

GLOBAL VS. CONTINENTAL FINANCIAL MARKET INFRASTRUCTURES: A CROSS-JURISDICTIONAL PLS-SEM MULTI-GROUP ANALYSIS OF TRANSACTION COST ECONOMICS

DOI: 10.17261/Pressacademia.2025.1997

PAP- V.22-2025(1)-p.1-5

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To cite this document

Laudenbach, H. (2025). Global vs. continental financial market infrastructures: a cross-jurisdictional pls-sem multi-group analysis of transaction cost economics PressAcademia Procedia (PAP), 22, 1-5.

Permalink link to this document: <http://doi.org/10.17261/Pressacademia.2025.1997>

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ABSTRACT

Purpose- This study examines how transaction costs arise and differ across Global and Continental financial market infrastructures (FMIs) by applying a cross-jurisdictional Transaction Cost Economics (TCE) framework. Motivated by regulatory and technological transformation following MiFID II/MiFIR, the research analyzes whether the structural determinants of transaction costs vary between internationally integrated stock exchange groups and regionally focused market operators. The study employs Partial Least Squares Structural Equation Modeling (PLS-SEM) combined with permutation-based Multi-Group Analysis (MGA) to evaluate how infrastructure transactions, market economics, and infrastructure operations interact in shaping transaction cost outcomes.

Methodology- Two anonymized datasets were constructed from audited financial statements, trading statistics, historical listing archives, and industry factbooks covering 2012–2023. All variables were transformed using natural logarithms to ensure statistical comparability. The PLS-SEM results reveal consistently high explanatory power for both institutional clusters (Global FMIs: $R^2 = 0.995$; Continental FMIs: $R^2 = 0.975$), confirming that the TCE-FMI model effectively captures structural cost dynamics across jurisdictions.

Findings- The MGA findings identify significant cross-group differences in four of the five hypothesized relationships. Global FMIs exhibit markedly lower sensitivity of transaction costs to trading activity and stronger dependence on market economics, indicating greater scalability and stronger integration into international capital flows. Conversely, Continental FMIs remain more volume-driven, with operational structures that are more sensitive to fluctuations in trading intensity. Only the relationship between infrastructure operations and transaction costs shows no significant difference, suggesting a convergent operational cost architecture for personnel, technology, and overhead resources across jurisdictions.

Conclusion- Overall, the study demonstrates that regulatory frameworks and institutional scope materially shape the cost architecture of financial markets. Global infrastructures appear to benefit from broader market reach, automation, and technological maturity, while Continental infrastructures retain a more traditional, activity-dependent cost structure. These results extend Transaction Cost Economics to the context of modern digitalized FMIs and provide a replicable methodological design for future cross-jurisdictional research on regulatory transformation and market infrastructure governance.

Keywords: transaction cost economics, financial market infrastructures, PLS-SEM, multi-group analysis, MiFID II / MiFIR regulation

JEL Codes: G18, G28, D23

1. INTRODUCTION

In the years following the global financial crisis, regulatory reforms across major jurisdictions sought to reinforce market stability, increase transparency, and strengthen investor protection.¹ Within the European Union, MiFID I, MiFID II, and MiFIR emerged as central regulatory pillars, reshaping both the structural configuration and operational practices of financial market infrastructures.² These regulatory shifts influence not only the functioning of stock exchange organizations but also the economic mechanisms underlying transaction costs, infrastructure investments, and competitive dynamics.

At the same time, financial market infrastructures have become embedded in increasingly technology-intensive environments. Modern exchanges rely on digital process automation, cloud-based systems³, and advanced data architectures utilized for artificial intelligence

¹ Francioni, Freis and Hachmeister (2017), pp. 239-259

² Francioni (2017), p. 11; Geranio (2018), pp. 15, 22-23, 27-28, 35-51

³ Kun (2024), pp. 14-15

solutions⁴, which alter the cost structure of pre- and post-trading services. As a result, regulatory compliance and technological capability increasingly act as intertwined drivers of operational efficiency and institutional competitiveness rather than external constraints.

