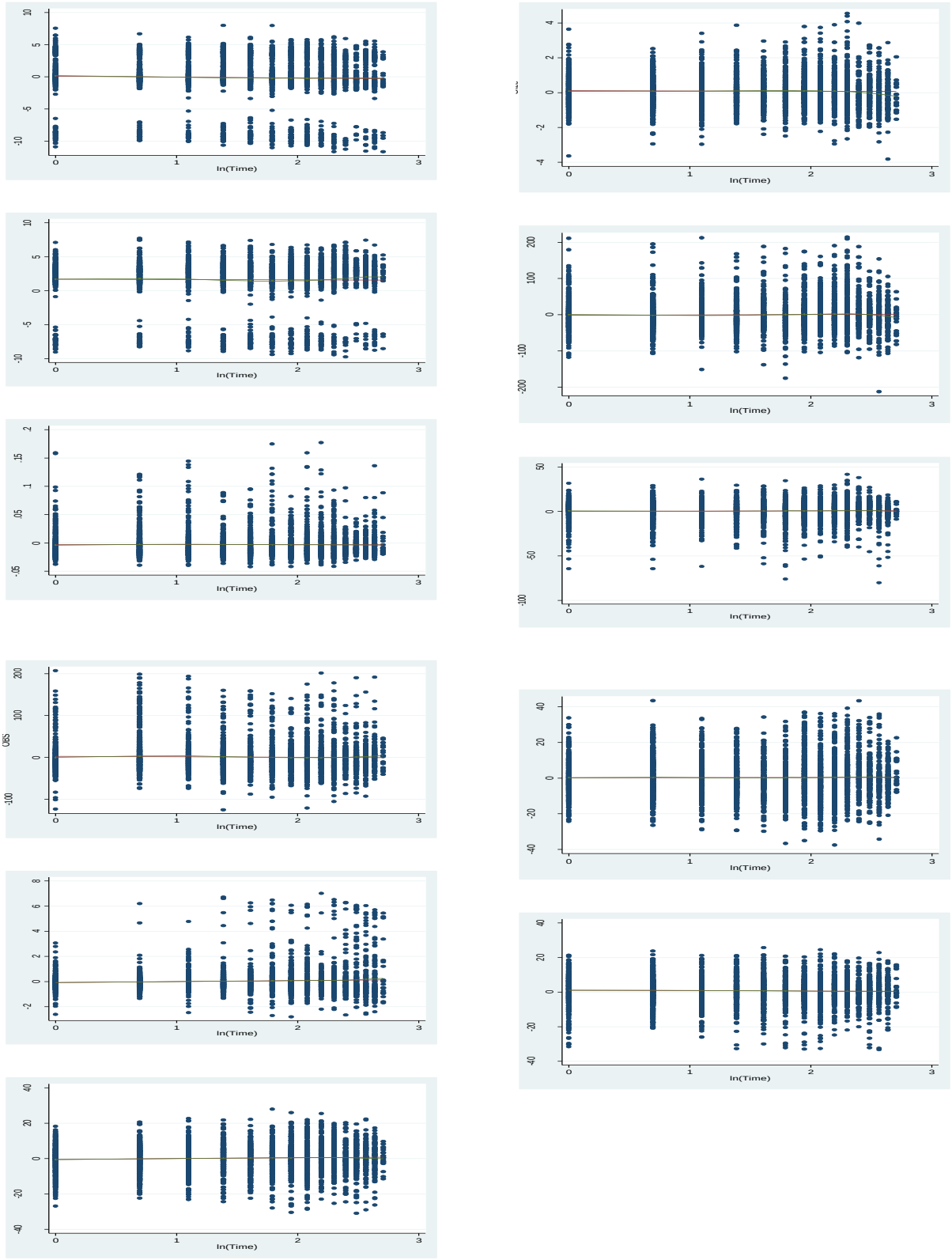
Correlation matrix

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) SBHC_affiliate	1							
(2) MBHC_affiliate	-0.66*	1						
(3) Z-score	0.02*	-0.03*	1					
(4) Size	0.04*	0.12*	-0.03*	1				
(5) Equity/ assets	-0.15*	-0.02*	0.17*	-0.19*	1			
(6) Deposit	0.12*	-0.13*	-0.02*	-0.25*	-0.46*	1		
(7) OBS	-0.05*	0.13*	-0.07*	0.47*	-0.08*	-0.15*	1	
(8) Cost-to-income	0.01*	-0.09*	-0.18*	-0.09*	0.09*	-0.01*	-0.00	1
(9) Real estate loans	0.07*	-0.01	-0.09*	0.298	-0.29*	0.09*	0.19*	-0.0
(10) Multi- family mortgages	0.06*	-0.0005	0.07*	0.06*	-0.19*	0.07*	-0.03*	-0.0
(11) Liquidity	-0.01*	-0.03*	0.06*	-0.17*	0.19*	-0.05*	-0.16*	0.1

Z-score equals to (return on assets + capital ratio) / Standard deviation of return on asset. Standard deviation of return on asset is calculated at fo asset. Equity/assets are total equity divided by total assets. Size is logarithm of total asset. Deposit ratio is total deposits divided by total assets. OB by total assets. Cost-to-income ratio is non-interest expense divided by operating income. Real-estate loans are the ratio of real-estate loans to tota ratio of multi-family mortgages to total assets. Liquidity is the ratio of liquid assets to total assets. * denotes significance at 1% level.

