

Essays on Macroeconomics and Corporate Finance

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Abstract

This thesis studies the persistent effects of a shift from loose credit for firms to tight credit. It argues that a decrease in entrepreneurs' ability to borrow leads to an endogenous decrease in the interest rate, and that this decrease in the interest rate dampens the incentives of entrepreneurs to accumulate wealth and hence amplifies investment distortions for firms. Furthermore, the endogenous decrease in the interest rate increases the riskiness of consumption for entrepreneurs and also for workers, a novel spillover effect. In a calibration using U.S. firm-level data, I find that these amplification effects are large.

Executive Summary

Chapter 1 “A Model of Deleveraging”

This paper studies the persistent effects of a decrease in firms’ ability to borrow. In particular, the paper examines how the economy responds to a shift from loose credit for firms to tight credit.

Shocks to firms’ ability to borrow may play an important role in financial crises, business cycles and long-term macroeconomic performance. This paper focuses on entrepreneurial firms. To shed light on the effects of a decrease in firms’ ability to borrow, this paper uses a dynamic, general-equilibrium model that emphasizes wealth accumulation by entrepreneurs and entrepreneurs’ supply of financial assets to workers.

The paper argues that a decrease in entrepreneurs’ ability to borrow leads to an endogenous decrease in the interest rate, and that this decrease in the interest rate dampens the incentives of entrepreneurs to accumulate wealth and hence amplifies investment distortions for firms. In addition to making this argument in a theoretical model, I calibrate the model using U.S. firm-level data and find that this amplification effect is large.

The paper’s main argument can be understood by contrasting what happens when a decrease in borrowing ability affects a single firm and when a decrease in borrowing ability affects all firms. When only a single firm is affected, the affected firm would respond by decreasing borrowing dramatically. However, if all firms face a decrease in borrowing ability, the firms cannot all reduce their borrowing without generating a

decrease in the interest rate. That is, a decrease in firms' ability to borrow leads to a decrease in their supply of financial assets at a given interest rate, and hence to a decrease in the interest rate. This decrease in the interest rate makes it more expensive for entrepreneurs to accumulate wealth. Because entrepreneurs' wealth is essential to undertaking investment opportunities, the decrease in the interest rate amplifies investment distortions for firms.

The decrease in the interest rate also makes it more expensive for workers to accumulate wealth to alleviate their own financial frictions. In the model, workers face shocks to their labor productivity that they cannot directly insure. As a result, workers self-insure by accumulating wealth as a buffer stock: when workers experience bad shocks, they buffer their consumption by selling some assets. When there is a decline in the borrowing ability of entrepreneurs, the resulting endogenous decrease in the interest rate discourages workers from accumulating wealth and hence leads to a novel spillover effect; specifically, there is an increase in the riskiness of consumption for workers. This effect is present even though the workers are not directly affected by the decrease in entrepreneurs' ability to borrow. This highlights the role of entrepreneurs as suppliers of assets to workers. It is common to think about how shocks to entrepreneurs can affect consumers through general equilibrium in the labor market: if entrepreneurs want to hire more labor, wages increase and workers benefit. This paper emphasizes how shocks to entrepreneurs, such as a credit crunch, affect consumers through the financial market. In particular, the increase in the riskiness of workers' consumption occurs solely because of changes in the financial market, namely, a decrease in the interest rate.

The role of the decrease in the interest rate on entrepreneurs' wealth accumulation and investment distortions can be understood by considering the following results. In the model, if the interest rate is high, firms will completely save their way of their financial constraints. Indeed, in a baseline model, I show that the equilibrium interest rate is high, and hence a decrease in firms' ability to borrow has no persistent effect on output or productivity. In contrast, when a standard friction for workers is added to the model – namely, that workers need to save to self-insure against shocks to their labor productivity – workers' desire to save results in a low equilibrium interest rate. Thus, even in the long-run, financial constraints are binding for some entrepreneurs. This opens the door to the main analysis, and underlines the importance of considering wealth accumulation and the endogenous interest rate when thinking about how the economy responds to a decrease in firms' ability to borrow.

A second mechanism by which a decrease in interest rates leads to increased investment distortions is by tilting the composition of investment and output toward firms with a greater ability to borrow and away from firms with a lesser ability to borrow, even conditional on the firms' productivity. Thus, for example, if entrepreneurs face constraints on their ability to pledge their future revenues to investors but large, public firms do not, then aggregate productivity could be improved, in a static sense, by reallocating capital from public firms to entrepreneurs – and, importantly, this scope for reallocation will be greater when the interest rate is lower.

In the main analysis, I study the persistent effects of a decrease in firms' ability to borrow on investment distortions and total factor productivity, the riskiness of consumption, the level of investment, and other variables of interest. Understanding the

persistent effects is of interest for several reasons. For one, it is not surprising that a decrease in firms' ability to borrow leads to a temporary increase in investment distortions. What is less obvious is the capacity of entrepreneurs to adjust to their decreased ability to borrow by accumulating wealth over time. In this paper, I argue that, in general equilibrium, this ability is limited by the shortage of stores of value.

With this motivation, I examine how the economy responds when firms' ability to borrow declines. A decrease in firms' ability to borrow leads to a decrease in firms' steady-state supply of financial assets at a given interest rate. As a result, there is no longer an equilibrium at the previous interest rate. In order to obtain an equilibrium, the interest rate falls, encouraging firms to supply more financial assets and workers to hold fewer. The decreased interest rate makes firms willing to bear greater investment distortions in order to economize on the costs of holding liquid wealth. Thus, the decrease in the interest rate amplifies the increase in investment distortions caused by the reduction in firms' ability to borrow. Likewise, the decreased interest rate makes workers and entrepreneurs alike willing to bear greater consumption risk in order to economize on the costs of holding liquid wealth.

