

Essays on Banking Competition

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„Das habe ich noch nie vorher versucht,
also bin ich völlig sicher, dass ich das schaffe.“

aus *Astrid Lindgren, Pippi Langstrumpf geht an Bord, 1946*

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Submitted research papers in chronological order

1. Herwald, S., Voigt, S. and Uhde, A. (2024). The impact of market concentration and market power on banking stability – evidence from Europe. *Journal of Risk Finance*, 25(3):510–536.
2. Voigt, S. and Uhde, A. (2026). The impact of market power on banks' ESG scores - evidence from Europe and North America. *Working Paper*, Paderborn University.
3. Voigt, S. (2026). The nexus of market power and female board representation in European banks. *Working Paper*, Paderborn University.

1 Motivation

The investigation of market power in banking markets is of central importance to both academic research and policy discussions. Banks play a pivotal role in financial intermediation, influencing the allocation of capital, the transmission of monetary policy and overall economic stability. The degree of market power in banking markets can shape pricing behavior (e.g. Bretschger *et al.*, 2012; Gropp *et al.*, 2011, Boyd *et al.*, 2004, De Nicoló *et al.*, 2004, Matutes and Vives, 2000), access to credit (e.g. Uhde and Heimeshoff, 2009; Dell’Ariccia and Marquez, 2006; Petersen and Rajan, 1995), risk-taking incentives (e.g. Uhde and Heimeshoff, 2009; Dell’Ariccia and Marquez, 2006; Petersen and Rajan, 1995) and the resilience of the financial system (e.g. Ijtsma *et al.*, 2017; Uhde and Heimeshoff, 2009). In light of structural changes in the banking sector, such as consolidation, regulatory reforms and political debates, reassessing the effects of banking market power is therefore timely and highly relevant. Consequently, the three submitted research papers included in this cumulative dissertation address distinct topics related to the effect of market power in banking markets, which are motivated as follows.

First, the need for greater consolidation within the European banking sector has been repeatedly articulated by regulators and supervisory authorities since the global financial crisis and the subsequent European sovereign debt crisis. Institutions such as the *Committee on the Global Financial System* and the European Central Bank emphasize consolidation as a key mechanism for addressing post-crisis challenges (Committee in the Global Financial System, 2018; European Central Bank, 2020; 2021). While consolidation is often regarded as a means to mitigate these challenges (e.g. low interest rates, high capital requirements, inefficiencies, refinancing constraints and foreign competition), its implications for financial stability warrant careful consideration. As this dimension has received comparatively limited attention, Herwald *et al.* (2024) contribute to understanding the relationship between consolidation, market power and financial stability in the European banking sector.

Second, and in addition to the aforementioned post-crisis challenges, regulators increasingly recognize concerns about the economic and financial impact of climate change, potentially destabilizing the banking sector (Basel Committee on Banking Supervision, 2021a; 2021b). They have emphasized the need to better align lending practices with climate-related financial risks (Basel Committee on Banking Supervision, 2022; 2023). Moreover, the European Banking Authority emphasizes that ESG considerations should be embedded in banks' governance structures and risk management frameworks, given their material implications for financial resilience (European Banking Authority, 2021). Existing empirical research suggests that the extent to which banks adopt ESG-oriented practices may depend on their degree of market power (Serino *et al.*, 2024; Bissoondoyal-Bheenick *et al.*, 2023) affecting moderation channels such as stakeholder discipline (Forgione and Migliardo, 2020). Against this backdrop, Voigt and Uhde (2026) empirically analyze the relationship between bank market power and their ESG scores, differentiating between loan market power and deposit market power as well as European and North American banking markets.

Third, the European Commission put forward the *Gender Balance on Corporate Boards Directive* (EU 2022/2381) in an effort to promote gender diversity in top management positions (European Commission, 2025). The directive proposes a ratio of 40 percent of the underrepresented gender among non-executive directors and 33 percent among all board directors for large listed firms in the European Union (European Commission, 2025). According to the *Special Eurobarometer on Gender Stereotypes*, in 2024, gender imbalance was more than twice as pronounced in member states of the European Union which have not taken 'substantial action' compared to member states that introduced measures (European Commission, 2025). Connecting the regulatory efforts and theoretical frameworks on the relationship between competition (as the opposite of market power), discrimination (Becker, 1957) and critical mass theory (Kanter, 1977a; 1977b), Voigt (2026) empirically investigates the effect of bank market power on the likelihood of complying with the directive.