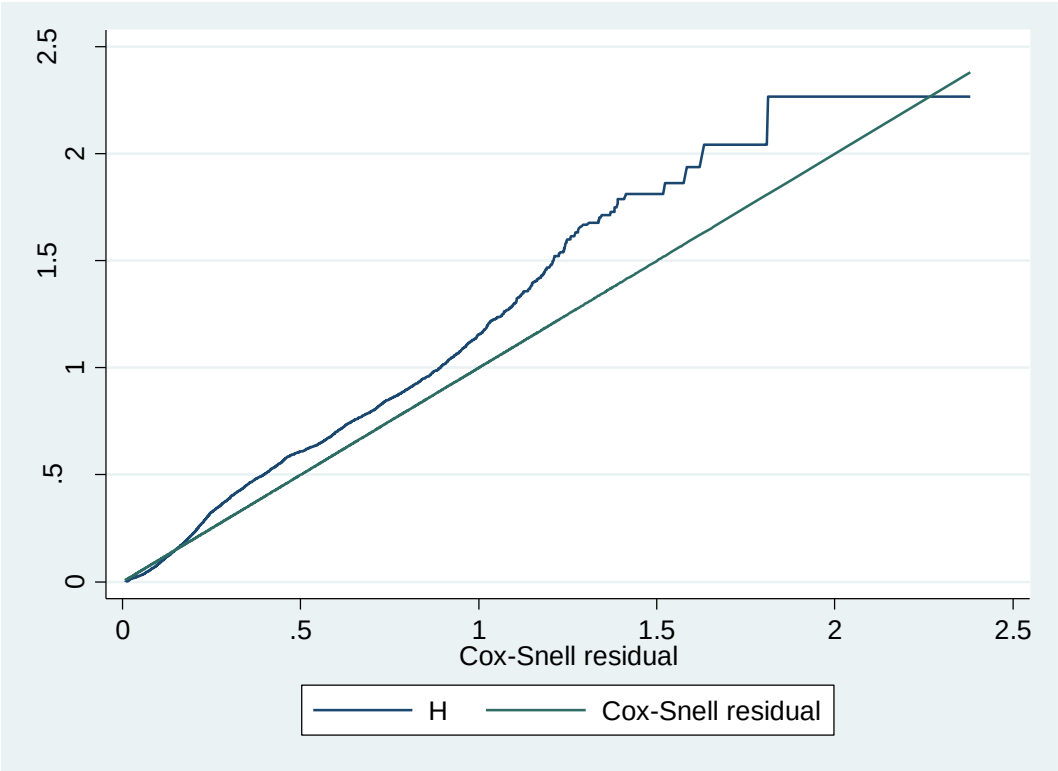
APPENDIX B

B1. Plots of scaled Schoenfeld residuals against ln(Time), model with targets



Note: Figures plot scale Schoefeld residuals obtained from Model (1) Table 