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Dynamic credit relationships in general equilibrium ☆

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Abstract

We construct a general equilibrium model with private information in which borrowers and lenders enter into long-term dynamic credit relationships. Each new generation of ex ante identical individuals is divided in equilibrium into workers and entrepreneurs. Workers save through financial intermediaries in the form of interest-bearing deposits and supply labor to entrepreneurs in a competitive labor market. Entrepreneurs borrow from financial intermediaries to finance projects which produce privately observed sequences of random returns. Each financial intermediary holds deposits from a large number of workers and operates a portfolio of dynamic contracts with different credit positions. We calibrate the model to the U.S. economy and find that dynamic contracting is very effective at mitigating the effects of private information. Moreover, restricting borrowers and lenders to use static (one-period) contracts with a costly monitoring technology has adverse effects both on the level of aggregate economic activity and on individual welfare unless monitoring costs are very small. Finally, the optimal provision of intertemporal incentives leads to increasing consumption inequality over time within generational cohorts as in U.S. data.
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1. Introduction

The last 20 years have seen many efforts at modelling explicitly private information and the financial contracting process in the benchmark neoclassical growth model. In particular, a substantial part of the literature addresses the question of how the presence of private information contributes to the propagation of aggregate economic uncertainties. Bernanke and Gertler (1989), for example, argue that with private information, swings in the firm's balance sheet are a potential source of persistent output dynamics. In Williamson (1987b), monitoring costs of financial intermediaries are important for the propagation of aggregate disturbances. Kiyotaki and Moore (1997) also study business cycle dynamics propagated through the financial contracting process between entrepreneurs and investors, although their story is based on limited commitment instead of private information. Carlstrom and Fuerst (1997) develop a computable general equilibrium model based on Bernanke and Gertler (1989) to address quantitatively the importance of agency costs for the propagation of aggregate shocks. Cooley and Nam (1998) incorporate a problem of debt contracting with asymmetric information into a quantitative monetary business cycle model to generate a persistent liquidity effect induced by monetary disturbances.

An obvious yet serious limitation of most of the existing literature on financial contracting and business cycles is that the financial borrowing and lending process is modelled as a one-shot game.[1] In practice, financial intermediaries often engage in long-term relationships, rather than interact only once with their borrowers. Modelling the financial lending process as a one-period contract may severely restrict the contracting parties' ability to achieve risk-sharing, and hence may have important implications for how successfully the contract can be used in a dynamic macroeconomic setting as an explicit description of the financial lending process. In addition, from a technical perspective, in a standard dynamic general equilibrium macroeconomic model, borrowers and lenders are all infinitely lived agents, and very special assumptions have to be made in order to fit the static contracting relationship into the rest of the economy (which is fully dynamic).[2]

The above limitation of the literature was first pointed out by Gertler (1992), who developed a model in which lenders and borrowers can enter into long-term but finite contractual relationships and used his model to show that shifts in aggregate economic fundamentals can be amplified through the process of long-term contracting. Yet, as Gertler himself pointed out, "a major limitation of this model is that it lies well short of a fully dynamic framework that can be matched to data. While allowing for multi-period contracts ... is a helpful step in this important direction, there is still a long way to go" (p. 470).

What this paper attempts to undertake can be viewed as just another step in the long way that Gertler (1992) pointed out. Instead of being ambitious in providing a theory that explains business cycles dynamics, this paper constructs a quantitative dynamic general equilibrium model with no aggregate uncertainty but in which long-lived economic agents can enter into fully dynamic financial lending contracts. We find that, relative to static

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[1]One notable exception is Cooley et al. (2004).

[2]See Carlstrom and Fuerst (1997) and Cooley and Nam (1998). Note that the static contracting relationship can be more comfortably embedded in an OLG framework (Boyd and Smith, 1997). This perhaps is the main reason why most of the theoretical contributions in the literature have used an OLG structure with two-period-lived agents.