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Can parents protect their children? Risk comparison analysis between affiliates of multi- and single-bank holding companies

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ABSTRACT

We find that multi-bank holding companies (MBHCs) in the U.S. have lower insolvency risk than single-bank holding companies (SBHCs) at the parent level, but have significantly higher insolvency risk than the latter at the subsidiary level. Our results suggest that MBHC parents tend to benefit from the internal capital market while allowing for more risk-taking at the individual levels. We further find that the higher risk for MBHC affiliates is because of the organizational and geographic complexity at the MBHC parent level. Our results highlight the importance of government regulation on banks at both parent and subsidiary levels.

1. Introduction

Ever since the passage of the 1956 Bank Holding Company Act, bank holding companies (BHCs) have become dominant in the U.S. banking industry. As of 2012, BHCs as a group controlled well over $15 trillion in total assets, more than 95% of all U.S. banking assets (Avraham et al., 2012). Although the literature has suggested numerous operational advantages of BHC structure, concerning reduced restrictions on scale and scope in various banking activities and greater flexibility in financing at both the parent and subsidiary levels (Pozdena 1988), it is not clear in both theory and empirical evidence whether BHC structure provides an additional layer of protection for their subsidiaries. We attempt to address this question in this paper.

Specifically, we investigate the differences in insolvency risk between Single-BHC (SBHC) and Multi-BHC (MBHC) at their subsidiary levels. We apply internal capital market theory and complexity theory to form our hypotheses. First, we postulate that MBHC affiliates have lower insolvency risk than SBHC affiliates, all else being equal. Diversification at the parent level enhances the parents' ability to obtain better external financing deals to create internal capital market and 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. The creation of internal capital market is regarded as 'source-of-strength' effect, which states that a parent can raise internal funds by divesting a non-banking subsidiary to rescue a troubled banking subsidiary. Literature on business groups also argues that business groups enable members to share risk by reallocating resources (Marisetty and Subrahmanyam, 2010; Gopalan et al., 2007; Khanna and Yafeh, 2005; Ferris et al., 2003).

A competing hypothesis is that MBHC affiliates have higher insolvency risk than SBHC affiliates, as suggested by complexity theory. In the wake of deregulation, MBHCs have become more organizationally complex over the past two decades in terms of the number of separate legal affiliates and their geographic locations (Cetorelli and Goldberg, 2014; Cetorelli et al., 2014; Avraham et al., 2012). On the one hand, complexity theory argues that agency problems between the managers of the parent and affiliates in the

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organizational hierarchy structure decrease the investment efficiency of subsidiaries (Rajan et al., 2000; Scharfstein and Stein, 2000). On the other hand, complexity theory posits that a competitive environment exists in the hierarchy structure (Pina e Cunha and Vieira da Cunha, 2006; Anderson, 1999). Complexity theory also centers on the limited ability of the parent to equitably provide resources for all of its subsidiaries as the parent adopts increasingly complex structures due to diversification (Kahn and Winton, 2004; DeYoung, 2003; Hughes et al., 1999).

We use a sample of U.S. commercial banks between 1994 and 2012 to test these two hypotheses. Our descriptive statistics show that MBHC affiliates are larger, more diversified and have more off-balance-sheet activities. We find that MBHC affiliates tend to have higher levels of insolvency risk (measured as the Z-score) than SBHC affiliates. These results are consistent with the complexity hypothesis, but not with the internal capital market hypothesis.

However, an important issue that may arise when attempting to estimate the riskiness of different types of banks is that the choice of banks to become such types may be endogenous. Our identification strategy seeks to address the endogeneity of the bank type decision by applying a propensity score matching (PSM)-based pairwise difference-in-differences approach. Specifically, we consider those banks which change status from SBHC affiliates into MBHC affiliates, i.e. the parent of an SBHC becomes an MBHC. We match the SBHC affiliates that changed status (treatment) with those SBHC affiliates that did not (control), using the propensity score matching method. We then adopt the difference-in-differences identification strategy to investigate whether the difference in insolvency risk between the treatment and control groups increases after the status changes of the treatment group. We find that SBHC affiliates changing into MBHC affiliates increase their level of risk, as compared to those controlled SBHC affiliates, therefore reaffirming our main results.

