Journal of Financial Economics 120 (2016) 346–362

Contents lists available at ScienceDirect

Journal of Financial Economics

journal homepage: www.elsevier.com/locate/finec

Does the geographic expansion of banks reduce risk?☆

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ARTICLE INFO

Article history:
Received 10 December 2014
Revised 29 June 2015
Accepted 1 July 2015
Available online 22 January 2016

JEL classification:
G21
G28
G11

Keywords:
Banking
Bank regulation
Financial stability
Risk
Hedging

ABSTRACT

We develop a new identification strategy to evaluate the impact of the geographic expansion of a bank holding company (BHC) across US metropolitan statistical areas (MSAs) on BHC risk. For the average BHC, the instrumental variable results suggest that geographic expansion materially reduces risk. Geographic diversification does not affect loan quality. The results are consistent with arguments that geographic expansion lowers risk by reducing exposure to idiosyncratic local risks and inconsistent with arguments that expansion, on net, increases risk by reducing the ability of BHCs to monitor loans and manage risks.

1. Introduction

Economic theory provides conflicting views on a basic question in banking: Does the geographic expansion of a bank's activities reduce risk? Textbook portfolio theory suggests that geographic expansion will lower a bank's risk if it involves adding assets whose returns are imperfectly correlated with existing assets. In addition, Diamond (1984) and Boyd and Prescott (1986) emphasize that diversified banks enjoy cost-efficiencies that can enhance stability. And, if diversification makes a bank too big or interconnected to fail, implicit or explicit government guarantees can lower the risk of investing in the bank (Gropp, Hakenes, and Schnabel, 2011).

Other theories stress that expansion increases bank risk. Agency-based models of corporate expansion (Jensen, 1986; Berger and Ofek, 1995; Servaes, 1996; and Denis, Denis, and Sarin, 1997) suggest that bankers might expand geographically to extract the private benefits of managing a larger "empire" even if this lowers loan quality and increases bank fragility. Furthermore,

☆ We thank Tobias Berg, Allen Berger, Jan Krahnen, Felix Noth, Klaus Schaeck and seminar participants at Bangor University, Goethe University Frankfurt, the University of Mainz and the Financial Intermediation Research Society (FIRS) Conference. Goetz gratefully acknowledges financial support from the Center of Excellence SAFE, funded by the State of Hessen initiative for research LOEWE. The views expressed herein are those of the authors and do not necessarily reflect those of the ECB or the Eurosystem.

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http://dx.doi.org/10.1016/j.jfineco.2016.01.020
S0304-405X(16)00026-X/

Brickley, Linck, and Smith (2003) and Berger, Miller, Petersen, Rajan, and Stein (2005) stress that distance can hinder the ability of a bank's headquarters to monitor its subsidiaries, with potentially adverse effects on asset quality. And, to the extent that diversification increases complexity, it could hinder the ability of banks to monitor loans and manage risk (Winton, 1999).

Empirical assessments of these views have yielded mixed results. Demsetz and Strahan (1997) and Chong (1991) find that geographically diversified BHCs hold less capital and choose riskier loans. Acharya, Hasan, and Saunders (2006) find that as BHCs expand geographically, their loans become riskier. In contrast, Akhigbe and Whyte (2003) and Deng and Elyasiani (2008) present evidence that risk falls as BHCs expand geographically. Similarly, Calomiris (2000) argues that branching restrictions in the United States during the early part of the twentieth century inhibited diversification and increased the fragility of the US banking system relative to that in Canada, which permitted nationwide branching.

This ambiguity might reflect the challenge of identifying an exogenous source of variation in geographic diversification. If BHCs increase the riskiness of their assets when they expand geographically, then an ordinary least squares (OLS) regression of risk on geographic diversity will yield an upwardly biased estimate of the impact of geographic expansion on risk. That is, OLS estimates will understate any risk-reducing effects of geographic expansion due to attenuation bias. Furthermore, BHCs not only choose whether to expand, they choose the degree to which they diversify across different banking markets.

