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Derivatives-hedging, risk allocation and the cost of debt: Evidence from bank holding companies

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ABSTRACT

We investigate the association between derivatives-hedging and the cost of debt in publicly-traded bank holding companies (BHCs) and test the risk-allocation effect of derivatives-hedging using the 2007–2009 financial crisis as a quasi-experiment. Consistent with Froot and Stein (1998) and Schrand and Unal (1998), we find evidence supporting the risk allocation hypothesis in BHCs. Banks reduce their exposure to tradable risk (e.g., interest rate and exchange rate risks) via derivatives-hedging and simultaneously extend more loans and take greater credit risk in lending (their main area of expertise) in order to earn higher economic rents. The risk allocation strategy is associated with an increase in overall bank risk, measured by the cost of debt, during the non-crisis periods but its dynamics breaks down during the financial crisis of 2007–2009, resulting in a negative relationship between derivatives-hedging and the cost of debt.

1. Introduction

Existing studies on the usage of derivatives have mainly focused on the relationship between corporate firms' derivatives positions and their value and risk. These studies usually exclude financial services firms from their samples and concentrate solely on the cost of equity, overlooking the interdependence between derivatives and the cost of debt altogether (e.g., Allayannis & Weston, 2001; Bartram, Brown, & Conrad, 2011; Graham & Rogers, 2002; Guay & Kothari, 2003; Guay, 1999; Hentschel & Kothari, 2001). To fill this gap, in the current study we investigate the association between the cost of debt of bank holding companies (BHCs) and the scale of their derivatives-hedging positions.

We focus on the banking industry for the following four reasons. First, BHCs are distinct from non-financial firms because they are highly leveraged and heavily regulated. These features provide a fertile ground for drawing fresh inferences about the usage of derivatives by firms as they help reveal the interplay between regulation, leverage, derivatives-hedging, and firm risk. Second, BHCs possess greater access to and greater expertise on the derivatives market and are engaged in derivatives activities to a much larger scale than non-financial firms. Hence, these firms are in a position to receive the relevant information earlier and to take faster actions for hedging and speculative purposes.[2] Third, due to the nature of their business, BHCs tend to be more sensitive to interest rate and currency risks.[3] Hence, their usage of derivatives for hedging plays a major role in their risk management strategies. Derivatives positions of BHCs also have a great impact

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[2] U.S. banks are major users of financial derivatives; they held notional derivatives of $16.8 trillion in 1996 and $220.4 trillion in 2014, demonstrating a thirteen-fold increase over this period (*Source:* Quarterly Report on Bank Trading and Derivatives Activities, Office of the Comptroller of the Currency, 2014, 4th quarter).

[3] The interest rate risk exposure of commercial banks is well documented. The S&L crisis and the collapse of the S&L industry in the 1970s and 1980s was also largely due to interest rate risk (Saunders & Cornett, 2014).

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on the derivatives market because of their large market shares. Fourth, BHCs are required by regulators to report their usage of derivatives in much more details, than non-financial firms, providing a richer source of data for analysis of the subject. These data are reported on the Reporting Form FR Y-9C, the Consolidated Financial Statements for Holding Companies.

We focus on cost of debt for the following reasons. First, debt market is a predominant source of financing for firms. According to the Securities Industry and Financial Markets Association (SIFMA, 2012), between 1990 and 2011, the new debt issuance volume in the U.S. increased from $169 billion to $1.178 trillion while the total new equity issuance increased from $24 billion to $198 billion. Second, debt markets differ from equity markets in several important aspects. Unlike shareholders, debt holders have an asymmetric payoff structure in that they generally receive fixed future cash flows but face significant downside risk. Volatility in firm value has opposite effects on equity and bond prices. Higher volatility is detrimental to bondholders as firm's default probability increases, but it has a positive effect for shareholder value (Blankerspoor, Linsmeier, Petroni, & Shakespeare, 2013; Campbell & Taksler, 2003).[4] The use of hedging as a risk-reduction tool may benefit the bondholders since it reduces cash flow volatility and consequently raises the probability that the firm can meet its interest and principal payment obligations (Saunders & Cornett, 2014). It also diminishes the probability of firm failure and lowers the costs associated with financial distress and bankruptcy (Froot, Scharfstein, & Stein, 1993; Smith & Stulz, 1985).[5]

