Monetary policy and bank lending to small firms

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ABSTRACT

This paper presents an empirical test of the balance sheet channel of monetary policy. I take advantage of a panel data set containing nearly all domestic banks to search for an adjustment in lending patterns induced by changes in the stance of monetary policy. I find that in response to monetary policy tightening, banks decrease the proportion of credit extended to high-agency-cost "small" borrowers. Additionally, I provide evidence that this result is in fact driven by a balance sheet effect working on small borrowers rather than on small lenders.

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1. Introduction

Understanding how monetary policy is transmitted to the real economy is central to the study of macroeconomics. However, it has been established that the policy induced changes in the cost of capital are insufficient to explain the subsequent magnitude, timing, and composition of the economic response.[2] To reconcile this, the traditional "interest-rate view" has been augmented by theoretical and empirical evidence of a so-called credit channel of monetary policy. Models of the credit channel show that financial market imperfections amplify the effects of monetary policy through at least two distinct sub-channels. As described in Bernanke and Blinder (1988), the "bank lending channel" predicts a decline in the aggregate level of credit extended by banks in response to a monetary tightening. While this channel arises due to lower system-wide reserves, thereby leading to a reduction in the supply of intermediated credit, an additional "balance sheet channel" described by Bernanke and Gertler (1989) predicts a disruption in credit extension as a result of procyclical movement in borrowers' financial positions caused by monetary tightening. With imperfect information and heterogeneous borrowers, models of the credit channel predict tighter credit standards that lower the share of loans extended to less credit-worthy firms.[3]

If financial intermediaries respond to higher real interest rates with a "flight to quality" as argued by Bernanke et al. (1996), then this compositional shift in banks' loan portfolios is part of the monetary transmission mechanism. The primary purpose of this paper is to identify the balance sheet channel of monetary policy even if the interest rate and bank lending

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[1] *Note*: The majority of this paper was written while the author was associated with the University of Oregon. The analysis and conclusions set forth are those of the author alone and do not indicate concurrence by the Board of Governors or other members of the research staff.

[2] See Bernanke and Gertler (1995) and Hubbard (2001) for a review.

[3] For a thorough discussion of the distinction between the balance sheet and bank lending channels see Bernanke and Gertler (1995).

channels operate simultaneously. While there has been relatively strong evidence for a credit channel of monetary policy in recent years (summarized in Mishkin, 2007), many papers fail to differentiate between the bank lending and balance sheet hypotheses (e.g. Gertler and Gilchrist, 1994; Kashyap et al., 1994; Morgan, 1998). There is also a body of work that finds support for a specific channel, but either uses aggregate data as in Lang and Nakamura (1995) or disaggregate data specific to a single sector (Gertler and Gilchrist, 1994; Kashyap et al., 1993; Oliner and Rudebusch, 1995). Although strong evidence is reported in each of the aforementioned studies, each limitation presents a disadvantage. First, making use of aggregate data precludes the identification of heterogeneity amongst financial intermediaries and/or borrowers. Secondly, employing narrow sectoral data potentially poses a sampling problem. To the extent that a single sector (e.g. manufacturing) is not representative of the aggregate economy, one must be cautious in drawing conclusions or making policy decisions.

In this paper, I analyze data on virtually all domestic banks to conclude that banks exhibit a significant flight to quality in response to a monetary tightening. Using similar data, Kashyap and Stein (2000, 1994) demonstrate the importance of controlling for bank-level characteristics and demonstrate that smaller banks exhibit lending patters that are consistent with the bank lending channel. In this paper, I examine the share of bank loans extended to small businesses to argue that similar patterns emerge in the manifestation of the balance sheet channel. In response to a shift towards tighter monetary policy, banks adjust the composition of their loan portfolios away from small, high-agency-cost borrowers.[4] According to the US Small Business Administration, small businesses employ half of all private sector employees and account for more than half of all private sector output. Thus, distributional effects of monetary policy propagated through the balance sheet channel are of interest to a broad array of policy makers and advocacy groups alike.

