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Liquidity, infinite horizons and macroeconomic fluctuations

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Abstract

This paper develops a computable dynamic general equilibrium model in which corporate demand for liquidity is endogenously determined. In the model, liquidity demand is motivated by moral hazard, as in Holmström and Tirole (J. Politic. Econom. 106 (1998) 1). As a result of incorporating agency cost and endogenously determined liquidity demand, the model can replicate an empirical business cycle fact, the hump-shaped dynamic response of output, which is seldom observed in standard RBC dynamics. Further, in the model the corporate demand for liquidity from a financial intermediary (credit line, for instance) is pro-cyclical, while the degree of liquidity dependence (defined as liquidity demand divided by corporate investment) is counter-cyclical. These business cycle patterns are consistent with a stylized fact empirically verified in the *lending view* literature.

JEL classification: E3; G3

Keywords: Liquidity; Corporate finance; Business cycle

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1. Introduction

This paper develops a computable dynamic general equilibrium model in which the role of liquidity over the business cycles can be analyzed. My focus is especially on the corporate demand for liquidity and its influence on business cycles via investment decision rules. It is an empirical fact that corporations rely heavily on short-term debt for working capital expenses in the United States as well as in Japan.[1] Corporate finance and the role of the banking sector have recently caught considerable attention of business cycle researchers. In this stream of literature, the real business cycle (RBC) framework with a financial intermediary developed by Fuerst (1992)[2] is a pioneering work. It was intensively studied by Christiano (1991), Christiano and Eichenbaum (1993), and Einarsson and Marquis (2001), among others. These models are well capable of explaining empirical business cycle facts, including bank loans and other financial variables. However, they fail to replicate the actual auto-correlation patterns of output and investment.[3] One advantage of the model introduced in this paper is its superior performance compared with the Fuerst-Christiano style of RBC models in mimicking actual auto-correlation patterns.

Another stream of studies on the interaction of corporate finance and the business cycle extends *agency cost* models, which were originally developed in microeconomic contract theory, to macroeconomics and dynamic general equilibrium analysis. Roughly speaking, the difference between the value of the firm in what would be an ideal contracting situation and what is viable through negotiation is referred to as *agency cost*.[4] In agency cost models, the net present value (NPV) of an investment project is not maximized, simply because lenders and borrowers (entrepreneurs) have divergent incentives, so that for each agent NPV maximization could be suboptimal. The financial contract between lender and borrower is characterized by the nature of the concessions necessary to achieve at least a second-best solution.

This study is in the stream of dynamic general equilibrium (DGE) analysis with agency cost. The key feature of my model, a unique financial contract structure, is taken from Holmström and Tirole (1998) (denoted as HT, hereafter). The paper extends the HT model to an infinite horizon environment using a modeling strategy similar to that of Carlstrom and Fuerst (1997), so that it can aid in the analysis of business cycle dynamics that result from such liquidity-dependent corporate financing. The first notable result of the paper is that my model generates a hump-shaped impulse response very similar to that in Carlstrom and Fuerst (1997), which is reported as an empirical fact in earlier business cycle studies.[5]

Further, my DGE model provides several insights into other aspects of corporate liquidity demand and business cycles. Figs. 1 and 2 show empirical evidence that

[1]For instance, see Einarsson and Marquis (2001).

[2]The theoretical foundation of the Fuerst–Christiano framework is based on an earlier study by Lucas (1990).

[3]This is pointed out by Cogley and Nason (1995) and Gilchrist and Williams (2000).

[4]Amaro de Matos (2001).

[5]An empirical study of hump-shaped dynamics of output was conducted by Cogley and Nason (1995).