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Competition in fragmented markets: New evidence from the German banking industry in the light of the subprime crisis

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ABSTRACT

Of all of the EU member states, Germany has the largest banking market. However, not all German banking institutions necessarily face fierce competition. Because the industry is highly fragmented, strict separation of the three existing banking pillars may impede competition, with negative effects on financial stability. We assess the competitive stances of 1,888 universal banks from 2001 to 2009 by using the Panzar–Rosse revenue test. We find evidence that measuring competition at an average country level does not necessarily generate valid evaluations of fragmented markets. In addition, we find no clear indication that either the particular objectives of cooperative and savings banks or the legal protection of these institutions impedes competition or discriminates against private banks. Therefore, as long as the relationship between competition and financial stability is dubious, the overall effect and the social costs or benefits of political measures that influence the structure of the German banking market are at least questionable.
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1. Introduction

The current financial crisis has clearly demonstrated the importance of a stable financial system to economic growth and welfare. In this system, banks play a vital role because they attract short-term deposits from many small investors and grant long-term loans to borrowers. In addition, the banks' role as intermediaries allows them to provide liquidity to depositors while also protecting borrowers from the liquidity needs of their investors (Diamond and Dybvig, 1983; Diamond and Rajan, 2001). The banks' abilities to diversify by financing independent projects further reduces information asymmetry and the costs of delegation (Diamond, 1984) and enables banks to transform indivisible, illiquid and risky assets into divisible, liquid and (nearly) riskless liabilities. These transformation activities traditionally explain the advantage of financial intermediation. However, at the same time, they expose banks to the risk of runs in that the expectation of a bank's failure may, in the sense of a self-fulfilling prophecy, actually initiate the failure. Further, the failure of a single bank may have contagion effects on the whole banking system either by creating a panic among depositors or by affecting the interbank lending relationships.

In this context, large banks are of particular importance because their failure could pose significant risks to other financial institutions and the financial system as a whole. Specifically, a large bank's failure could trigger a systemic crisis that negatively affects the monetary system and real production (Diamond and Dybvig, 1983; Stern and Feldman, 2004). To ensure financial stability, those institutions considered as 'too-big-to-fail' might implicitly or explicitly be protected by public guarantees or subsidies, as observed during the subprime crisis.

The probability of default of a systemically important bank may depend on the degree of competition in the financial industry. According to the *charter value hypothesis,* banks facing a lower degree of competition can earn monopoly rents and will hold higher capital buffers to preserve those rents for the future. Consequently, increasing competition will erode rents, trigger excessive risk-taking (Besanko and Thakor, 1993; Boot and Greenbaum, 1993 and Hellman et al., 2000) and thus decrease financial stability. Though not undisputed (for a deeper investigation, see Carletti and Hartmann, 2002; Vives, 2010; Jiménez et al., 2010), this theory is supported by a significant number of empirical studies. For example, Keeley (1990) analyses the US banking market and finds that

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competition is negatively related to bank solvency and positively related to the perceived bankruptcy risk (measured as the risk premiums for uninsured certificates of deposits). He concludes that decreasing charter values induced by liberalisation and deregulation encourage risk-taking. Thus, he argues that increasing competition at least partially contributes to the fragility of the banking sector. Additionally, Beck et al. (2006) analyse data for 69 countries from 1980 to 1997 and support this view by finding that concentrated banking systems are less likely to experience systemic crises.

In contrast, Boyd and de Nicoló (2005) develop a theoretical model and claim that market power leads to higher loan rates, which, in turn, create moral hazards. Specifically, entrepreneurs will choose riskier projects and thereby lower the quality of banks' loan portfolios while simultaneously increasing bankruptcy risk. However, both studies rely on structural measures of competition, as they assess competition based on concentration measures (Beck et al., 2006) or the number of institutions in the market (Boyd and de Nicoló, 2005). Those measures are, in fact, a weak proxy for competition because they do not explicitly account for the conduct of banks, as mentioned by Shaffer (1982b) and empirically verified by Claessens and Laeven (2004) and Schaeck et al. (2009).

