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REVIEW ARTICLE

THE ROLL OF BANK SIZE ON MARKET POWER

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The Roll of Bank Size on Market Power

Sumeet Saurabh

Research Scholar of Cmj University

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INTRODUCTION

One of the most prominent developments in the banking industry has been the strong worldwide consolidation observed during the past decades. This is rejected by a sharp fall in the number of banks, increased concentration, and the increased size of the largest banks both in absolute terms and relative to the smaller banks. These developments for the major economies during 1990-2005. The changes in market structure raise the question how and to what extent competition is affected by the expansion of the largest banks. Several studies predict a positive relation between bank size and market power, which they contributes to, for instance, the more dominant position of large banks relative to their smaller competitors. e.g. Monti and Klein , Jappelli , Freixas and Rochet , and Bikker andBos . An alternative view is that smaller banks tend to operate primarily on local markets where competition is often seen as weaker, whereas larger banks tend to operate more on national and international levels where competition is generally assumed to be stronger due to the impact of foreign banks . The latter view is supported by the empirical literature based on the Panzar-Rosse model, which establishes a negative relation between bank size and market power. For instance, Bikker and Groeneveld , De Bandt and Davis Bikker and Haaf , Hempell , Bikker , and Koutsomanoli-Fillipaki and Staikouras all and that bank competition increases with bank size.

With the contradictory results in the theoretical and empirical literature in mind, this paper explores a novel approach to assessing the relation between bank size and market power. Our starting point is the Panzar-Rosse (P-R) model, which is a popular method to assess competition in the banking industry. Seminal articles by Rosse and Panzar and Panzar and Rosse provide a convincing and convenient framework for analyzing the banking market structure. The P-R model uses bank-level data and measures how a change in factor input prices is rejected in equilibrium revenues earned by banks. In a situation of perfect competition, marginal costs and total revenues will increase by the same percentage as input prices. In a monopoly, however, an increase in factor input prices will raise marginal costs but reduce output and hence total revenues. Under certain assumptions, the P-R model provides a direct measure for the degree of competitiveness in the banking industry of a particular country, which is called the `H statistic'. This statistic is calculated from a reduced-form bank revenue equation and measures the elasticity of total revenues with respect to factor input prices. This paper extends the traditional P-R model by introducing a direct role for bank size. The P-R model is formulated as a quantile regression P-R model that estimates the degree of competition among the smallest banks, where ¿ can take any value in the range 0¡100. Moreover, these estimates are based on observations of all banks in a country, thus avoiding the small sample sizes that result from splitting up samples into size classes.

The results of this paper shed new light on the relation between market power and bank size. Based on a large sample of 17,476 banks in 101 countries over 16 years, comprising in total 112,343 bank-year observations, we and that different levels of competition exist in different size segments of the banking market. In particular, we show that market power increases with bank size ¡ a result that covers more than 85% of all banks in our sample and that is robust across 42 countries, including the world's major economies. Our findings confirm the theoretical strands of literature that predict a positive relation between bank size and market power, but contradict the conventional view in the P-R literature that competition increases with bank size. We relate the two conflicting conclusions to the observation that all published studies in this field employ a misspecied P-R model. As is demonstrated in Bikker et al. (2006), taking the interest income as share of total assets (the `price') instead of the absolute interest income (the `revenue') as the dependent variable in the P-R model leads to serious overestimation of the degree of competition in the banking industry. We show that this misspecication is also responsible for the erroneous conclusion that competition increases with bank size and use an appropriately specified model to assess the correct relation between bank size and market power. We distinguish two possible drivers behind the market power of large banks. The first is that size itself plays a major role. Large banks are likely to be in a better position to collude with other banks. Large banks may also benefit from their more established reputation. Furthermore, large banks are presumably more successful in creating fully or partly new banking products and services than small banks, e.g. because of economies of scale in product development. This enables them to exploit their monopolistic power, as is common in markets where monopolistic competition is the prevailing market structure.

The second explanation is that large banks tend to operate on different product and geographical submarkets. The wholesale market is characterized by tailor-made products and services supplied by a limited number of large banks only, which enables them to exploit a certain monopolistic power. The setup of this paper is as follows. It provides a brief overview of the theoreti- cal and empirical literature on the relation between bank size and market power.It introduces the P-R model. Next, it discusses the data sample used in the empirical part of this paper. Moving forward to it, we describe the empirical P-R model and extend this model with an explicit role for bank size. It discusses the estimation results and contains a robustness check on the empirical results. Subsequently, it explains why previous studies are misspecied and how this leads to incorrect assessment of the relation between bank size and market power. Finally, it concludes the paper.

