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Bank competition and monetary policy☆

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Abstract

There is an apparent theoretical discrepancy between the effects of monetary policy shocks on economies with differently competitive banking sectors. We employ cross-country data to investigate this hypothesis with two different approaches. First, using aggregate data we analyze the correlation between two indices: (i) a cumulative impulse response function providing an index of the effect of monetary policy shocks; and (ii) Panzar and Rosse's *H*-statistic as an index of the state of bank competition. Second, using disaggregated data we regress bank lending on the interaction of bank competition and monetary policy shocks. The first approach does not provide any evidence of a relationship between monetary policy shocks and bank competition. However, the second approach suggests that competition in the banking industry leads to smaller monetary policy effects on bank lending.

JEL classification: E5; G1

Keywords: Monetary policy; Vector autoregression; Bank competition; Panzar–Rosse; *H*-statistic

1. Introduction

Following financial market deregulation in the late 1980s, the banking industry in many countries experienced mergers, new entries, and expansion into new businesses areas as observed in many other markets. In particular, the mergers of banks after the late 1980s in the U.S. and the early 1990s in Japan and Europe are prominent. As a result, the situation in the banking industry has differed from country to country. We can also expect competition to change with the liberalization of a restricted banking system. Recent studies investigate whether the deregulation of the banking industry can result in markets becoming considerably more competitive.[1] On the other hand, some theoretical studies examine whether differences in bank competition can cause variations in economic conditions. If so, it is important to analyze what happens in economies with different degrees of bank competition.

Monetary policy is not exempt from the effects of bank competition. Putting aside some recent work, few studies examine the relationship between competition in the banking industry and the effects of monetary policy. For instance, Stiglitz and Greenwald (2003, Part I) use a mean-variance approach to analyze the banking system mechanism under the assumption that the representative bank is risk averse and maximizes its utility as a function of the mean and standard deviation of its wealth. They investigate both competitive and restricted banking systems, and show that in a competitive system the effect of raising interest rates on bank lending is weaker than in a more restricted setting. In Stiglitz and Greenwald's (2003) model, there is an emphasis on the wealth effect, through which an increase in interest rates leads to a decrease in deposits. Since the wealth effect is relatively small in a competitive banking system, the effect of monetary policy is then weaker.

Using the Monti–Klein model, which is a Cournot model applied to the banking market, Freixas and Rochet (1997, Section 3.2) investigate the effects of the interbank rate on deposit and lending rates in an oligopolistic banking market. Their model suggests that a high degree of bank competition decreases the effects of the interbank rate on the lending rate. This implies that if the monetary authority changes the interbank rate as an instrumental target, greater competition in

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[1] For a literature survey on concentration and competition in banking, see Berger et al. (2004).

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the banking industry will lead to smaller monetary policy effects. This finding is the same as that of Stiglitz and Greenwald (2003).

On the other hand, Alencar and Nakane (2004) criticize earlier studies for only undertaking a partial equilibrium analysis, and instead investigate monetary policy under perfect competition and monopolistic competition by applying Townsend's (1979) costly state verification approach with a dynamic general equilibrium model. Their simulation demonstrates that increased bank competition causes the economy to be more sensitive to interest rates. This finding contradicts those of Stiglitz and Greenwald (2003) and Freixas and Rochet (1997). Moreover, Van Hoose (1985) shows that if the central bank targets monetary aggregates and uses the security rate as a policy instrument, changes in bank competition will have no impact on monetary control or the deviation of money from the target. Clearly, the policy implications of these theoretical models are not mutually consistent.

In this paper, we use cross-country data to examine the impact of bank competition on the effects of monetary policy. First, we construct indices of competition and the effect of monetary policy shocks for 22 countries (including developing countries), and investigate the correlation between these two variables. We approximate an index of bank competition by estimating Panzar and Rosse's (1987) *H*-statistic. This statistic lies between 0 and 1, with a higher value indicating greater competition. Since there are several studies that have estimated *H*-statistics for various countries, we average these figures and use them as the index of bank competition. For an index of monetary policy shocks, we use the cumulative impulse response function of the interest rate equation in a vector autoregressive (VAR) model estimated for each country.

