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Relationship lending and the transmission of monetary policy

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ABSTRACT

Repeated interactions allow lenders to uncover private information about their clients, decreasing the informational asymmetry between a borrower and his lender but introducing one between the lender and competing financiers. This paper constructs a credit-based model of production to analyze how learning through lending relationships affects monetary transmission. I examine how monetary policy changes the incentives of borrowers and lenders to engage in relationship lending and how these changes then shape the response of aggregate output. The results demonstrate that relationship lending prevails in equilibrium, smoothes the steady state output profile, and induces less volatile responses to certain monetary shocks.

1. Introduction

Macroeconomists have shown how intermediation costs can propagate shocks when lenders are imperfectly informed about their borrowers. Commonly omitted from the analysis though is the potential for lenders to learn about their clients through repeated interactions. This omission is problematic because recent empirical evidence suggests that there is a link between relationship lending and the transmission of monetary shocks. As defined in Boot (2000), relationship lending is the provision of credit by intermediaries that acquire proprietary information about their borrowers over time or across products. Among the major European economies, Ehrmann et al. (2001) establish that relationship lending is much more prevalent in Germany and Italy than in Spain and France. Incidentally, they also find that the quantity of bank loans responds less severely to a monetary contraction in the first two countries. Borio and Fritz (1995) find a similar pattern on the pricing side, with the pass-through from higher policy rates to higher loan rates occurring more slowly in Germany and Italy than in Spain.[1] A correlation with spending is also visible as Mojon and Peersman (2003) demonstrate that the peak decline in investment following a monetary contraction is smaller in Germany and Italy than in Spain and France.

This paper establishes a theory of how relationship lending affects the macroeconomic response to monetary policy. It begins by constructing a credit-based model of production where lenders can uncover private information about their borrowers' abilities over time. While such learning decreases the informational asymmetry between a lender and his borrower, it introduces one between the lender and competing financiers so the extent and effect of relationship lending must be endogenously determined. The paper undertakes this determination and analyzes how monetary policy changes the incentives of borrowers and lenders to engage in relationship lending by changing the cost of funds on the interbank market. How the response of aggregate output depends on the response of relationship lending is then examined.

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[1] Additional support for the impact of relationship lending is provided for Italy by Gambacorta (2004) and for Germany by Weth (2002) and Iacoviello and Minetti (2008). Moreover, based on US survey data, Berger and Udell (1995) conclude that American borrowers with larger banking relationships tend to pay lower interest rates and are less likely to pledge collateral.

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In contrast to typical models of financial acceleration, the results demonstrate that relationship lending prevails in equilibrium and dampens the credit channel. The prevalence of such relationships depends not only on the policy rate but also on institutional parameters so, given differences in these parameters, cross-country differences in relationship lending and monetary transmission are supported by the model.

The analysis uncovers two mechanisms through which relationship lending affects monetary transmission. The first operates during the credit relationship while the second operates beforehand. As lenders acquire information over the course of their relationships, they retain only sufficiently good borrowers. The presence of other lenders limits monopoly power and, in order to induce higher repayment rates, it is optimal for informed lenders to concede positive surplus to some of their borrowers. As will be demonstrated below, this concession includes offering policy-invariant credit terms over intermediate ranges of the policy rate, giving rise to a first mechanism. To be sure, informed lenders do not concede the entire surplus from relationship lending and, in anticipation of future relationship profits, unmatched lenders compete more intensely for new borrowers. A second mechanism arises because this competition lowers loan rates for any given policy, alleviating some of the tightness that information frictions may impart on first-time borrowers without actually changing these frictions in the first period. At an aggregate level, the two mechanisms combine to produce a smoother steady state output profile and a less volatile response to certain monetary shocks.