In this study, we employ data on publicly-traded BHCs over the sample period 1996–2011 to examine the interdependence between derivatives-hedging by banks and their cost of debt. On the one hand, hedging-derivatives enable banks to reduce their exposure to interest rate and exchange rate risks (tradable risks),[6] thereby reducing their cash flow volatility and the costs associated with bankruptcy and financial distress (the risk-reduction effect). On the other hand, hedging-derivatives may be used as a risk-allocation technique by banks, which could potentially increase their risk exposure (Schrand & Unal, 1998; Froot & Stein, 1998). Specifically, in a world of capital market imperfection where increasing total risk is costly, hedging allows financial intermediaries to reduce their exposure to tradable (homogenous) risk that yields low or no economic rents (e.g., interest rate and exchange rate risk) and to simultaneously increase their exposure to credit risk (lending) in which they have a comparative advantage and from which they can earn higher economic rents (the risk-allocation effect). Based on the above counterbalancing forces, the nature of the association between hedging and cost of debt is an empirical question. We examine this relationship and employ the financial crisis of 2007–2009 as a quasi-experiment to investigate the risk-allocation versus risk-reduction effect of derivatives-hedging since the crisis period might have changed the relative merits of these two forces.

Several interesting results are obtained. First, we find a positive association between BHCs' cost of debt and their usage of derivatives-hedging when the data over the entire sample period is used. Second, the positive relationship between cost of debt and hedging-derivatives is reversed during the financial crisis of 2007–2009, suggesting that the direct association found between these two variables is driven by the non-crisis period. The explanation for the reversal is that during the crisis period, the dynamics of risk allocation between tradable risk and credit risk broke down because credit risk became the dominant concern of banks, and the sharply rising counterparty risk cast a shadow of doubt over the reliability of their hedging positions. This, in turn, rendered the credit supply channel of derivatives-hedging ineffective and disallowed an increase in the bank lending level and credit risk through the hedging channel. The disruption of the lending channel during the crisis is also likely to have resulted from a decline in banks' incentives and desires to allocate risk during this period. Along this line, we document that during the non-crisis period, greater derivatives-hedging was indeed associated with greater overall lending and that banks did take on greater credit risk in lending, while with the onset of the crisis, the impact of hedging on lending and credit risk attenuated.

We contribute to the literature in the following ways: First, while most existing studies focus on the relationship between corporate firms' derivatives positions and firm value and risk, we fill the gap in the literature by examining the relationship between cost of debt and derivatives-hedging in the previously excluded financial services industry. Second, we exploit the recent financial crisis of 2007–2009 as a quasi-experiment to test the risk-allocation versus risk-reduction hypotheses and provide more compelling evidence on risk allocation by examining the interplay between hedging-derivatives, lending behavior and credit risk. The remainder of the paper is organized as follows: Literature review and hypotheses are presented in Section 2. Data and methods are described in Section 3. Empirical results and conclusions are presented in Sections 4 and 5, respectively.

2. Hypothesis development

Market imperfections such as taxes, agency costs, information asymmetry, regulatory burden, and costly financial distress provide a rationale for firms to manage their risk exposure (e.g., Geczy, Minton, & Schrand, 1997; Guay & Kothari, 2003; Smith & Stulz, 1985). Empirical evidence on corporate use of derivatives to manage risk is mixed. For example, Guay (1999) finds that firms that are new users of derivatives, experience significant reductions in their stock return volatility, and lower interest- and exchange-rate risks, compared to firms that do not use derivatives. Bartram et al. (2011) find that using financial derivatives reduces both total and systematic risk and results in a higher market value. In contrast, Hentschel and Kothari (2001) find few measurable differences in risk between firms using derivatives and firms not using derivatives. It is notable that existing studies exclude financial firms from their sample and do not investigate the implications of hedging on the cost of debt.[7]

We investigate how derivatives-hedging is associated with cost of debt of BHCs. Hedging may benefit bondholders through several channels: Smith and Stulz (1985) show that hedging reduces a firm's cash flow volatility, and, consequently, lowers the expected financial distress and bankruptcy costs. This, in turn, results in a lower cost of debt. Froot et al. (1993) theorize that hedging can curtail the under-investment problem when a firm faces growth

[4] Higher exposure to systematic volatility risk could also have an adverse effect on shareholder value. For example, Ang, Hodrick, Xing, and Zhang (2006) find lower average returns earned on stocks with high exposure to systematic volatility risk. The rationale is that since market volatility coincides with significant market declines, investors seek stocks with high sensitivities to market volatility to hedge against market downside risk, lowering their returns as a result.

[5] Empirical evidence also lends support to such a view. For example, Veronesi and Zingales (2010) calculate the costs and benefits of the Troubled Asset Relief Program (TARP) during the recent financial crisis. They find that the biggest winners were bondholders of the impacted banks as their bankruptcy risk declined, while shareholders (and taxpayers) were the losers.

[6] We use 'derivatives-hedging' and 'hedging-derivatives' interchangeably throughout the text.

[7] A notable exception is Adkins, Carter, and Simpson (2007) who examine the impact of managerial compensation and ownership on the use of foreign exchange derivatives of BHCs. They find that foreign exchange derivatives are inversely related to option grants and positively related to managerial ownership.

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