The remainder of this paper is organized as follows. Section 2 describes the strategy used to identify the balance sheet channel. Section 3 outlines the data used, presents the estimated model, and describes the econometric method used. Section 4 contains the results of the estimation, and Section 5 concludes.

2. Identification

In order to investigate patterns in the extension of credit to high-agency-cost borrowers, I construct small-business-loan-to-total (SBL) ratios that measure the proportion of each bank's total commercial loan book invested in loans to small firms. The data contain information on loans to small firms classified as either commercial and industrial (C&I) loans, or loans secured by a firm's property, plants, or equipment (hereafter referred to as 'real estate' loans). Using these SBL ratios as the outcome to identify a balance sheet channel is a unique feature of this study. It is in this way that I attempt to directly measure banks' loan portfolio positioning in order to demonstrate a mechanism by which small firms disproportionately lose access to external funds. Previous studies such as Bernanke et al. (1996), Gertler and Gilchrist (1994, 1993), and Oliner and Rudebusch (1996) provide evidence of the differential response of high-agency-cost (usually small) firm spending and investment decisions. While these authors assume the existence of intermediate financial frictions that lead to their results, it is the aim of this paper to use bank balance sheets to demonstrate a manifestation of these frictions.[5]

Though the SBL ratios here can be viewed as the complement of Lang and Nakamura's (1995) "% safe" variable, I use disaggregate data to test the balance sheet channel on a bank level. As such, I am able to identify any distributional effects of monetary policy across banks and firms alike. Other studies have made use of similar SBL ratios as outcome variables, but their purpose has been to explore the relationship between bank consolidation and its impact on credit extension.[6]

The idea that small borrowers may be more susceptible to monetary policy tightening is not a new one, and dates to Bach and Huizenga (1960) and Galbraith (1957). There are several reasons to expect that the burden of tighter credit standards should fall disproportionately on small firms and thereby generate measurable changes in real activity. First, small firms (by definition) have lower collateralizable net worth, leading to greater incentive incompatibility. Secondly, unconditional survival rates are lower for small firms and bankruptcy costs are proportionally larger for small borrowers due to the fixed costs associated with monitoring and evaluation.[7] Finally, smaller firms are less diversified which increases idiosyncratic risk.

As mentioned earlier, the balance sheet channel predicts a reduction in the net supply of loans to less creditworthy borrowers. This of course leads to the question of whether an observed reduction in the *share* of loans to small firms (i.e. a fall in the SBL ratio) may instead be evidence of a shift in demand only. Fortunately, however, much evidence exists to dispute an initial fall in small firm demand for bank loans. Gertler and Gilchrist (1996) and Milne (1991) argue that small firms initially demand more loans in the face of a monetary contraction. This is due in part to the sharper decrease in sales that small firms experience relative to their larger counterparts. Oliner and Rudebusch (1996) find that small firms become more dependent on internal financing for investment spending in response to a monetary contraction than do large firms. The authors take this result as an indication that small firms experience a scarcity of external financing. Large firms similarly increase their loan demand to smooth the impact of lower sales (and finance the resulting inventories), but with more success than small

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[4] Much research exists to suggest that small, relatively young firms are likely to have higher agency costs. See, for example Gertler and Gilchrist (1994, 1993) and the references therein. In particular, Hyytinen and Pajarinen (2008) provide evidence that firm age may be a better proxy for measuring agency costs. Since I do not observe borrower age, I identify the balance sheet channel by using borrower size.

[5] The readjustment of bank loan books described here is likely not the only manifestation of these frictions. The non-price terms of lending are other obvious examples.

[6] See Peek and Rosengren (1998) and Strahan and Weston (1998) for examples.

[7] Morgan (1992) contains many references to literature suggesting that bankruptcy costs are proportionately higher for small firms.