The importance of financial intermediation for real activity has been emphasized in the macroeconomics literature.[2] However, in analyzing how credit markets transmit shocks to the real economy, macroeconomics has essentially discounted the propensity of agents in these markets to engage in relationship lending: Williamson (1987), Bernanke and Gertler (1989), and Kiyotaki and Moore (1997) abstract from multi-period credit relationships while Gertler (1992), Khan and Ravikumar (2001), and Smith and Wang (2006) abstract from the learning benefits of such relationships. In contrast, the key feature of multi-period lending relationships in my model is learning and, in particular, the informational advantage of an inside lender over all other lenders. Indeed, it will be assumed that agents cannot commit ex ante to long-term contracts, making multi-period lending relationships a sequence of one-period arrangements whose benefits are derived solely from the possibility of lender learning.[3] To the extent that it emphasizes relationship lending, my paper is also related to the banking literature and, in particular, work by Schmeits (2005) and Van Tassel (2002) on the properties of these relationships. However, neither study investigates how policy rates affect the resulting contracts or how these contracts then transmit shocks to the macroeconomy, two questions which are key components of my analysis.[4]

The rest of the paper proceeds as follows: Section 2 describes the environment in more detail, Section 3 characterizes the optimal credit decisions, Section 4 determines the resulting output functions, Sections 5 and 6 discuss the output implications of relationship lending, and Section 7 concludes. Unless otherwise derived, all proofs are presented in the online appendix.[5]

2. Environment

Time is discrete. All agents are infinitely-lived, risk neutral, and have discount factor $\beta \in (0,1)$. There is a continuum of firm types, denoted by ω and distributed over the interval $[0,1]$ according to a non-degenerate probability density function $f(\cdot)$. All firms have access to the same production technologies: an investment project called *P1* and a speculative project called *P2*. Types are private information and high-ω firms are better in the sense that they are more likely to operate the investment project successfully. In particular, a type ω who operates *P1* is able to produce θ_1 units of output with probability $p(\omega)$ and zero units with probability $1-p(\omega)$, where $p:[0,1]\to[0,1]$ is a continuously differentiable and strictly increasing function. In contrast, the outcome of the speculative project *P2* is independent of firm type, yielding θ_2 with probability q and zero with probability $1-q$. Assume $\theta_2 > \theta_1$ and $q\theta_2 = p(0)\theta_1$ so that the speculative project is riskier in the sense that it is second order stochastically dominated by the investment project.[6] The presence of a speculative outside option allows the credit contracts described below to affect real activity by changing the relative attractiveness of safe projects.

To undertake either project, firms need one unit of capital. Project output is not storable so this capital must be borrowed from a measure of ex ante identical lenders that also populates the economy. Lenders cannot operate the production technologies but they have access to an interbank market for capital. The interest rate in the interbank market

[2] Perhaps most pointedly, Bernanke (1983) and Diamond and Dybvig (1983) argue that financial disruption propelled a potentially normal-course recession into the Great Depression. For a survey of the literature on real-financial interactions in business cycles, see Gertler (1988). For a discussion of real-financial interactions in economic development, see King and Levine (1993).

[3] Multiple periods are important here both because they permit learning and because learning has long-term implications. This contrasts with the growth model of Bose and Cothren (1997) where lenders invest in learning about borrowers but the information acquired cannot be used in future contracts since agents are two-period-lived overlapping generations who only enter into credit contracts in their first period.

[4] To this end, I also extend the oft-used two-type banking environment to a continuum of borrower types, permitting non-degenerate lender beliefs and continuous output functions. Moreover, the first period credit market in my model is competitive, borrowers can choose a different project each period, and all lenders can condition their second period loan rates on first period default history. While some of the last three features are present in either Schmeits (2005) or Van Tassel (2002), neither paper contains all three. Combining these elements allows me to explore more avenues through which relationship lending can influence real activity.

[5] The online appendix can be found with the online version of this article on the Journal's website.

[6] $p(0)\theta_1 > q\theta_2$ requires more algebra but yields similar conclusions.