The remainder of this cumulative dissertation is organized as follows. Section 2 of Part I provides an overview of the three submitted research papers, including details on scientific dissemination and the contributions of the respective authors. Parts II to IV present the submitted research papers of this cumulative dissertation in chronological order.

2 Summary of the submitted research papers

This section presents an overview of the three research papers submitted as part of this cumulative dissertation. Each of the following subsections provides a concise summary of the respective paper, outlining the identified research gaps, its contributions to relevant theoretical and empirical strands of literature, implications for policymakers and potential directions for future research. Table 1 reports the respective empirical methodologies, data sources and research questions. Table 2 to 4 present details on the workflow, contributions made by the individual authors and information on the scientific dissemination for each submitted research paper.

2.1 Herwald et al. (2024)

In Part II of this cumulative dissertation, Herwald *et al.* (2024) empirically investigate the relationship between market concentration, market power and banking stability.

Analyzing bank-level data for commercial, savings and cooperative banks in the EU-15, the authors contribute to several strands of the related theoretical and empirical literature. First, the paper at hand extends the discussion on the concentration-stability (Bretschger *et al.*, 2012; Gropp *et al.*, 2011, Boyd *et al.*, 2004, De Nicoló *et al.*, 2004, Matutes and Vives, 2000; Uhde and Heimeshoff, 2009; Dell’Ariccia and Marquez, 2006; Petersen and Rajan, 1995; Boyd and Prescott, 1986) and the concentration-fragility view (Boyd and De Nicoló, 2005; Caminal and Matutes, 2002; Goetz, 2018; De Nicoló *et al.*, 2004; Gropp *et al.*, 2011; De Nicoló and Lucchetta, 2009; Boyd and De Nicoló, 2005; Mishkin, 1999; Boyd and Runkle, 1993) by providing evidence for the concentration-fragility view when analyzing the effect of the HHI (as a structural concentration measure) on the z-score. Second, Herwald *et al.* (2024) also extend the discourse on the suitability of structural and non-structural measures as proxies for competition by advocating a dual approach combining both types of measures. The authors provide empirical evidence on the notion that market power does not necessarily correlate with concentration and may independently influence stability in the banking market. Third, as previous studies predominantly focused on the entire

Table 1: Overview of the submitted research papers

Research paper	Methodology	Data sources	Research questions
Herwald et al. (2024)	Linear (fixed effects) and system-GMM dynamic panel regressions	Moody's BankFocus, Barth et al. (2013), World Bank's WDI, ECB Statistical Data Warehouse	Do structural and non-structural measures yield consistent findings regarding their impact on banking stability? Does market power exacerbate or mitigate the effects of market concentration on banking stability? Do the empirical results support or reject calls for greater European banking market consolidation?
Voigt and Uhde (2026)	Linear (fixed effects) panel regressions	Moody's BankFocus, Barth et al. (2013), World Bank's WDI, ECB Statistical Data Warehouse, LSEG Data & Analytics	Does individual bank market power in the deposit and the loan market change the ESG scores (differently) for European and North American banks?
Voigt (2026)	Logistic (random effects) panel regressions	Moody's BankFocus, World Bank's WDI, ECB Statistical Data Warehouse, banks' annual reports (hand collected)	Does individual bank market power influence female board representation in European banks?

banking market, Herwald *et al.* (2024) consider the competitiveness of the loan and the deposit market separately by adapting the product-specific Lerner Index.

Extending the work of Forssbäck and Shehzad (2015), Herwald *et al.* (2024) employ the product-specific Lerner indices for the loan and the deposit market by using a comprehensive dataset of 3,943 EU-15 banks from 2013 to 2020 including commercial, savings and cooperative banks. The authors additionally address endogeneity issues between concentration, market power and stability and deconstruct the z-score into its components to directly assess the effects of concentration and market power on bank profitability, capital ratios and return volatility. Moreover, Herwald *et al.* (2024) make use of the zero lower bound and negative interest policy environment in Europe during their sample period to account for banks' pricing behavior during this period.