LITERATURE REVIEW

A number of theoretical models describes the relation between bank size, average bank size, or concentration on the one hand and market power or market conduct on the other. At the same time, many studies assess the empirical relation between bank size and market power. We review some relevant contributions.

BANK SIZE AND MARKET POWER: THEORY

The theoretical model of Jappelli assumes that banks set loan market prices and that they face a given deposit rate on their liabilities. The authors zoom in on the Lerner index of market power, which measures the relative markup of the price over marginal costs. Since the discrepancy between product price and marginal cost of production is the core of monopoly power, this index rejects market power. In Jap- pelli's model, an increase in average bank size results in less competition, which Corvoisier and Gropp contribute to the more dominant position of large banks relative to their smaller competitors. The imperfect competition model of Monti and Klein is similar to the model of Jappelli and also assigns more market power to large banks. Freixas and Rochet discuss a comparable model, deriving an expression for the Lerner index in the loan and deposit markets. Although a different concept, concentration is to some extent related to bank size. Mar- kets become more concentrated when the number of banks decreases or when the skewness of the size distribution of banks increases . Therefore, we also mention some studies that relate concentration to competition. The Structure-Conduct-Probability (SCP) framework uses concentration as a proxy for market structure. The positive relation between concentration and projects within this model relies on microeconomic theory with collusion presumption added. The competitive form earns normal projects and the monopoly accumulates extra projects. In between these two extremes, collusion and the use of market power is easier the lower the number of firms in the market and the tighter the barriers to entry. Bain , Stigler , and Hannan . According to the SCP hypothesis, all banks respond similarly to an increase in market concentration, by strengthening their collusive behavior. As a result, they all benefit equally from such a change.

Two alternative theories suggest that the competitive environment of banks does not necessarily suffer from market concentration. The contestability theory states that a con- centrated banking market can still behave competitively, as long as the entry barriers for potential newcomers are limited . The efficiency hypothesis supposes that the most efficient banks gain market share at the cost of less efficient banks; Demsetz . In this case, bank efficiency is the driving force behind market concentration, resulting in lower prices, as in the case of higher competition. The SCP model presumes that all banks benefit equally from a high level of concentration. This assumption is relaxed in the Cournot model for oligopolistic collusion; see e.g. Bos and Bikker and Bos . The Cournot model focuses on individual banks' market shares, assuming that banks set a mark-up on prices rejecting their market power, which increases with the bank's market share.

2.2 BANK SIZE AND MARKET POWER: EMPIRICS

Where the theoretical literature is quite uniform in attributing more market power to large banks, the empirical literature provides also ample evidence for the opposite relation. Bikker and Haaf , analyzing bank competition in the European Union, divide the banks in each country into groups of small, medium-size and large banks based on their total assets. Subsequently, they estimate the standard P-R model for each country and size groups, obtain size-dependent values of the H statistic for each country and found that competition increases with bank size. Using a similar approach, De Bandt and Davis , Hempell , and Koutsomanoli-Fillipaki and Staikouras all confirm this result. A different approach is used by Bikker and Groeneveld . They document higher levels of competition when they weight each observation in the standard P-R model with bank size, which leads them to the conclusion that the market environment of the larger banks is more competitive.

Fernandez de Guevara et al. analyze market power in relation to bank size for European countries. These authors use the empirical implementation of the model of Jappelli as proposed by Corvoisier and Gropp . They establish a positive relation between bank size and market power, which they contribute to either cost advantages or to the capacity of large banks to impose higher prices. Fernandez de Guevara and Maudos apply the same model to the Spanish banking market and show that bank size has a significantly negative effect on market power. Additionally, they found that the relation between

market power and bank size is nonlinear. After a certain point, an increase in size increases market power. As a consequence, both small and large sized banks exercise more market power than medium-size banks. The authors argue that small banks may enjoy more market power because of their dominant presence in local markets, where their meshed branch network acts as an entry barrier. At the same time, large banks may be able to exercise market power because of their nation-wide dominant position. The empirical evidence on the positive SPC relation between bank concentration and protests is impressive, but weakens when other market structure variables besides concentration are added. Some papers report a negative impact of concentration on projects when market shares are added to the equation, Martin, Gilbert and Salinger. Where the SCP model usually ignores conduct and relates market structure directly to performance, several studies focus on the relation between concentration and competition, the first step in the SCP model.

Investigating several European countries, Fernandez de Guevara et al. do not find a significant impact of concentration on competition. By contrast, Bikker and Haaf found a significantly positive effect of various concentration ratios on market power, whereas Claessens and Laeven establish a significantly negative impact of concentration on market power. Finally, when explaining net interest margins, DemirgÄuc-Kunt et al. and evidence that relatively large banks ¡ measured in terms of market share i can exert market power to increase net interest margins. Surprisingly, bank size itself has a negative impact on margins in this study.