# Introduction
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The goal of this *Handbook of Competition in Banking and Finance* is to provide a collection of state-of-the-art chapters on (1) the properties of the various approaches to measure financial-sector competition, (2) the level of actual financial-sector competition across countries, sectors and submarkets, and (3) the spill-overs of financial-sector competition to other sectors. The *Handbook*'s target audience consists of academic researchers, graduate students, policymakers, and solvency and anti-trust supervisors.

We have been invited by Edward Elgar to act as the editors of this *Handbook*. We were very keen to accept this invitation, because of our own past and more recent research experience. That is, during the past decade we have noticed a strong need among academic researchers and policymakers to capture the degree of financial-sector competition by means of a *single* statistic. Yet it is a very challenging task to map the complex and multi-dimensional concept of market power into a single measure. Furthermore, if such a one-dimensional statistic is flawed, this will affect any subsequent analysis based on the statistic. This may lead to incorrect policy recommendations and could seriously harm the welfare of consumers and firms. It is therefore crucial to measure financial-sector competition by means of reliable, well-established methods. This is, however, easier said than done.

The literature has already shown that not all measures of competition qualify as sound. For example, Bikker et al. (2012) and Shaffer and Spierdijk (2015) have recently proved that neither the sign nor the magnitude of the highly popular and frequently used Panzar–Rosse H-statistic can reliably identify the degree of market power. Yet many empirical studies still use this method to assess the level of banking competition and its impact on, for example, systemic risk (Anginer et al., 2014). Other well-established methods of market power also have certain limitations. It is important to be aware of these limitations and to discuss their implications for empirical work. One of the goals of this *Handbook* is to critically reflect on these problems, which is scarcely done in the existing literature.

This *Handbook* consists of four parts. The chapters in Part I discuss the characteristics of various measures of financial-sector competition. Part II contains several empirical studies of the level of – and trends in – financial-sector competition across countries. Part III deals with the spill-overs of market power to other sectors and the economy as a whole. Lastly, Part IV is about competition in banking submarkets and subsectors.

## I.1 MEASUREMENT OF FINANCIAL-SECTOR COMPETITION

Decades of theoretical and empirical research have contributed in numerous ways to the measurement of banks' market power and the change in the degree of market power in response to regulatory changes.

In Chapter 1, Sherrill Shaffer and Laura Spierdijk show that several of the most

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convenient measures of market power suffer from serious problems. The measure proposed by Hay and Liu (1997) and Boone (2008a, 2008b) cannot be unambiguously interpreted as reflecting the degree of market power without controlling for economies or diseconomies of scale. Faced with an ongoing and undiminished need to assess banks' market power, they advocate a focus on the handful of "least objectionable" measures. Among these measures are the Lerner (1934) index and the Rothschild (1942)–Bresnahan (1982, 1989)–Lau (1982) conduct parameter, which together provide well-established and easily understood measures related to policy-relevant aspects of market power according to formal models of firms and industries. The latter approach is most demanding in terms of data requirements and non-linear estimation techniques.

The theoretical literature has already shown that the Panzar–Rosse H-statistic is not a reliable measure of market power. Surprisingly, it is still a widely used statistic in empirical banking studies. Such studies persist in relying on the erroneous belief that H > 0 is inconsistent with significant market power. Chapter 2, written by Sherrill Shaffer and Laura Spierdijk, is the first study to provide strong empirical evidence against the latter perception by analyzing a US banking market that is a priori known to be a duopoly. They find "competitive" estimates of H but, consistent with a priori expectations, non-competitive outcomes according to an alternate measure of competition, the Lerner index. Moreover, their bank-specific estimates of the H-statistic are mutually inconsistent, suggesting additional problems with the Panzar–Rosse test. Their most important recommendation is not to use the H-statistic for the measurement of (banking) competition.

