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The effects of asymmetric information between borrowers and lenders in an open economy

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A B S T R A C T

This paper assesses the effects of asymmetric information between borrowers and lenders in an open economy with access to international capital markets. Information asymmetry and agency costs arise because only borrowers can costlessly observe actual returns from production. Agency costs increase the cost of external finance and lower steady state investment, capital and output. They also affect the business cycle and the central bank's response to shocks. The long-run effects of agency costs are exacerbated in an open economy and their impact is influenced by the degree of access to international capital markets. The results thus highlight the importance of incorporating credit market interactions into open economy macroeconomic models.

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1. Introduction

This paper develops a theoretical model to assess the effects of asymmetric information between borrowers and lenders in an open economy with access to international capital markets. Information asymmetry arises in credit markets because borrowers know more about their investment projects than lenders do. It leads to agency costs when lenders delegate control over resources to borrowers, and borrowers (agents) have an incentive not to perform in the best interest of lenders (principals).

The idea that credit markets can have real economic effects is not new. It has been examined since at least Wicksell's early writings on monetary dynamics (Wicksell, 1906) and Fisher's "debt-deflation theory of great depressions" (Fisher, 1933). More recently, distressed financial and banking systems,

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e.g. in the United States, the United Kingdom, Scandinavia, Latin America, Japan and other east Asian countries, have rekindled interest in the role of credit markets in economic activity.

Based on Bernanke and Gertler's (1989) seminal contribution, Carlstrom and Fuerst (1997) and Bernanke et al. (1999) develop a closed economy general equilibrium model, in which agency costs increase firms' cost of external finance relative to internal funds.[1] However, imperfect information and the resulting credit market frictions may be more pronounced in small open economies than in large closed economies. Small economies tend to have a large number of small firms, which are more affected by asymmetric information than large businesses, because of economies of scale in acquiring and monitoring information.[2] Moreover, in open economies with access to international capital markets, domestic savings are not constrained to domestic (risky) investments. Furthermore, the cost of borrowing is influenced by movements in the relative price of currencies, i.e. the exchange rate.

The model in this paper builds on Carlstrom and Fuerst's (1997) closed economy agency cost model. It is extended to an open economy with a floating exchange rate, foreign trade and access to international capital markets. The model also includes an inflation targeting monetary authority and a government and domestic prices are assumed to converge only gradually to world prices (adjusted for the exchange rate), i.e. prices are sticky.

The paper proceeds as follows. Section 2 develops a theoretical small open economy agency cost model that is calibrated to New Zealand. The long-run and business cycle effects of asymmetric information and agency costs are examined in Sections 3 and 4. Section 5 presents some sensitivity analysis and the last section summarizes and concludes.

2. Theoretical model

There are six agents in the economy: households, firms, financial intermediaries, entrepreneurs, a government and a monetary authority. Households and entrepreneurs form a continuum of agents with unit mass. The proportions of households and entrepreneurs are given by $(1-\eta)$ and η.

2.1. Financial intermediaries

Financial intermediaries provide external finance to entrepreneurs. They help overcome an information asymmetry that arises because entrepreneurs must use external finance to produce capital, an input into firms' production, and because their technology is subject to idiosyncratic shocks that only entrepreneurs can costlessly observe. More specifically, each entrepreneur i has access to a stochastic technology, $\omega_t(i)$, that transforms an input of IN_t consumption goods into $\omega_t(i)\mathrm{IN}_t$ units of capital.[3] Each entrepreneur i produces capital by using their own internal funds or net worth $\mathrm{NW}_t(i)$ and by borrowing $(\mathrm{IN}_t(i)-\mathrm{NW}_t(i))$ consumption goods from financial intermediaries. After new capital is produced loans are repaid in capital goods. The distribution function and density of the technology shock are given by $\Phi(\omega_t(i))$ and $\phi(\omega_t(i))$.

Agency costs arise because lenders can only observe each entrepreneur's technology shock $\omega_t(i)$ at a monitoring cost of $\alpha\mathrm{IN}_t(i)$ capital inputs, i.e. there is costly state verification (Townsend, 1979). The information asymmetry creates a moral hazard problem because entrepreneurs have an incentive to underreport the true value of their production shock $\omega_t(i)$. The optimal contract is structured so that entrepreneur i always truthfully reports the value of $\omega_t(i)$. The contract is risky debt and characterized by the size of entrepreneur i 's project, $\mathrm{IN}_t(i)$, and a critical $\omega_t(i)$ that triggers bankruptcy, denoted by $\varpi_t(i)$. If the realization of the technology shock $\omega_t(i)$ is below the critical $\varpi_t(i)$, the entrepreneur becomes bankrupt and defaults on the debt contract. In the event of default, the financial intermediary

[1] Much of the literature to date has focused on the United States, a large semi-closed economy. See also Fuerst (1995) and Fisher (1999).

[2] For instance, Gertler and Gilchrist (1994) find that, following economic downturns, borrowing and output by bank dependent firms, which are typically small, often fall more than borrowing and output by large firms with access to public debt markets.

[3] The random variable $\omega_t(i)$ is assumed to be lognormally distributed across time and entrepreneurs, i.e. $\ln(\omega_t(i)) \sim N(\tilde{\mu}, \tilde{\sigma}^2)$, with a mean of unity and a standard deviation of σ.

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