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Market structure and the pass-through of the federal funds rate

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ABSTRACT

We study the effect of local market bank concentration on business loan originations and on the pass-through of the federal funds rate to business loan originations. Economic theory on the relationship between concentration and the pass-through of input prices to quantity (or price) is ambiguous. We find that more concentrated markets have lower business loan originations and experience smaller changes in business loan originations in response to changes in the federal funds rate. Our results support the idea that market concentration dampens quantity reactions to input price changes.

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1. Introduction

The role of competition in the pass-through of input prices has long been a topic of interest in economic research. This research has focused on the effects of competition on, for example, exchange-rate pass-through and tax incidence. This paper considers the relationship between competition and the pass-through of the federal funds rate, a major input price in the banking industry. The federal funds rate is the interest rate most commonly used as an instrument of monetary policy.¹ The pass-through of changes in the federal funds rate to bank lending has potential repercussions for the real economy and for the transmission of monetary policy. Understanding the effect of local bank competition on the pass-through of the federal funds rate is important, because it gives policymakers a clearer understanding of how changes in the federal funds rate affect bank lending in areas with differing levels of bank competition.

Theory on the relationship between market power and the pass-through of the federal funds rate is ambiguous. While theory gives no clear answer on how competition affects the pass-through of the federal funds rate, empirical analysis could clarify the

conditions associated with under- or over-adjusting to rate changes. This paper extends the existing empirical literature by examining explicitly the implications of the effect of market power on loan volume for the pass-through of federal funds rates and the transmission of monetary policy.

A majority of the empirical work on lending and competition has focused on static and dynamic analysis of interest rates and lending levels rather than the adjustment of lending to input prices. Several articles have examined the relationship between market structure and loan and deposit interest rates using the Structure–Conduct–Performance theory, which posits that greater market concentration leads to less lending and higher loan rates.² Other work focusing on “relationship lending” has posited that market power may increase certain types of lending, because lenders with market power are willing to risk short-term losses in exchange for the prospect of greater long-term profits from lending to growing borrowers with whom the lenders have established relationships.

Another branch of research has focused on the transmission mechanisms of monetary policy in an effort to better understand how they affect the real economy. Recent literature has considered the role of credit market imperfections (arising from information asymmetries) in the transmission of monetary policy, or the so-called credit channel (see [Bernanke and Gertler, 1995](#)). Some

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¹ [Nautz and Schmidt \(2009\)](#) find that improved communication and transparency have increased the Federal Reserve's control over the federal funds rate since 1994.

² The literature has also noted a relationship between market structure and deposit rates. While this paper concentrates on bank lending, analogous research could examine the relationship between bank competition and deposit volumes.

authors (such as Carlino and Defina, 1998; Ashcraft, 2006) have used Call Report data to analyze the effectiveness of US monetary policy in different geographic areas under the assumption that most lending occurs near a bank's branches. No research exists, however, on the effects of local banking competition on the sensitivity of bank lending to monetary policy.³ We are able to detect the dampening effect of market concentration on responses in loan activity to monetary policy. In particular, we find that as banking market concentration increases, the sensitivity of bank lending to the federal funds rate (our monetary policy indicator) decreases.⁴ Because of this relationship between the sensitivity of lending supply to changes in the federal funds rate and concentration, monetary authorities may have reason to be concerned with changes in banking market concentration.⁵

Another contribution of this paper is the use of Community Reinvestment Act (CRA) data that allow us to investigate the relationship between banking industry competition—measured by local market concentration—and new lending activity using measures of loan volumes that are superior to those used in past research. The CRA data annually measure the dollar volume of loan originations under \$1 million to all businesses and, separately, to only those businesses with less than \$1 million in revenue. CRA loan data are collected at the census-tract level for all depository institutions, regardless of whether the lender has a branch presence in a nearby location.⁶ Because CRA data measure loan originations, they are likely to reflect changes in bank lending more accurately than the quarterly Call Report data used by previous micro-level research. Our results find that both higher levels of local market concentration and increases in concentration have significantly negative correlations with changes in loan volumes.

1.1. Previous research

It is well known that the effect of market power on output is indeterminate. This is true, in particular, for the case of adjustment to changes in input prices. The shape of demand and supply curves can lead to two possible results. In the first case, as the degree of competition decreases, output becomes less sensitive to changes in marginal costs and price changes in response to marginal cost shocks become muted; as a result, the sensitivity of output to price decreases as the market becomes less competitive. In the second case, under certain demand and cost curvature conditions, price becomes more sensitive to changes in marginal costs as the degree of competition decreases. Vives (1999) discusses the general conditions for such “overshifting” to occur, and Freixas and Rochet (1998) show that a model of banking with constant elasticity of demand and a symmetric Cournot equilibrium yields an inverse relationship between competition and output.