3 against ln(Time). Red lines represent fitted value whereas lowness smooth curves are in green.

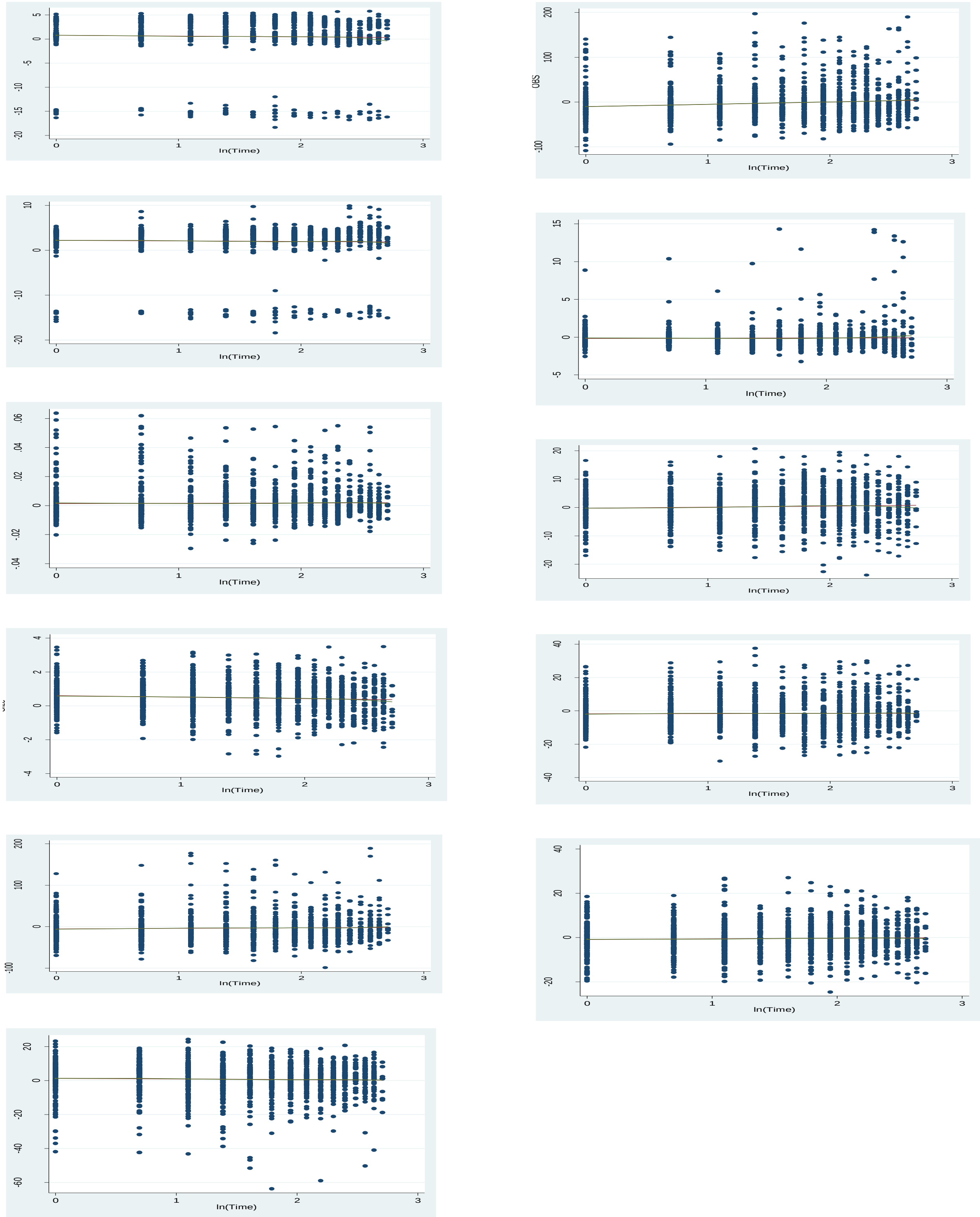
B2 Plots of cumulative Cox-Snell residuals, model with targets