A frequently used approach to measure banking competition is the conduct parameter (or conjectural variations) method in the spirit of Rothschild (1942), Bresnahan (1982, 1989) and Lau (1982). Applications of this method make no structural distinction between financial and non-financial products. Yet financial products such as mortgages, consumer loans and SME loans differ substantially from non-financial products; an interest rate is not "the" price of a loan. In Chapter 3, Bastiaan Overvest adjusts the conjectural variations model to incorporate the net-present-value principle. He explicitly takes the characteristics of financial products into account. He shows that the adjusted method tends to yield higher estimates of market power than the conventional approach.

The focus of Chapter 4, written by Laura Spierdijk and Michalis Zaouras, is also on one of the "least objectionable" measures of competition mentioned in Chapter 1. The authors analyze the "other side" of the competition–risk nexus in a setting of endogenous bank risk. They express the Lerner index as a function of risk-related parameters and other determinants. Their main result is that banks' ability to raise prices above the competitive level depends, among other things, on the extent to which lenders respond to an increase in the loan rate by taking more risk. Their most important conclusion is that differences in Lerner indices may arise as a result of differences in banks' risk-taking behavior.

Empirical studies and related legal practice using concentration as a proxy for competition measurement are prone to a fallacy of division. That is, concentration measures are able to identify perfect competition and perfect collusion,[1] but fail to identify intermediate levels of market power. In Chapter 5, Jaap W.B. Bos, Yee Ling Chan, James W. Kolari and Jiang Yuan extend the classic Cournot model that has been used in the literature to derive the Herfindahl–Hirschman Index (HHI) of market concentration. They propose an adaptation of this model in order to remove the aggregation bias and omitted vari-

able bias that exist in many empirical studies. An application of their extended model to US commercial bank data (1984–2013) confirms that concentration measures are indeed unreliable competition metrics. This is in line with what Shaffer and Spierdijk observe in Chapter 1. The results of Bos et al. lead to the conclusion that their new critical mass indicator builds upon the HHI as a measure of market power. More specifically, their critical mass index incorporates competitive information that is not contained in the HHI. They discuss policy recommendations and implications for future research.

## I.2  EMPIRICAL RESULTS ON COMPETITION IN BANKING AND INSURANCE

The critical discussion of the properties of competition measures in Part I is followed by a discussion of empirical results in Part II.

Chapter 6, written by Martien Lamers and Victoria Purice, reviews the existing literature on the empirical measurement of banking competition across different regions of the world. Starting from competition measures based on market shares (such as the HHI), the field has by now primarily moved to the use of bank-level measures grounded in the New Empirical Industrial Organization (NEIO) paradigm. Examples are the flawed Panzar and Rosse (1987) H-statistic and the sounder Lerner index. Using the aforementioned measures, many researchers have observed a decreasing level of competition during the last few decades in all parts of the world. The authors confirm this trend using the World Bank's Global Financial Development database.

The recent financial crisis has affected the banking sector in several European countries, forcing them to embark on a process of restructuring. The resulting increase in market concentration may affect the level of banking competition. In Chapter 7 Juan Fernández de Guevara and Joaquín Maudos examine the impact of the crisis on banking competition in Europe's largest economies (2002–12). They use the Lerner index and the Boone–Hay–Liu measure to assess banks' market power in the loan market. The results show that market power increased in many countries after the onset of the crisis. However, this result is sensitive to the competition measure used. The widespread strategy to promote mergers and acquisitions (M&A) in response to the crisis may have had a negative impact on banking competition, yet it seems to have improved financial stability. Eventually, the net effect of increased banking concentration may be positive in terms of social welfare.

In Chapter 8, Zuzana Fungáčová and Laurent Weill use the Lerner index to analyze bank competition in China. They use a sample of 157 banks, covering the period 2004–14. Their findings are threefold. First, the degree of bank competition is low in comparison to what is observed in other countries. Second, no improvement in bank competition has been observed during the last decade. Third, the degree of bank competition depends on the type of bank. Foreign banks tend to have less market power than banks owned by public authorities. The researchers' results therefore support the view that pro-competitive policies like increased foreign bank entry and privatization could enhance bank competition in China.