With regard to their baseline model, the authors regress both product-specific Lerner indices and the HHI on a bank's z-score, finding a negative impact of the structural concentration measure (HHI) and a positive impact of both non-structural Lerner indices on the stability proxy. Furthermore, a range of robustness tests is performed in order to validate the baseline results. In this context, Herwald *et al.* (2024) compute separate HHIs for the loan market and the deposit market and regress them together with the Lerner Index for the respective sub-market on the z-score. Potential endogeneity issues are addressed by employing a two stage-least square estimator and a system Generalized Methods of Moments (system-GMM) estimator in a dynamic panel model. To analyze the impact channels through which concentration and market power may affect stability, the z-score is deconstructed into its components. The authors additionally split the sample by banking groups to identify the type of business model which drives the baseline results and by the underlying interest rate regime to account for changes in the interest-rate pass through. Lastly, in the empirical analysis of

Herwald *et al.* (2024) interaction terms of the structural and non-structural measures are employed using different levels of the Lerner Index as a moderator.

Herwald *et al.* (2024) find that greater market concentration (measured by the HHI) reduces banking stability, whereas higher market power (measured by the product-specific Lerner indices) enhances stability. The weak relationship between concentration and market power challenges the traditional Structure-Conduct-Performance paradigm and suggests that mixed results in prior literature may partly reflect differences in measurement and variable selection. Breaking the stability measure down into its components further reveals that increased concentration tends to raise profitability and capitalization but also leads to higher return volatility, which ultimately dominates and hence reduces stability. By contrast, greater market power increases profitability and capitalization while simultaneously lowering return volatility. These effects appear particularly relevant for savings and cooperative banks operating in more regionally concentrated markets. Furthermore, the stabilizing effect of market power may be linked to the interest-rate pass through mechanism and loss-leader pricing strategies. Finally, the results suggest that the destabilizing impact of rising market concentration vary with the degree of market power held by banks operating within increasingly concentrated markets.

Building upon these findings, future research could use comparative analyses across regions or regulatory regimes to shed light on the role of supervision, capital requirements and monetary policy in moderating these effects. Further work could also examine micro-level outcomes, such as how pricing strategies affect loan quality, deposit rates and customer welfare. Lastly, employing alternative measures of competition and non-traditional indicators of market structures, including digital platforms and network effects, may provide a more comprehensive understanding of the mechanisms linking market structure, competitive behavior and banking stability.

Table 2: Herwald et al. (2024): Working process and scientific dissemination

Panel A: Workflow and contributions made by author
• Co-authorship with S. Herwald and A. Uhde (S. Herwald (45%), S. Voigt (45%), A. Uhde (10%)) • Idea and first concretization by S. Herwald and S. Voigt • Elaboration of the theoretical framework and literature review by S. Herwald and S. Voigt • Compiling of data by S. Herwald and S. Voigt • Conceptual development and implementation of the empirical methodology by S. Herwald and S. Voigt • First draft by S. Herwald and S. Voigt • Feedback, comments and corrections by A. Uhde and participants of the TAF Brown Bag Seminar • Revision due to comments by S. Herwald and S. Voigt • Additional statistical implementation for the referee reports by S. Herwald and S. Voigt • Response to the reviewer by S. Herwald, S. Voigt and A. Uhde • Research assistance by J. Bergmeier, D. Erhard, A.-L. Habig, S. Heuwinkel, M. Hoormann, T. Müller, L. Weigelt and C. Uhde
Panel B: Scientific dissemination
• The work on this paper started in October 2020 • Presentation of first ideas in the TAF Brown Bag Seminar in Paderborn (September 2021) • Presentation at the Fakultätsforschungsworkshop of Paderborn University in Melle (September 2022) • First draft in October 2022 • Submission to the Review of Finance (VHB Jourqual: A) in December 2022 • Receipt of the referee report (reject) from the Review of Finance in February 2023 • Submission to The Quarterly Review of Economics and Finance (VHB Jourqual: B) in February 2023 • Receipt of the referee report (reject) from The Quarterly Review of Economics and Finance in February 2023 • Submission to the Journal of Risk Finance (VHB Jourqual: B) in March 2023 • Presentation at the HypoVereinsbank Ph.D. Workshop in Bochum (April 2023; co-author)

