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Changes in bank lending standards and the macroeconomy

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ABSTRACT

Identifying macroeconomic effects of credit shocks is difficult because many of the same factors that influence the supply of loans also affect the demand for credit. Using bank-level responses to the Federal Reserve's Loan Officer Opinion Survey, we construct a new credit supply indicator: changes in lending standards, adjusted for the macroeconomic and bank-specific factors that also affect loan demand. Tightening shocks to this credit supply indicator lead to a substantial decline in output and the capacity of businesses and households to borrow from banks, as well as to a widening of credit spreads and an easing of monetary policy.

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1. Introduction

The main difficulty confronting any empirical investigation into the roles that banks play in business cycle fluctuations involves identification of credit supply shocks.[2] Most economic disturbances that affect the supply of credit likely have independent effects on real variables as well; for example, an unanticipated change in the stance of monetary policy may change the interest rate on, or quantity of, bank loans, but at the same time, that change may also affect spending and production through its influence on expectations and interest rates.[3]

To better identify credit supply shocks, this paper develops a new indicator of changes in the supply of bank-intermediated credit: a change in bank lending standards that is not contaminated by the bank-specific and macroeconomic factors that can simultaneously affect the demand for credit.[4] This new measure of changes in the supply of bank-intermediated credit is constructed from the bottom up, using *bank-level* responses on changes in lending standards for businesses and households as reported on the Federal Reserve Board's Senior Loan Officer Opinion Survey on Bank Lending Practices (SLOOS). This is the first paper that uses bank-level responses to study the role of credit supply factors in U.S.

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[1] This paper was written when Mary Beth Chosak was working at the Federal Reserve Board.

[2] The notion that the commercial banking sector—or a financial system more generally—may serve as a propagation mechanism for, or a source of, economic shocks has a long and venerable tradition in macroeconomics, see Bernanke (1993) for a review of the historical literature. More recently, spurred by the extraordinary events of the 2007–2009 financial crisis, an emergent theoretical literature emphasizes the implications of the capital position of financial intermediaries for asset prices and macroeconomic dynamics (see Brunnermeier and Sannikov, forthcoming; He and Krishnamurthy, 2013).

[3] Although much of the literature on this so-called bank lending channel has documented substantial effects of monetary-policy-induced changes in bank loans on real activity, some researchers have found much smaller effects, see, for example, King (1986), Bernanke and Blinder (1988), Romer and Romer (1990), Bernanke and Lown (1991), Gertler and Gilchrist (1993), Ramey (1993), Kashyap and Stein (1994), Kashyap and Stein (2000), Peek and Rosengren (1995a), Peek and Rosengren (1995b), Peek and Rosengren (2000), Driscoll (2004), Ashcraft (2005), and Gilchrist and Zakrajšek (2012a).

[4] The adjusted measure of changes in bank lending standards can be downloaded from http://www.federalreserve.gov/pubs/feds2012/201224/201224abs.html.

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economic fluctuations; the previous research that employs SLOOS survey data on changes in bank lending standards used aggregated responses.[5]

Specifically, an econometric model is used to adjust the reported changes in lending standards by removing the portions associated with changes in the economic outlook, risk tolerance, and other factors that can simultaneously affect loan demand. Empirical analysis at both the macro and micro levels strongly indicates that the reported changes in bank lending standards that are "purged" of the demand-related factors provide a more accurate measure of movements in the supply of bank loans available to potential borrowers. Such shifts in the effective supply of credit could arise, for example, from banks' internal reassessments of the inherent riskiness of their business lines, changes in regulations or the supervisory environment, or changes in industry strategies (see Bassett and Zakrajšek, 2003).

To evaluate systematically the macroeconomic effects of shocks to the supply of bank-intermediated credit, we include the adjusted changes in lending standards in a standard monetary vector autoregression (VAR). This analysis shows that credit supply disturbances have economically large and statistically significant effects on output and core lending capacity of U.S. commercial banks.[6] Specifically, an adverse credit supply shock of one standard deviation is associated with a decline in the level of real GDP of about 0.75 percent 2 years after the shock, while the capacity of businesses and households to borrow from the banking sector falls more than 4 percent over the same period. Such disruptions in the credit-intermediation process also lead to a substantial rise in corporate bond credit spreads and elicit a significant easing of monetary policy, macroeconomic dynamics typically associated with financial crises.