Next, we employ causal mediation analysis to test whether complexity is the channel that drives our main findings. We consider three different dimensions of bank complexity, organizational, geographic and business complexity, at the parent bank holding company level. We follow Cetorelli and Goldberg (2014) and measure organizational complexity as the total number of bank and non-bank subsidiaries a BHC has. Following Goetz et al. (2013), geographic complexity is measured by subtracting one from BHC's concentration of asset cross states that is calculated by Herfindahl–Hirschman index of BHC's assets in each state in which it is active. Business complexity is estimated by non-interest income divided by operating income (Stiroh and Rumble 2006; Stiroh, 2004) at the *parent* BHC level. We interact these complexity measures with MBHC dummy in our main model. We find that the negative effect of MBHC_affiliate on Z-score is taken away once we control for organizational complexity and geographic complexity, but not business complexity. These results suggest that organizational complexity and geographic complexity are the main driver of the higher level of risk of MBHC affiliates compared to SBHC affiliates. This is consistent with our complexity hypothesis.

We then consider stand-alone banks as a separate group in addition to SBHC and MBHC affiliates and compare its insolvency risk among the three groups. We find no significant difference in bank risk between stand-alone banks and SBHC affiliates. This result is not surprising, given that most SBHCs do not have non-bank subsidiaries and hence do not form an internal capital market within the SBHCs. In consistent with our main results, we find that MBHC affiliates are riskier than stand-alone banks.

Finally, we compare the insolvency risks of SBHCs and MBHCs at the parent (the highest position in the bank structure hierarchy) instead of the subsidiary level. We find that MBHCs have lower insolvency risk than SBHCs. Overall, our findings that MBHC affiliates are riskier than SBHC affiliates at the subsidiary level but MBHCs have less risk than SBHCs at the parent level suggest that MBHCs take advantage of the internal capital market among subsidiaries to achieve diversification benefits at the parent level, while allowing for higher level of risks in their individual subsidiaries. This evidence is consistent with Billett and Mauer (2003) finding that inefficient subsidies to financially constrained divisions significantly increase the excess value of diversified firms. It also explains to some extent the ongoing trend of forming MBHCs in the U.S.

Our paper contributes to multiple strands of the literature. First, our paper is related to the literature that examines the impact of the internal capital market on BHC value. Cremers et al. (2011) examine the distribution of influence within the banking business group. Billett and Mauer (2003) investigate the relationship between the internal capital market and excess value of diversified firms. A number of previous studies, for example, Fauver et al. (2003), Lin and Servaes (2002), Khanna and Palepu (2000), examine the link between capital market development and the value of diversification. Their evidence suggests that large diversified firms are better able to access external financing. Our results suggest that MBHC parents achieve diversification benefits by allowing their subsidiaries to take more risks than their SBHC counterparts.

Second, our paper contributes to the recent growing literature on bank complexity (Cetorelli et al., 2014; Cetorelli and Goldberg 2014; Liu et al., 2016). According to Cetorelli et al. (2014), studies on organizational complexity have policy importance because of its systemic risk implication in spreading shock across many affiliates within multiple industries in the financial sector. Studies on bank complexity, however, have not been documented comprehensively since the collapse of the banking system during the 2007–2009 financial crisis, which triggered the debate on the role of complex banks. Our paper finds that increased complexity at both organizational and geographic levels leads to increased insolvency risk of MBHC subsidiaries; however, these increased risks are diversified away at the parent level, resulting in an overall gain for MBHC parents.

Third, our results comparing the insolvency risk between stand-alone banks and BHC affiliates extend the substantial literature comparing stand-alone and affiliated banks. This literature has primarily focused on bank performance before and after acquisition (Pozdena 1988; Mayne 1977; Piper and Weiss 1974; Ware, 1973; Talley, 1972) and with respect to cost efficiency (Yamori et al., 2003; Rose and Scott, 1979) and dividend policy (Mayne, 1977).

The remainder of this paper is organized as follows. Section 2 reviews related literature and develops the two main hypotheses. Section 3 describes the data and summary statistics. The subsidiary results are presented in Section 4 while Second 5 reports results of the parent level. Section 6 concludes.

2. Hypotheses development

Diversification at the parent level enhances the parents' ability to obtain better external financing deals to create internal capital market (Khanna and Palepu 2000). The internal capital market theory suggests that the creation of an internal capital market, where the headquarters allocate capital across different projects, could limit the distortions arising from external financing costs (Shin and Stulz 1998; Lamont 1997; Stein 1997). This theory has advanced the importance of its benefits for banks' affiliates with a banking group. Houston et al. (1997) find that lending activities of bank subsidiaries are closely tied to the BHC's capital position but not the cash flows at the subsidiary level. This evidence suggests that MBHCs create internal capital markets to allocate scarce capital within the organization. Building on Houston et al. (1997), Houston and James (1998) examine the relationship between organizational structure and bank lending by comparing lending behaviours of MBHC affiliates