North American Journal of Economics and Finance 31 (2015) 52–74

Contents lists available at ScienceDirect

North American Journal of Economics and Finance

Policy interest rate, loan portfolio management and bank liquidity

Gianfranco Giulioni *

Department of Philosophical, Pedagogical and Economic-Quantitative Sciences, University of Chieti-Pescara, Viale Pindaro, 42, 65127 Pescara, Italy

ARTICLE INFO

Article history:
Received 19 July 2013
Received in revised form 26 October 2014
Accepted 28 October 2014
Available online 7 November 2014

JEL classification:
G2
E5

Keywords:
Bank portfolio management
Flight to quality
Evergreening
Policy interest rate
Risk-taking channel

ABSTRACT

This paper analyzes how the movements of the policy interest rate affect bank-relevant variables through changes in the composition of the loan portfolio. Using a computational approach that fully accounts for borrowers' heterogeneity, we show how the variety of bank customers changes and how this change affects the bank's cash influx, making it more volatile. The paper also sheds light on how the composition of the loan portfolio is affected by an increase in the policy interest rate when it is kept at low levels. Safer borrowers exit the loan portfolio first, causing a gradual increase in the loan portfolio risk. The interest payment influx shrinks because riskier borrowers repay less often. Furthermore, we find that a shortening of the lending time horizon increases the volatility clustering of the bank interest payment influx.

1. Introduction

In a number of recent economic events, monetary policy actions have had milder or unexpected effects with respect to those foreseen by the models used to plan them. This may be because economic theory has not yet reached a complete understanding of the banking system's role in the monetary transmission mechanisms. Indeed, the impulses given by the Central Bank must "pass through" the banking system, which, according to the strand of economic literature labeled the "credit view"

* Tel.: +39 0854537584.
E-mail address: g.giulioni@unich.it

http://dx.doi.org/10.1016/j.najef.2014.10.008
1062-9408/

(see Trautwein, 2000, for a survey), significantly affects the result of policy actions. Among recent works that stress the need for a better understanding of the role of the banking sector in monetary transmission mechanisms, the book by Stiglitz and Greenwald (2003) is a primary example. The authors argue, "It is precisely when monetary policy becomes of crucial importance that the traditional models fail most dramatically. Later, we will argue that the failure to understand key aspects of financial institutions and their changes lies behind some of the recent failure in macro-economic policies, including the 1991 US recession and the severe recessions and depressions in East Asia that began in 1997" (Stiglitz & Greenwald, 2003, p. 4).

The link between banks' behavior and monetary policy has been widely analyzed in the literature. Some works address the topic by examining aggregate variables (see Bernanke & Gertler, 1995, for example), whereas others focus on the relationship between monetary policy and the bank's balance sheet (Bacchetta & Ballabriga, 2000; Kashyap & Stein, 1994). The effects of the introduction of capital adequacy standards on banks' lending (da Silva & Divino, 2013; Gambacorta & Mistrulli, 2003; McAleer, Jimenez-Martin, & Perez-Amaral, 2013) and, more generally, on banks' behavior (Jacques, 2008; VanHoose, 2007) and the relationship between capital adequacy and macroeconomic fluctuations (Blum & Hellwig, 1995) have drawn particular attention in this strand of literature.

The banking sector has been one of the most important protagonists in the recent financial turmoil,[1] which motivated new studies on banks' behavior following policy actions. Some of these studies address the relevance of banks' asset quality and discuss the "risk-taking" channel of the monetary policy (see, for example, Adrian & Shin, 2009; Borio & Zhu, 2008). Gambacorta (2009) surveys the theory and provides empirical evidence for this channel of monetary policy.

The theoretical analysis of the bank balance sheet decision, especially that concerning assets, is a demanding task because of the high heterogeneity in the opportunities for funds allocation. In fact, each possible borrower is one such opportunity. Thus, the bank lending activity provides the major source of heterogeneity. The mathematical approach normally used in economic modeling handles a limited number of variables, so models for banks' decision making generally determine the total amount lent, appointing some other variable or parameter to account for borrowers' heterogeneity. An alternative modeling strategy that can fully account for heterogeneity adopts the bottom-up approach, which is implemented by using computational techniques (Tesfatsion, 2002).

The present paper aims to improve the existing literature by using the bottom-up approach to analyze the bank portfolio decision. In particular, we focus on the lending portfolio by building a model that keeps track of individual borrowers' features over time. The approach is particularly useful to understand the dynamic implication of a bank choice concerning the loan portfolio and allows for *detailed knowledge* of the state of the bank lending portfolio, which is crucial for any policy maker. In particular, we study the relationship between bank loan portfolio behavior and the policy interest rate level by analyzing (i) how banks identify the set of projects to be financed and (ii) how the set of financed projects changes with the policy interest rate. The goal is to evaluate the dynamic effects of this behavior on a number of variables, such as bank liquidity and risk position.

We share with the recent literature, especially with the literature on the monetary policy "risk-taking" channel cited above, a focus on the effects of low interest rates (Dell'Ariccia, Laeven, & Marquez, 2014). However, the approach proposed by this paper offers some new insights.

First, we focus on the bank loan portfolio composition rather than on the composition of the assets of the bank balance sheet. As highlighted above, the latter approach "averages" out borrowers' heterogeneity and addresses the issue of how much a bank should lend in total and how much should be allocated to other types of assets, such as government bonds or market shares.

Second, borrowers' heterogeneity is accounted for by considering each project financed by the bank as a random process. The model has a mean-variance representation, and we lay the groundwork to frame the bank lending portfolio choice using Markowitz's portfolio theory.

Third, we argue that a bank dealing with low interest rates (Lombardi & Sgherri, 2007, for example, focusing on the interest rate level in recent years) operates in a "prickly" situation where the constraints

[1] Laeven and Valencia (2008)'s database assesses the relevance of the systemic banking crisis phenomenon. They identify 124 systemic banking crises in the 1970–2007 period in the world.