To address this challenge and assess the impact of geographic diversification on BHC risk, we develop and use a new instrumental variable strategy that identifies exogenous sources of variation in geographic diversity at the BHC-level. To measure risk, we primarily use the standard deviation of a BHC's stock returns, which Atkeson, Eisfeldt, and Weill (2014) show is a sound measure of a firm's risk of default. We also show that our results hold when using the *Z*-score and other risk measures. To measure geographic diversification across different banking markets, we use the distribution of deposits in a BHC's subsidiaries and branches across US Metropolitan Statistical Areas (MSAs). We examine the distribution of deposits, rather than the distribution of assets, because the Federal Deposit Insurance Corporation's (FDIC's) Summary of Deposits provides deposit data across all of a BHC's banking-related entities, i.e., branches *and* subsidiaries. In contrast, data sources from the Federal Reserve and the Office of the Comptroller of the Currency provide only data on assets at the subsidiary level. Since this is a period during which some BHCs transformed some of their subsidiaries into branches, using the distribution of deposits has the advantage that our measure of geographic diversity does not change simply because a BHC changes the legal form of its banking-related entities.

Our identification strategy has two building blocks. First, we exploit the cross-state, cross-time variation in the removal of interstate bank branching prohibitions as an exogenous increase in the ability of BHCs headquartered within a state to enter other states. From the 1970s through the 1990s, individual states of the United States removed restrictions on the entry of out-of-state banks. Not only did states start deregulating in different years, some states also signed bilateral and multilateral reciprocal interstate banking agreements in a somewhat chaotic manner over time. There is enormous cross-state variation in the 20-year process of interstate bank deregulation, which culminated in the Riegle-Neal Interstate Banking Act of 1994. This reform eliminated all remaining restrictions on interstate banking by 1995 and branching by 1997. As we discuss and show below, there are good economic and statistical reasons both for treating the process of interstate bank deregulation as exogenous to bank risk and for using it as an exogenous source of variation in BHC diversity. This first building block yields state-time information on the legal ability of BHCs headquartered in one state to enter MSAs in each other's state, but it alone does not differentiate among BHCs headquartered within the same MSA.

The second building block exploits pre-existing variation in the physical location of BHCs within an MSA into a gravity model of individual BHC investments in "foreign" MSAs—MSAs other than the MSA in which the BHC is headquartered. Using information on the exact street address of each BHC's headquarters, we start by calculating the aerial distance from the BHC to all MSAs outside of the BHC's home MSA. Because of their physical location BHCs within the same MSA have different distances to MSAs in other states and the gravity model thus differentiates among the investment behavior of BHCs headquartered within the same MSA.

We then combine the gravity model of BHC investment with the dynamic process of interstate bank deregulation to construct an instrumental variable for the time-varying diversification of each BHC across MSAs. In particular, we use the BHC-specific distance to all other MSAs and estimates from our gravity model to compute the projected share of deposits that each BHC will receive from subsidiaries or branches in each "foreign" MSA and impose a value of zero when there are interstate bank regulatory prohibitions on a BHC owning a subsidiary or branch in that MSA.

This *gravity-deregulation methodology* yields a time-varying, BHC-specific instrumental variable of cross-MSA expansion that explains actual bank expansion well. Even when comparing BHCs headquartered within the same MSA and controlling for MSA-pair-time fixed effects, BHCs within the same MSA that are physically closer to a foreign MSA expand more into that market than BHCs headquartered in the same MSA that are further away from that foreign MSA. Based on this instrument, we use two-stage least squares (2SLS) to evaluate whether a BHC's geographic diversification across MSAs reduces its risk.

We start with OLS regressions that confirm past findings and motivate an instrumental variable approach. In regressions of BHC risk on BHC expansion, we find a positive relationship between BHC risk and the expansion of bank activities across MSAs. As stressed above, however, attenuation bias could drive these results. Thus, we next use our instrumental variable based on the gravity-deregulation model.