Note: Figures plot the cumulative Cox-Snell residuals obtained from Model (1) Table 3

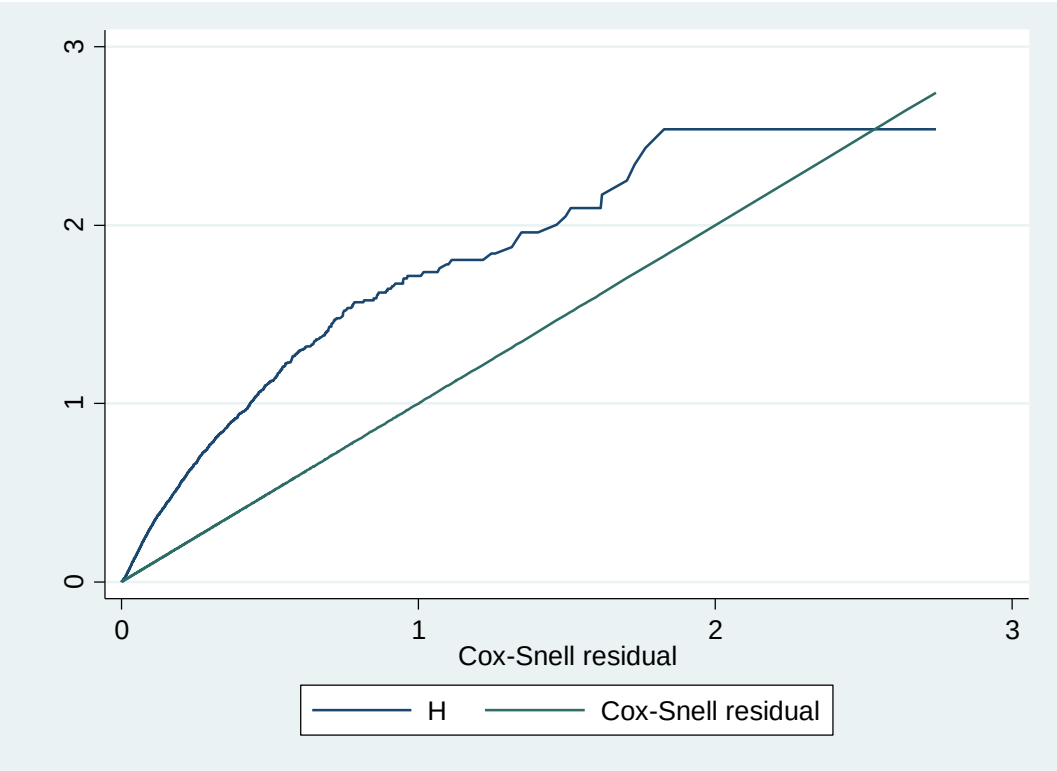
APPENDIX C

C1. Plots of scaled Schoenfeld residuals against ln(Time), model with acquirers



Note: Figures plot scale Schoenfeld residuals obtained from Model (1) Table 5 against ln(Time). Red lines represent fitted value whereas lowness smooth curves are in green.

C2. Plots of cumulative Cox-Snell residuals, model with acquirers



Note: Figures plot the cumulative Cox-Snell residuals obtained from Model (1) Table 5

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