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- Revision after comments from A. Uhde and workshop participants (May 2023)
 - Receipt of the first referee report (major revisions) in August 2023
 - Resubmission in September 2023
 - Receipt of the second referee report (minor revisions) in December 2023
 - Resubmission in December 2023
 - Accepted for publication in the Journal of Risk Finance in March 2024
-

2.2 Voigt and Uhde (2026)

In Part III of this dissertation, Voigt and Uhde (2026) analyze the relationship between market power and banks' ESG scores by employing a sample of 79 publicly listed European banks and 159 publicly listed banks in North America, with 770 bank-year observations for the European and 1,815 bank-year observations for the North American sample over the period of 2010 to 2021.

Voigt and Uhde (2026) contribute to prior empirical literature in several ways. To begin with, the authors add to the literature on banking competition and corporate social responsibility (Maside-Sanfiz et al., 2024; Forgione and Migliardo, 2020; Cicchiello et al., 2023) by shifting the focus from industry-wide competition to bank-specific market power as a determinant of ESG performance. Moreover, the study contributes to the literature on financial intermediation and stakeholder influence (Andrieș and Sprinean, 2023; Newton et al., 2022) by distinguishing between loan and deposit markets. Finally, the authors add to the literature on comparative financial systems and demonstrate how institutional and regulatory differences shape the relationship between market power and ESG engagement (Krivogorsky et al., 2011; McKeen-Edwards et al., 2006; Rezaee et al., 2023; Mueller and Sfrappini, 2025).

In order to empirically investigate the relationship between market power and banks' ESG performance, Voigt and Uhde (2026) employ a bank-fixed effects linear panel model with clustered robust standard errors at the bank level for their baseline analysis. As an additional robustness check, an analysis for a sub-sample of global systemically important banks (G-SIBs)

is performed. Furthermore, the authors control for potentially ESG related events (the aftermath of the Paris Agreement, the reemergence of the #MeToo movement and the COVID-19 pandemic) by splitting the sample on the basis of the respective years.

The analysis reveals that ESG performance in European and North American banks is shaped differently by the interplay of market power, regulation and regional factors. In Europe, higher loan market power is associated with lower ESG scores. This finding suggests that competitive pressure may foster ESG engagement, while higher market power could be detrimental to sustainability objectives. For North America, the authors find that higher deposit market power reduces ESG engagement, underscoring a limited effectiveness of depositor discipline in concentrated banking markets. With regard to the analysis of G-SIBs, the authors highlight the importance of accounting for systemic relevance when designing ESG regulatory standards. Voigt and Uhde (2026) empirically show that for European G-SIBs, loan market power weakens ESG scores, while higher deposit market power fosters them. The authors provide the explanation that the ESG score-increasing effect of deposit market power may stem from enhanced ESG investing due to reduced funding costs. In North America, loan market power is associated with higher ESG scores, suggesting strategic ESG engagement in a less strict regulatory environment compared to Europe. Overall, the findings in Voigt and Uhde (2026) highlight the need for coordinated sustainability policies. ESG enforcement should integrate sustainability regulation, competition policy and prudential supervision, adapted to regional market structures.

With regard to further research objectives, it would be valuable to study the long-term effects of evolving ESG disclosure standards, regulatory changes and market-based incentives. Additionally, future research could also examine technological innovation, digital banking and fintech competition and their effect on banks' implementation and disclosure of ESG practices. Concerning the limitations of Voigt and Uhde (2026), a more holistic approach of assessing

ESG performance in banks can be suitable, as ESG scores may not adequately capture banks’ sustainability practices regarding their credit portfolio.

