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The use of financial derivatives and risks of U.S. bank holding companies ☆

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ABSTRACT

This article examines the impact of financial derivatives on systematic risk of publicly listed U.S. bank holding companies (BHCs) from 1997 to 2012. We find that the use of financial derivatives is positively and significantly related to BHCs' systematic risk exposures. Higher use of interest rate derivatives, exchange rate derivatives, and credit derivatives corresponds to greater systematic interest rate risk, exchange rate risk, and credit risk. The positive relationship between derivatives and risks persists for derivatives for trading as well as for derivatives for hedging. We also analyze the role of BHCs' size and capital and the impact of the global financial crisis on the relationship between derivatives and risks.

1. Introduction

Banks have drastically increased the use of financial derivatives in recent decades. The notional principal amount of financial derivatives held by U.S. bank holding companies (BHCs) rose from less than $18 trillion at the end of 1995 to nearly $270 trillion at the end of 2012.[1] Increased activity in financial derivatives markets was generally looked upon favorably before the 2007–2010 global financial crisis. Greenspan (1999) noted that "the value added of derivatives themselves derives from their ability to enhance the process of wealth creation." Trichet (2007) further explained that "[p]rice discovery in the credit derivatives market reduces the risk of mispricing loans." Recently, however, the perspective has turned around because the risks of financial derivatives have become more evident. The Financial Stability Board (2010) concluded that "the crisis demonstrated the potential for contagion arising from the interconnectedness of OTC derivatives market participants and the limited transparency of counterparty relationships." The unanswered question is whether banks use financial derivatives for hedging or for speculative purposes.

This article analyzes why BHCs use financial derivatives and, more specifically, whether financial derivatives expose BHCs further towards more or fewer risks. In particular, we measure whether the use of financial derivatives is related to the risk exposures of BHCs towards systematic interest rate risk, exchange rate risk, and credit risk.

We collected on-balance-sheet and off-balance-sheet financial data and stock prices of publicly traded U.S. BHCs from 1997 to 2012. Financial derivatives activity in the U.S. financial market is dominated by a small group of large financial institutions (i.e., the top 25 BHCs hold 99.8% of the financial derivatives, Office of the Comptroller of the Currency, 2012). We split our sample BHCs into large and small BHCs (asset size more vs. less than $50 billion). Figs. 1 and 2 depict the notional principal amounts of interest rate, exchange rate, and credit derivatives held by large BHCs and small BHCs in our sample.

Our analysis shows that a BHC's use of financial derivatives is associated with its higher exposure towards systematic interest rate risk, exchange rate risk, and credit risk (i.e., nondiversifiable risk exposures that investors cannot trade away on the financial markets). Interestingly, the positive relationship between financial derivatives and systematic risk exposure seems stronger for large BHCs than for small BHCs. These results may indicate that large BHCs with their main operations such as

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[1] FRB of Chicago, holding company data, https://www.chicagofed.org/applications/bhc_data/bhcdata_index.cfm.

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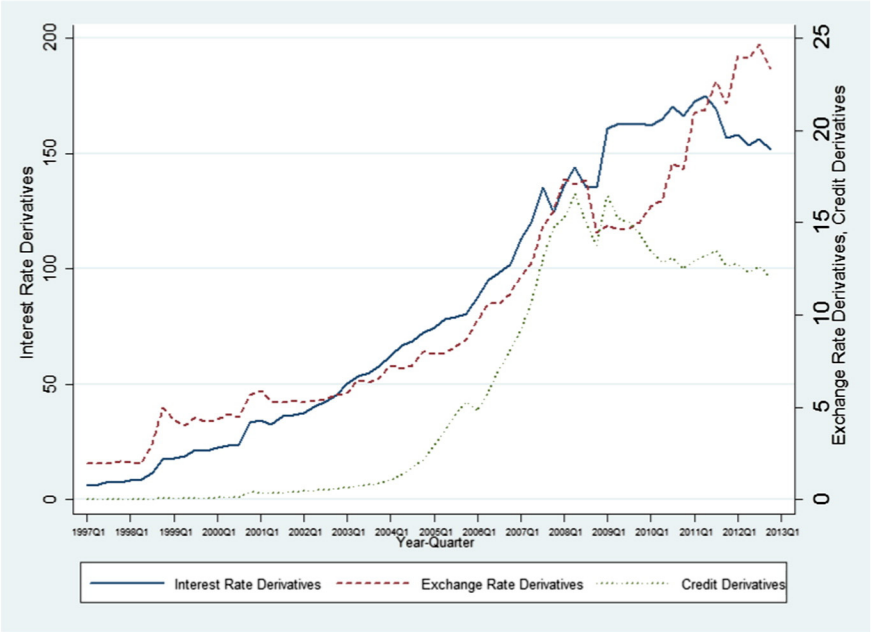