To test whether this approach indeed generates a more accurate measure of shifts in the supply of loans, we use the bank-level version of an analogous series as an instrument in a regression of loan quantities on loan prices (i.e., loan-rate spreads). If the adjusted changes in bank lending standards are a cleaner indicator of movements in credit supply, then using them in this way should help to trace out the slope of the loan demand curve. A variant of the benchmark econometric model can be used to adjust the reported changes in standards on commercial and industrial (C&I) loans for the macroeconomic and bank-specific factors that can also influence the demand for such loans. These bank-level shifters in the supply of C&I loans are then matched with data from the Federal Reserve's Survey of Terms of Business Lending (STBL), a source of detailed contract information on individual C&I loan originations.

The results indicate that while a simple OLS regression of (log) loan amounts on the corresponding interest rate spreads results in an estimate of the semi-elasticity of loan demand of about -0.5, an IV regression—using the bank-specific adjusted changes in C&I lending standards as instruments for loan-level interest rate spreads—yields an estimate of the semi-elasticity between -1.1 and -1.7, depending on the functional form. The large decrease in the estimated coefficient is consistent with the interpretation that the adjusted changes in banks' lending standards capture shifts in C&I loan supply. All told, the combination of VAR results with those based on loan-level data provides compelling evidence that the adjusted changes in overall lending standards provide a purer measure of movements in the effective supply of bank-intermediated credit.

2. Data sources and methods

Estimating shifts in the effective supply of bank loans to businesses and households requires combining survey information on the reported changes in bank lending standards with other bank-specific and macroeconomic variables that might affect—either explicitly or implicitly—loan demand. The choice of control variables, described below, was guided in part by the reasons banks report on the survey, as well as by both theoretical models and empirical research on the cyclical behavior of lending standards.

The SLOOS itself is a valuable source of information of why banks change their lending standards. In particular, a portion of the SLOOS devoted to questions on C&I lending queries banks to rate the relative importance of several reasons that may have led them to change their lending policies on such loans. The possible reasons include macroeconomic factors, such as a less favorable or more uncertain economic outlook; bank-specific factors, such as changes in tolerance for risk and a deterioration in the bank's current or expected capital position; or borrower-specific factors, such as an increase in industry-specific problems.

In general, changes in the economic outlook and shifts in risk tolerance—cyclical factors that likely have an independent effect on loan demand—are the most commonly cited reasons for changes in bank lending standards and terms on C&I loans (see Fig. A2 in online appendix).[7] In addition, banks that ease lending policies very often point to increased competition

[5] See, for example, Schreft and Owens (1991), Lown et al. (2000), and Lown and Morgan (2002, 2006). A closely related research effort using the Bank Lending Survey conducted by the European Central Bank includes the work of De Bondt et al. (2010), Ciccarelli et al. (2010), Cappiello et al. (2010), and Maddaloni and Peydró (2013). The use of bank-level responses, however, is gaining traction. In a recent paper, Del Giovane et al. (2011) use a subset of bank-level responses of the ECB's Bank Lending Survey—the subset containing the responses of Italian banks—to quantify the importance of supply and demand factors behind the contraction in business lending during the recent financial crisis.

[6] Core loans are the sum of commercial and industrial loans, loans secured by real estate, and consumer loans; these business lines correspond to the loan categories covered by the SLOOS. Core lending capacity is the sum of core loans outstanding and the amount of unused commitments to make such loans. The focus on this broader measure of credit intermediation by commercial banks is motivated by the fact that the banking system provides credit to businesses and households in two important ways: by originating new loans (on balance sheet) and by providing lines of credit (off balance sheet), see Bassett et al. (2011) for discussion and details.

[7] These responses are consistent with the econometric evidence of Asea and Blomberg (1998), who use a detailed data set of C&I loan contracts to document that terms on business loans vary systematically over the business cycle, with looser credit policies occurring during economic expansions and vice versa.