Table 3: Voigt and Uhde (2026) Working process and scientific dissemination

Panel A: Workflow and contributions made by author
• Co-authorship with A. Uhde (S. Voigt (90%), A. Uhde (10%)) • Idea and first concretization by S. Voigt • Elaboration of the theoretical framework and literature review by S. Voigt • Compiling of data by S. Voigt • Conceptual development and implementation of the empirical methodology by S. Voigt • First draft by S. Voigt • Feedback, comments and corrections by A. Uhde • Revision due to comments by S. Voigt • Research assistance by N. Harding, S. Heuwinkel and M. Hoormann and E. Huhn.
Panel B: Scientific dissemination
• The work on this paper started in April 2023 • First draft in October 2024 • Revision after comments from A. Uhde in December 2025 and January 2026 • The paper has not yet been presented or submitted

2.3 Voigt (2026)

In Part IV of this dissertation, Voigt (2026) employs a unique sample of hand-collected board data of 220 large commercial banks in the EU-27 over the period from 2020 to 2024. The study empirically analyzes the relationship of market power on a bank’s likelihood of employing at least 33 percent female directors on its board. The choice of the research design is motivated by the gender diversity target set by the so-called Women on Boards Directive (EU2022/2381) which proposes a ratio of 33 percent of the respectively underrepresented gender among all board directors for large listed firms in the European Union (European Commission, 2025).

Voigt (2026) contributes to several empirical and theoretical strands of literature. To begin with, the study adds to the literature on market power and female board representation

(Chen *et al.*, 2018; Kamarudin *et al.*, 2021; Ashenfelter and Hannan, 1986) by investigating the effects of market power on the likelihood of reaching the gender diversity target of the EU Directive for banks across all EU-27 countries. Moreover, the theoretical discussion of this study situates the objective of the EU Directive within the framework of critical mass theory (Kanter, 1977a; 1977b) which offers a more nuanced examination of how varying degrees of group heterogeneity effects interaction patterns, power and decision-making outcomes. Lastly, Voigt (2026) extends the theoretical framework of taste-based discrimination (Becker, 1957) by investigating the nexus of higher market power (lower competition) and discrimination against women in the context of bank board membership.

Regarding the baseline model, Voigt (2026) employs a logistic random effects model with time dummy variables and standard errors clustered at the bank level to empirically investigate changes in the likelihood of reaching at least 33 percent women on a bank's board of directors due to increasing levels of market power. Additionally, several robustness checks are conducted to validate the baseline results. In this context, Voigt (2026) splits the sample of European banks based on listing status, systemic importance and quota heterogeneity respectively.

The analysis initially reveals a negative relationship between higher market power and the likelihood of having at least 33 percent women on the board of directors for the entire sample of European banks. As additional robustness tests reveal, this relationship is especially pronounced for listed banks and banks which are considered to be systemically important. Remarkably, the analysis of the heterogeneity in the existence of gender quotas in the bank's headquarter country reveals a statistically significant negative impact of market power on the likelihood of complying with the EU Directive only for banks headquartered in countries which have established any kind of corporate gender diversity target.

Future research could examine whether the observed relationship between market power and female board representation in banks persists after the full implementation of the EU Directive by June 30, 2026 (European Commission, 2025). In particular, the deadline for transposing the directive into national law was December 28, 2024 (European Commission, 2025), while the sample period of Voigt (2026) concludes the fiscal year 2024. As a result, the effects of binding national regulations and enforcement mechanisms may not yet be fully observable in the data of the study. It could therefore be interesting to examine how these regulatory changes affect the relationship between market power and gender diversity once they are fully implemented. Another compelling research objective could be to exploit cross-country variation and temporal variation in the transposition of the directive. With data on the fully implemented gender diversity targets in all EU member states, a difference-in-differences design could compare banks in early- versus late-transposing countries to isolate the effect of market power on binding gender quotas in light of strategic differences in the board composition.

Table 4: Voigt (2026) Working process and scientific dissemination

Panel A: Workflow and contributions made by author
• Single authored paper • Research assistance by B. Besch and N. Harding.
Panel B: Scientific dissemination
• The work on this paper started in December 2024 • Presentation of idea and first results at the HypoVereinsbank Ph.D. Workshop in Kiel (November 2025) • Revision after comments from A. Uhde and workshop participants (November 2025 to February 2026) • First draft in February 2026 • Revision after comments from A. Uhde in March 2026 • The paper has not yet been submitted

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