Having identified these amplification and spillover effects, the paper then calibrates the model to assess whether these effects are economically significant. The calibration uses firm-level data from the Kauffman Firm Survey (KFS), a unique panel study of entrepreneurial firms.

One reason to focus on entrepreneurial firms is that the entrepreneurial sector in the United States is large. According to data from the 2007 Survey of Consumer Finances (SCF), 15 million U.S. households have a family member with an "active management

role" in a privately-held business which the family owns in whole or in part. Based on the SCF data, these entrepreneurial firms had total sales in 2006 equal to more than 13 trillion dollars; total sales of all businesses in the US in 2006 were 28 trillion dollars. The total number of employees of these entrepreneurial firms was 103 million; according to the Current Population Survey (CPS), the number of employed U.S. civilians in 2006 was 144 million. Using SCF data, the reported value of entrepreneurs' stakes in their businesses was 9.7 trillion dollars; for comparison, according to Federal Reserve Flow of Funds data, the value of corporate equities held by U.S. households and non-profits was 9.6 trillion dollars.

In the calibration, I find that the amplification and spillover effects are large. I study a decrease in firms' ability to borrow that generates a decrease in the interest rate consistent with the decline in long-term interest rates observed during the recent financial crisis. In general equilibrium, the resulting decrease in total factor productivity is more than twice as large as it would be if the interest rate were constant, as in a small open economy.

One advantage of the approach in this paper is that the financial constraints on firms in this economy arise endogenously, due to the moral hazard that firms face. In particular, if an entrepreneur reneges on a promise to repay, creditors cannot seize all of the entrepreneur's income and assets. As a result, entrepreneurs can pledge to investors only a fraction of their income and undepreciated capital. Importantly, there are no financial constraints on firms except for those that arise endogenously due to this moral hazard. Firms can issue state-contingent assets and assets of any maturity. Thus, this paper focuses on a single source of financial constraints – the moral hazard of reneging –

and all of the results can be traced clearly to this moral hazard. Moreover, the model maintains its tractability even though firms can choose any maturity structure.

In future work, I plan to study the transition dynamics (i.e., the short-run response of the economy) that arise after a decrease in firms' ability to borrow. I also plan to study how the scarcity of stores of value can amplify macroeconomic volatility at business-cycle frequency. In addition, I plan to study whether there is scope for governments to reduce distortions through fiscal policy, by creating financial assets backed by future taxation. Further, this approach in this paper can be useful for understanding the extent to which entrepreneurial firms are too small given their inherent productivity, and how this varies in response to macroeconomic shocks.

Chapter 2 "Trading and Advising on Wall Street"

This paper studies a commonly cited conflict of interest on Wall Street: a firm that engages in proprietary trading and provides trading advice to clients may be tempted to mislead its clients and trade against them for the firm's own account. This paper develops a model to understand how and why proprietary trading and advising coexist despite the temptation to mislead. In the model, firms face a trade-off. Profiting from information by advising incurs lower capital costs than proprietary trading, but not all the firm's information can be used by clients, and clients will only pay for what (in expectation) they will use. In choosing whether to engage in proprietary trading, advising, or both, a firm takes into account that a larger-proprietary trading capacity endogenously reduces the number of clients that the firm can credibly advise.

Chapter 3 “Preferred Habitat versus Limited Participation: Irrelevance and Relevance Results for Open-Market Operations”

During and after the recent financial crisis, the Federal Reserve purchased long-term government bonds – financed by short-term borrowing – in an attempt to reduce long-term interest rates. Understanding how such maturity-lengthening open-market operations affect interest rates is an important challenge for macroeconomics.

This paper examines a class of models – called preferred-habitat models – that, according to one interpretation, imply that maturity-lengthening open-market operations generate a reduction in long-term interest rates. In this paper, I clarify this interpretation by demonstrating that additional assumptions are needed for this interpretation. In particular, in a standard preferred-habitat model, I show that maturity-lengthening open-market operations have no effect on long-term interest rates if the agents in the economy ultimately receive the profits from the government's portfolio via lump-sum taxes or transfers. This is similar to well-known irrelevance results in the monetary economics literature. The intuition is that if the Federal Reserve makes trades essentially on behalf of agents in the economy and the agents have the capacity to undo these trades through private markets, then trades by the Federal Reserve cannot have an effect on prices or allocations. A contribution of this paper is to show that – unless some agents are restricted from trading bonds of certain or all maturities, which I call limited participation – maturity-lengthening open-market operations are irrelevant even in a standard preferred-habitat model. I then show how the introduction of limited participation implies that maturity-lengthening open-market operations do reduce the long-term

interest rate. What drives this result is limited participation, not the preferred-habitat preferences. With this motivation, I develop a model, with a more reasonable form of limited participation and without preferred-habitat preferences, in which open-market operations are relevant.

Finally, I use these models to discuss how arbitrageurs' wealth covaries with technology or endowment shocks, and how this covariance is affected by open-market operations. In preferred-habitat models with limited participation, maturity-lengthening open-market operations reduce long-term interest rates precisely because they decrease the amount of long-term debt that arbitrageurs have to absorb. However, because long-term debt is a hedge against bad technology shocks, maturity-lengthening open-market operations have the effect of increasing the covariance between technology shocks and arbitrageurs' wealth. That is, loosely speaking, more open-market operations mean that arbitrageurs' wealth be higher in good times and lower in bad times. Since the wealth of financial specialists is important to financial stability, the positive effect of maturity-lengthening open-market operations on the covariance between technology shocks and arbitrageurs' wealth may be a negative unintended consequence of this policy.