³ Pia Olivero et al. (2011), Carlino and Defina (1998) come closest to exploring such effects. Pia Olivero et al. look at the effects of competition on the transmission of monetary policy in ten Latin American and Asian countries. Carlino and Defina find that sensitivity to monetary policy differs across states as the mix of firms and banks varies. Their findings stress the ability of firms to obtain nonbank financing and of banks to obtain nonreservable funds. They also find that the mix of interest-sensitive industries affects monetary policy transmission.

⁴ This result is interesting in that it suggests that the existence of a market imperfection—namely, market power arising from concentration—reduces the effectiveness of monetary policy, whereas most other research on monetary policy finds that the stronger the market imperfection, the greater the effectiveness of the monetary policy instrument. See Bernanke et al., 1999.

⁵ Because we lack the data, we are unable to test the importance of bank concentration on the overall effect of monetary policy on the real economy through, for example, estimation of vector autoregressions.

⁶ As noted in the text, some small depository institutions do not have to file under CRA. A substantial loosening of reporting requirements enacted prior to the due date for 2005 CRA reports greatly reduced the utility of the data for research purposes. The number of CRA reporters dropped drastically from 2004 to 2005 then dropped again in 2006.

Some of the empirical literature in industrial organization has explored this theoretical ambiguity by examining whether banks in more concentrated markets tend to adjust prices less completely in response to changes in input costs than banks in markets with a more competitive structure. Hannan and Berger (1991) find that banks in more concentrated markets have more rigid deposit rates. They also find that deposit rates are stickier when they are moving upward than when they are declining.⁷ Neumark and Sharpe (1992) combine these results, finding that banks in more concentrated markets are slower to raise deposit rates and quicker to lower them when Treasury bill rates, a measure of input costs, change. They also find that banks in concentrated markets offer lower rates on deposits than banks in more atomistic markets.

As is typical of cross-sectional research in banking, these authors define banking markets as geographically local, with metropolitan areas used to approximate urban markets and county boundaries used to delineate rural markets. These definitions are based on two sources of support. Survey evidence finds that both households and small businesses overwhelmingly use depository institutions located within a few miles of their homes or places of business as viable suppliers of many banking services.⁸ In addition, a large number of empirical studies of the determinants of bank pricing and profitability find that local market structure has a significant effect on bank behavior and performance.⁹

Kahn et al. (2001) examine cross-sectional differences in the behavior of rates for personal and automobile loans, and get very different results for the two types of loan. They find that interest rates for personal loans are stickier in more concentrated banking markets, while auto loan rates adjust more quickly in such markets. They attribute the difference to efficiency gains from scale economies in auto loan markets that are absent in markets for personal loans.¹⁰ The results from these studies imply that, in more concentrated markets, bank interest rates on loans exhibit partial and sticky reactions to changes in input costs (such as those caused by changes in monetary policy), potentially dampening the effectiveness of monetary policy. Other empirical studies (Corvoisier and Gropp, 2002; Bikker and Haaf, 2002) confirm the price-concentration relationship in European banking markets.

Petersen and Rajan (1995) were the first to advance the notion that competition among banks could harm lending to businesses that are largely constrained to borrowing from banks. They argue that banks will limit their initial lending to new firms because it is not clear at first whether a new firm is a good or bad credit risk. In a model with “good” and “bad” entrepreneurs, they show that the constraints on initial lending by banks are weaker if banks have more market power and gain an implicit equity interest in the new firm through a greater probability of lending to successful entrepreneurs in the future. Banks with more market power set lower initial loan rates, and this lower demand for payments increases economic growth. In effect, market power allows banks to

⁷ Chong (2010) notes that regulatory restrictions also affect interest rate rigidity. This concern should not be an issue in the time period covered by our analysis.

⁸ For households, see Amel et al. (2008), which examines evidence from the Survey of Consumer Finances. For small businesses, see Kwast et al. (1997), which examines evidence from the Survey of Small Business Finances, and Amel and Brevoort (2005), which utilizes a survey by the National Federation of Independent Business. While bank customers frequently state that they search for banking services within areas smaller than a metropolitan area or county, the overlap of the search areas of many bank customers is assumed to transmit competitive forces throughout an economically integrated local area. Geographic markets are defined by the extent to which market power cannot be curtailed by substitution to out-of-market competitors.

⁹ See Group of Ten (2001), chapter V, for an overview of these studies.

¹⁰ An alternative explanation for the results for automobile-loan markets is that these markets were dominated by the captive-finance divisions of large automobile manufacturers, so that more concentrated markets were those in which GMAC and its equivalents had greater than usual market shares. These captive lenders may have reacted differently than banks to monetary policy shocks.

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