This shortcoming becomes even more important in fragmented banking systems, such as those in Germany or the US, where a large number of institutions operate in a specific local area with only a limited number of rivals. Those institutions may even operate as monopolists, a fact that remains undiscovered by those studies using structural measures as well as the multi-country studies using non-structural measures relying on the average degree of competition in a country. In particular, the German banking market is often criticised for being outdated and 'overbanked' by the Directorate-General for Competition of the European Commission and by large private banks. Especially savings and cooperative banks – also known as trustee savings banks and credit unions in other jurisdictions – often apply regional or territorial principles to their business models, which means that a specific local area, such as a city or administrative district, is reserved for an individual institution that is not directly competing with other similar institutions (through its network of branches) but is at least indirectly competing with other institutions of the respective pillar through other means, such as electronic banking (for a brief description of the German banking market, see Gischer and Stiele, 2009). The claim is that regional demarcation or a possible non-profit-maximising behaviour of the savings and cooperative banking group – in addition to the legal protection of these institutions provided by the rules governing their ownership structures – prevent a competitive equilibrium from emerging with negative effects on private banks. In this context, it should be noted that large private banks experienced significant losses during the subprime crisis and received partial governmental support, whereas small and medium-sized cooperative and savings banks seemed to play a stabilising role; these observations may be consistent with the charter value hypothesis.

Following this line of reasoning might create conflicts for political and regulatory decision makers, as they will struggle with a possible trade-off between competition and financial stability. Although financial stability may benefit because of hypothetical competitive advantages of cooperative and savings banks, this might also increase the risk of having to bail out large private institutions that suffer from competitive disadvantages. As a result, these banks may be unable to build up adequate capital buffers or may have incentives to take excessive risks, which might negatively affect financial stability.

The aim of this paper is to evaluate the degree of competition in the German banking industry and to reveal potential imbalances in competitive conduct. To that end, we complement and extend the existing literature on this issue in several respects. First, to the best of our knowledge, this study is the first since Lang (1997) to empirically investigate the competitive environment of universal banks in Germany. Analysing this issue is important because these banks provide a wide range of financial services to the entire German population and may therefore be more vulnerable to bank runs than more specialised institutions (e.g., savings and loan associations, business development banks, central institutions, specialised financing institutions or the so-called Landesbanken), whose inclusion in the sample could distort the results. Second, whereas previous empirical studies have assessed the average competitive stance of German banks within the context of multi-country studies, we will explicitly consider the high level of fragmentation in this industry by dividing the sample into characteristic groups according to the sector and size of the banks. In this manner, we will provide appropriate evidence addressing whether certain institutions show different competitive behaviours than others and whether the three-pillar structure of the market might generate competitive discrimination against private banks. Third, we will overcome the various methodological shortcomings of earlier studies. Unlike structural measures, the Panzar–Rosse revenue test allows us to explicitly assess the competitive conduct of banks. Further, because nearly all of the works applying this methodology to the German banking industry contain a critical misspecification or misinterpretation bias, the generalisability of their results may be limited. These problems create a need for further research to fill this gap. Fourth, this study is also the first to investigate how the experiences and various public rescue programs related to the subprime crisis have influenced the competitive stance within the German banking industry.

The remainder of this paper is structured as follows. Section 2 summarises the existing research techniques used to assess the degree of competition in a market. Section 3 briefly describes the Panzar–Rosse methodology used in this study and summarises the existing literature on this issue. Sections 4 and 5 contain the empirical model and the data used, respectively. The empirical results are presented and discussed in Section 6, and Section 7 concludes.

2. Measures of competition

The existing research techniques used to assess the degree of competition in a market can be divided into two major streams: structural and non-structural approaches (see Bikker and Haaf, 2000 for a detailed overview). As the name suggests, structural approaches aim to measure the degree of competition by examining the market structure with concentration ratios (e.g., the k-bank ratio, which is the share of assets held by the top k institutions) or indices (e.g., the Hirschman-Herfindahl Index). Those measures rely on the theoretical predictions of the traditional Structure-Conduct-Performance paradigm (SCP) of Mason (1939) and Bain (1956) and the efficiency hypotheses developed by Demsetz (1973) and Peltzman (1977).

Structural measures of competition may lead to theoretically and empirically ambiguous results for two main reasons (for a detailed overview, see Berger et al., 2004 or Shaffer, 2004): First, the contestability theory of Baumol (1982) raises questions about the linkage between the concentration of a market and the competitive behaviour in it. Second, according to Shaffer (2004), observed anti-competitive behaviour (i.e., the ability to set prices above marginal costs) may be caused by either conduct or efficiency.

Consequently, the structure of the banking market is a weak measure for drawing conclusions on competition or market power because *"competition is actually a property of conduct rather than structure"* (Shaffer, 1982b). This notion is also supported empirically by studies from Claessens and Laeven (2004) and Schaeck

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