Chapter 9, written by Jacob A. Bikker, investigates competition in the Dutch life insurance market by exploring unused scale economies during the 1995–2010 period. The key

assumption of this study is that unused scale economies reflect imperfect competition. Large unused scale economies exist for small and medium-sized life insurers, indicating that further consolidation would reduce costs. Over time, average scale economies decrease, while substantial differences between small and large insurers remain present. A direct measure of competition is provided by the relationship between efficiency and market share using the model developed by Hay and Liu (1997) and Boone (2008a, 2008b), and confirms that competitive pressure is lower than in other markets. No impact has been observed of increased competition from banks on the pension savings market, the so-called investment policy crisis or the credit crisis, apart from lower returns in 2008.

## I.3   SPILL-OVERS OF FINANCIAL-SECTOR COMPETITION

Competition in the financial sector has a great impact on the rest of the economy. That effect is the topic of Part III of this *Handbook*.

The traditional "competition-fragility" view postulates that increased banking competition leads to lower profit margins and reduced franchise value, which encourages banks to take more risk. Under the alternative "competition-stability" view, more market power in the loan market results in higher bank risk. That is, the higher interest rates charged on customers' loans make it harder to repay loans and exacerbate moral hazard and adverse selection problems. These two strands of the literature do not necessarily yield opposing predictions regarding the effects of banking competition on financial stability, though. Even if market power in the loan market results in riskier loan portfolios, the overall risks of banks may not increase. That is, banks can protect their franchise values by increasing their equity capital or by engaging in other risk-mitigating techniques. Allen N. Berger, Leora F. Klapper and Rima Turk-Ariss test these two theories in Chapter 10. Using data for 8235 banks in 23 developed nations, they regress measures of loan risk, bank risk and bank equity capital on several measures of market power and various control variables, including the Lerner index and the HHI. Consistent with the traditional "competition-fragility" view, their results suggest that banks with a higher degree of market power also have a lower overall risk exposure. The researchers' analysis also provides some support for one element of the "competition-stability" view – namely that market power increases loan-portfolio risk. Berger et al. show that this risk may be mitigated by higher equity-capital ratios.

Stochastic frontier techniques estimate the best-practice value of a firm's investment opportunities and the magnitude of a firm's systematic failure to achieve its best-practice market value – a gauge of the magnitude of agency costs. These frontiers are estimated from the performance of all firms in the industry and thus capture best-practice performance. Chapter 11, written by Joseph P. Hughes, Loretta J. Mester and Choon-Geol Moon, uses frontier measures of performance applied to 2007 data on top-tier, publicly traded US bank holding companies. Their study provides evidence on market discipline: higher managerial ownership at banks tends to align the interests of insiders with those of outside owners and is associated with improved financial performance. Furthermore, higher blockholder ownership tends to be associated with improved financial performance obtained from blockholders' monitoring. Finally, higher product-market concentration tends to be associated with poorer financial performance and the so-called managerial

quiet life. Using the frontier measure of investment opportunities, the authors show that banks with relatively higher-valued investment opportunities achieve less of their potential market value. At the same time, they find that banks with lower-valued opportunities achieve more of their potential value. Yet the latter banks achieve the same Tobin's q ratio and are thus better able to exploit less valuable investment opportunities. These results suggest that higher-valued opportunities may reduce managers' performance pressure and provide a stronger incentive to consume agency goods.

Although it is generally recognized that long-run competitive equilibrium is the most desirable market structure from a welfare perspective, banking markets represent an example of sectors where a competitive environment could turn out harmful. In the absence of any market power, banks are not able to collect enough information about borrowers and are therefore less willing to engage in lending relationships with their clientele. At the same time, these phenomena may have an adverse impact on their lending activity and hence on the performance of the economy as a whole. Neither the theoretical nor the empirical economic literature has reached consensus on the way banks contribute to economic growth. In Chapter 12, Paolo Coccorese surveys the existing literature on the relation between competition in banking markets and real economic activity. He additionally provides some new empirical evidence on this important topic.