Fig. 1. Financial derivatives held by large BHCs ($ trillion). *Note*: Quarterly data from FR Y-9C, sample period: 1997:Q1–2012:Q4.

prime brokerage, asset management, proprietary trading, and market making primarily use financial derivatives to derive trading-related gains and that these activities (and the related involvement in derivatives) further expose them to systematic risk. In comparison, the results may indicate that small BHCs (with their main operations in deposit taking and commercial lending) employ financial derivatives to a larger extent to hedge against systematic risk.

To further analyze what impact financial derivatives have on systematic risk exposures, we decompose financial derivatives according to their reported purposes. Since March 1995, BHCs are required to report whether their financial derivatives activity is for trading purposes or for purposes other than trading (i.e., for hedging). In Figs. 3 and 4, we report the use of financial derivatives according to their reported purposes in the subsamples of large BHCs and small BHCs.

Our findings show that derivatives held for trading and derivatives held for hedging purposes are both positively and significantly related to BHCs' systematic risk exposures (in the case of interest rate derivatives, exchange rate derivatives, and credit derivatives). This result suggests that the use of financial derivatives might not be aligned with the reported (hedging vs. trading) purposes, and that even financial derivatives classified for hedging purposes are associated with higher rather than lower systematic risks.

We also analyze the impact of the global financial crisis on the use of financial derivatives. In the global financial crisis, the relationship between interest rate derivatives and exchange rate derivatives and risk exposures became stronger than in normal times, and the positive relationship between credit derivatives and credit risk became less pronounced.

This article is organized as follows. Section 2 reviews the literature on financial derivatives and forms hypotheses. Section 3 presents the data selection and provides a basic data description. Section 4 describes the empirical methodology. Section 5 contains the main empirical findings. We analyze how the use of financial derivatives affects BHCs' systematic risk exposures. Section 6 concludes the article.

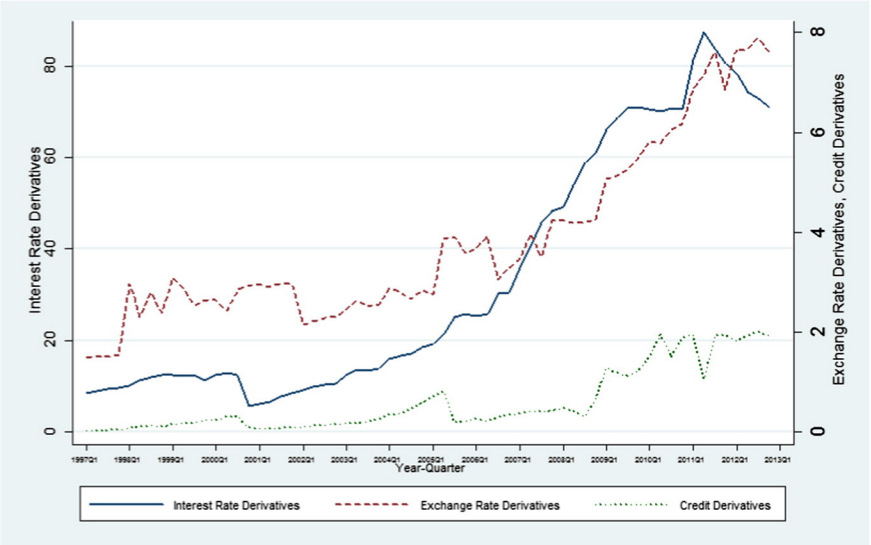

Fig. 2. Financial derivatives held by small BHCs ($ trillion). *Note*: Quarterly data from FR Y-9C, sample period: 1997:Q1–2012:Q4.

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