Interest rate derivatives at commercial banks:
An empirical investigation

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Received 21 September 2005; received in revised form 30 June 2006; accepted 21 July 2006
Available online 29 December 2006

Abstract

I analyze the effects of bank characteristics and macroeconomic shocks on interest rate risk-management behavior of commercial banks. My findings are consistent with hedging theories based on cost of financial distress and costly external financing. Banks with higher probability of financial distress manage their interest rate risk more aggressively, both by means of on-balance sheet and off-balance sheet instruments. As compared to the derivative users, the derivative non-user banks adopt conservative asset–liability management policies in tighter monetary policy regimes. Finally, I show that the derivative non-user bank’s lending volume declines significantly with the contraction in the money supply. Derivative users, on the other hand, remain immune to the monetary policy shocks.

* This paper is based on a chapter of my doctoral dissertation at Cornell University. Earlier versions of the paper were circulated under the titles ‘Do Banks Hedge in Response to the Financial Distress Costs?’ and “Interest Rate Risk Management at Commercial Banks: An Empirical Estimation”. I would like to thank Dave Backus (the editor), three anonymous referees, George Allayannis, Warren Bailey, Allen Berger, Rosalind Bennett, Sreedhar Bharath, Sugato Bhattacharya Murillo Campello, Dennis Capozza, Sudheer Chava, Serdar Dinc, Yaniv Grinstein, Bob Jarrow, Ed Kane, Han Kim, Anil Kumar, Paul Kupiec, Haitao Li, Bernadette Minton, Patrick Morris, M.P. Narayanan, Mitch Petersen, Uday Rajan, Clemens Sialm, Nejat Seyhun, Jayanthi Sunder, Bhaskaran Swaminathan and seminar participants at Cornell, FDIC/CFR workshop, FDIC/JFSR conference, University of Michigan and Western Finance Association’s meeting at Los Cabos for their helpful comments. I am indebted to N.K. Chidambaran, Robert Hauswald, Cathy Schrand and Haluk Unal for their discussions of this paper at various conferences and Adam Ashcraft and Mark Flannery for sharing useful data with me for this study. Financial support from FDIC’s Center for Financial Research is gratefully acknowledged. All remaining errors are mine.

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My findings suggest that a potential benefit of derivatives usage is to minimize the effect of external shocks on a firm’s operating policies.
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Keywords: Derivatives; Hedging; Lending; Monetary policy

0. Introduction

Financial intermediation often exposes banks to interest rate risks by creating mismatches in the maturity structure and re-pricing terms of their assets and liabilities.1 Banks use various tools, including the use of interest rate derivatives, to manage these risks.2 In the presence of costly bank failures, Diamond’s (1984) model implies that banks should hedge all market risks in which they do not have any special monitoring advantages. His model also implies that interest rate risk management should improve the intermediation efficiency of banks by allowing them to take more credit risk. Smith and Stulz (1985) show that the hedging of interest rate risk can increase firm value by lowering the expected transactions cost of bankruptcy. Froot et al. (1993) endogenize the cost of financial distress and argue that firms should hedge in order to avoid the cost of external financing in low internal cash-flow states. Other motivations for managing risks include managerial risk aversion, information asymmetry between the insiders and outsiders of the firm, increased debt capacity, and the convexity of taxes (see Stulz, 1984; Smith and Stulz, 1985; DeMarzo and Duffie, 1991; Leland, 1998 among others).

This paper investigates two central questions: (a) “What motivates a bank to hedge?” and (b) “Does hedging improve a bank’s intermediation capabilities?” I analyze the determinants of a bank’s interest rate risk-management decisions both by means of on-balance sheet techniques (i.e., by matching the GAP in the maturity and re-pricing terms of their assets and liabilities) and off-balance sheet instruments (i.e., by using interest rate derivatives).3 Although the role of maturity GAP and derivatives activities on a financial institution’s stock returns has been studied well in the literature (e.g., Flannery and James, 1984b; Schrand, 1997), the goal of this paper is to understand how various bank characteristics and macroeconomic shocks influence these decisions at commercial banks.

I use a panel data of about 8000 banks to investigate these issues in this paper. My sample is particularly well suited for analyzing the theories of interest rate risk management. First, banks face a high degree of interest rate risks, and, therefore, hedging decisions have a first-order impact on their performance. Second, banks are highly leveraged and face significant direct and indirect costs of bankruptcy. James (1991) shows that the direct losses of bank failures such as administrative and legal expenses are about 10% of the total assets. Third, due to stringent reporting requirements for the banking sector, I get much detailed information on a bank’s derivatives usage and hedging policies

1Flannery and James (1984b) provide evidence on the economic importance of these mismatches by analyzing the relation between the interest rate sensitivity of common stock returns and maturity composition of the bank’s assets and liabilities.
2See the case study of Banc One Corporation by Esty et al. (1994) for a clinical study of the risk-management practices at banks.
3All analyses of hedging theories in this paper are based on derivatives used for ‘hedging purposes’ only.
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