The term "shadow banking" refers to credit intermediation outside the regulated perimeter of traditional lenders. Banks, however, do play a significant role in it. In Chapter 13, Daniele Titotto and Steven Ongena review the origins and characteristics of the shadow banking system. They investigate how banks control various steps of the securitization process and analyze its relation with competition. They use a multi-product Lerner index to disentangle the market power of lending and non-traditional activities and find important differences in the two indicators, consistent with prior expectations. The market power related to non-traditional activities is both larger in magnitude and more pro-cyclical than that of traditional lending. Their results suggest that banks might engage in less traditional business lines to alleviate the competitive pressure borne by core activities.

The interest-rate pass-through (PT) from the central bank's main policy interest rate to bank lending and deposit interest rates is central to monetary policy transmission. However, in many countries the effectiveness of the monetary policy is limited by a slow, incomplete and asymmetric PT. Within a currency union, the effectiveness of a common monetary policy is further restricted by the cross-country heterogeneity of the PT. Differences in banking competition are an important source of this heterogeneity, but not necessarily the only one. In Chapter 14, Stefanie Kleimeier and Harald Sander provide a review of the empirical PT literature and pay specific attention to the effects of banking market competition on PT. While the evidence for a positive impact of banking competition on the PT is overwhelming, empirical studies differ in terms of pass-through methodology and competition measures. A best-practice approach has yet to emerge. The authors advocate the use of various measures related to market power, such as market shares, the price elasticity of demand and conjectural variation. They also suggest combining the market power from both banks and non-banks, across different markets.

## I.4    COMPETITION IN BANKING SUBMARKETS AND SUBSECTORS

The final part of this *Handbook* pays attention to competition in banking submarkets and subsectors.

In Chapter 15 Richard J. Rosen and Gregory F. Udell explore the relation between competition in the banking market and lending to small and medium-sized enterprises (SMEs). The traditional market-power view and the relationship-lending view are both discussed, including the different empirical implications of these views regarding the impact of banks' market power on lending to SMEs. The discussion is presented in the context of the lending-technology paradigm (Berger and Udell, 2006), which emphasizes the differences in the methods of underwriting SME loans.

Chapter 16, by Wilko Bolt and David Humphrey, tests the ability of competition measures to distinguish between relatively high and low prices in four bank service lines: business and consumer loans plus savings and time deposits. The HHI and H-statistic often do not do better than random chance. A mark-up (which boils down to an approximate Lerner index) and a frontier-based competition measure do better. Furthermore, the authors show that the HHI is not predictive of realized price conduct and should not be used to assess or reject bank mergers. The challenge is how to use other measures to augment or replace the HHI in bank-merger policy.

In Chapter 17, Reint Gropp and Christoffer Kok build on earlier work by Corvoisier and Gropp (2009) and examine the role of internet banking in retail-banking competition. Their empirical analysis focuses on European banks for the period 2002–15. Building on the idea of contestable markets, they show that internet banking has increased competition through the contestability of markets. The effect is stronger for retail deposits, but recently consumer loans also show an effect. They attribute this finding to the advent of fintechs. These outcomes support the use of non-concentration-based competition measures in banking research.

In Chapter 18, the final chapter, Manthos D. Delis, Iftekhar Hasan, Sotirios Kokas, Liuling Liu and Nikolaos Mylonidis explore the impact of banks' market power on the provision of credit using bank-level data from 131 countries. Their findings reconcile the opposing views of the theory on this matter and indicate the existence of a U-shaped relationship between banks' market power and loan growth. Specifically, they observe that higher market power, as measured by higher values of the Lerner index, reduces loan growth in accordance with the traditional view in industrial organization. However, they also document that, after a certain threshold, a further increase in banks' market power results in greater credit expansion. This finding is in line with the information hypothesis of Petersen and Rajan (1995). The findings are robust to the inclusion of country-specific time effects and to alternative formulations of the Lerner index.

## NOTE

1.    This holds true as long as the concentration index describes a single market. This no longer holds true in a multi-country setting, since the value of the concentration index would then be dominated by the size of the country. For example, suppose that we compared the concentration indices of Germany and the USA

against those of Belgium and the Netherlands. A hypothetical merger of Belgium and the Netherlands would halve the index value without a similar rise in competition.

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