Second, we use the financial statements of individual banks in each country to test the effects of monetary policy shocks on bank loans. Specifically, we regress bank loans on the *H*-statistic, an index of monetary policy shocks, and the interaction between these variables. The coefficient of the interaction denotes the magnitude of changes in loans of individual banks in a market with more intense competition following a monetary policy shock. Hence, testing whether the coefficient is significantly different from zero is equivalent to examining whether a change in bank competition influences the effects of monetary policy shocks on bank loans. To identify monetary policy shocks, we employ the residuals of the interest rate equation in the VAR. Because most previous studies on the effects of monetary policy shocks regard the disturbances of the interest rate equations as monetary policy shocks, our approach is thought appropriate. Using these two methods, our findings may provide new directions for the literature.

Incidentally, Adams and Amel (2005) study a subject that parallels the present study. They use U.S. data to test the impact of bank concentration on the transmission of monetary policy. They find that the effect of monetary policy on bank loans is weaker in concentrated banking markets. Their analysis differs somewhat from ours in some key areas. First, they use the Herfindahl Index as a measure of bank concentration, while we use an index of the degree of bank competition. As suggested by Claessens and Laeven (2004), the degree of concentration does not necessarily correlate with the degree of competition, so the analyses are not directly comparable. In addition, since the degree of competition, unlike the degree of concentration, can reflect contestability, it can more clearly represent the differences in market structure. Second, Adams and Amel use the FF rates as a monetary policy index, while we use the residuals of the interest rates equation in the VAR as monetary policy shocks. Most previous studies that use disaggregate data to investigate the effects of monetary policy employ money market rates per se as an index of monetary policy. However, if interest rates are influenced by changes in other macro-variables, including the rate of GDP growth, then the monetary policy effects may be overestimated. By contrast, we use a measure of monetary policy shocks, which eliminates variation in other macro-variables from nominal changes in interest rates. Therefore, our approach may more adequately grasp the effects of monetary policy. Third, Adams and Amel study only the U.S., whereas we focus on 22 countries. Looking at countries with different levels of development and banking systems allows us to obtain results that are more reliable.

The main result of this paper is as follows. In the analysis using aggregated data, we examine the effect of monetary policy shocks on bank loans, M2, the price level, and real GDP, but fail to find any relationship between these variables and the degree of bank competition. Even if we adjust for small sample sizes, this finding does not change. In the analysis using disaggregated data, we find that monetary policy shocks have an effect on credit, whereas high degrees of bank competition lead to lower effects of monetary policy shocks. In addition, although we conduct our estimation in various ways to confirm the sensitivity of the results, our findings remain robust. For instance, we introduce regional dummy variables for the U.S., Europe, and Asia–Oceania, and discover that the degree of bank competition weakens the effects of monetary policy shocks. Thus, our empirical results support the Stiglitz–Greenwald and Monti–Klein models.

The rest of the paper is structured as follows. In Section 2, we investigate the relationship between bank competition and the effect of monetary policy shocks. In Section 3, we use the financial data of individual banks to evaluate the relationship. In Section 4, we draw some conclusions.

2. Evidence using aggregated data

Impulse response functions and variance decomposition in VAR analysis are often used in studies on the effect of monetary policy shocks. To evaluate the relationship between bank competition and the effect of monetary policy shocks, one may introduce a variable representing bank competition into the VAR, however doing so leads to some problems in estimation. Although VAR analysis often employs quarterly or monthly data, it is difficult to estimate measures of bank competition at such high frequencies. In addition, the state of competition of the banking industry seems unlikely to change in the short term. Consequently, we apply an alternative approach: that is, assuming that both the state of bank competition and the effect