Against this backdrop, the present study examines how infrastructure transactions, market economics, and infrastructure operations shape transaction cost formation within two distinct jurisdictional groups – Global and Continental financial market infrastructures. Using Partial Least Squares Structural Equation Modeling (PLS-SEM) combined with permutation-based Multi-Group Analysis (MGA), the study evaluates whether these structural relationships differ systematically across jurisdictions and regulatory conditions. This approach enables a nuanced assessment of how MiFID II/MiFIR⁵ has transformed operational dependencies and transaction cost dynamics in technologically advanced financial market infrastructures operated by stock exchange organizations.⁶ Based on the conceptual framework, five sub-hypotheses are formulated for empirical testing within the MGA design.

2. LITERATURE REVIEW

The literature foundations of this study were developed through a structured, multi-phase review of research on transaction cost economics, financial market infrastructures, and the organizational characteristics of stock exchanges. A systematic search strategy was employed to identify relevant theoretical and empirical work, resulting in an initial dataset of 52,180 academic records. Following screening based on predefined inclusion criteria, 77 peer-reviewed publications published between 1998 and 2023 were retained.⁷ This body of literature provides a comprehensive overview of how transaction costs emerge within institutional settings and how financial market infrastructures evolve under changing technological and regulatory conditions.⁸

A significant portion of the reviewed literature examines the regulatory transformation of financial markets, particularly within the European Union. Studies focusing on MiFID I, MiFID II, and MiFIR highlight how transparency requirements, market structure reforms, and data-driven supervision influence trading behavior, operational processes, and cost formation within exchange groups. These regulatory analyses are complemented by supervisory assessments that document structural shifts in trading volumes, information products use, and cross-border market competitiveness.⁹

Guided by insights from the literature, the study develops the Transaction Cost Economics in Financial Market Infrastructures (TCE-FMI)¹⁰ framework, which conceptualizes the interplay among transaction costs, infrastructure transactions, market economics, and infrastructure operations. This framework supports a systematic investigation of how these constructs behave across different institutional contexts – here operationalized as Global versus Continental financial market infrastructures.

To operationalize the model, an extensive dataset was compiled drawing on audited financial statements, historical trading statistics, and factbooks published by stock exchange groups and industry associations. The dataset also incorporates archival sources such as historical listing records, secondary market documents, and corporate disclosures, covering the period from 2012 to 2023. These materials form the empirical basis for the cross-jurisdictional comparison conducted through PLS-SEM¹¹ and permutation-based Multi-Group Analysis (MGA).

3. DATA AND METHODOLOGY

This study applies the Transaction Cost Economics in Financial Market Infrastructures (TCE-FMI) framework to examine how transaction costs arise from the interaction of three latent constructs: Infrastructure Transactions (X_1), Market Economics (X_2), and Infrastructure Operations (X_3). These constructs jointly determine Transaction Costs (Y) and allow a structured comparison between Global and Continental financial market infrastructures in the post-MiFID II environment.

Infrastructure Transactions (X_1) capture the intensity of trading activity, measured through electronic order book (EOB) trading days, processed trades, and turnover across on- and off-order-book segments. Market Economics (X_2) reflects the economic scale and market scope of an exchange group, operationalized through market capitalization and the number of domestic, foreign, and total listings. Infrastructure Operations (X_3) represent internal cost structures, including personnel expenses, other operating costs, depreciation, and amortization, which together capture the operational capacity required to support trading, clearing, and settlement functions.

Transaction Costs (Y) are operationalized through revenue components linked to listing, trading, clearing, settlement, information services, indices, and connectivity solutions, providing a standardized proxy for the transaction costs faced by market participants.

To test the structural relationships among these constructs, the study applies Partial Least Squares Structural Equation Modeling (PLS-SEM). Given the observational nature of financial data, PLS-SEM identifies theoretically consistent associations rather than strict causal effects, and all variables are transformed using natural logarithms to improve scaling and distributional properties.

A Permutation Multi-Group Analysis (MGA) is then conducted to compare structural relationships between two anonymized institutional clusters – Global versus Continental FMIs – selected for their distinct market reach, technological maturity, and operational models. This

⁴ Tchunte, Lonlac and Kamsu-Foguem (2024), p. 9; Ghosh, Chaudhuri, Alfaro-Cortés, Gámez and García (2022).

⁵ COMMISSION-DELEGATED-REGULATION-(EU)-2017/567 (2017)

⁶ Bitz (2007), pp. 7-28; Williamson (1981), pp. 1537-1538; 1543-1551; Schmidt (1983), p. 187; Francioni (2017), pp. 15-70

⁷ Laudénbach (2025b)

⁸ Francioni (2017), p. 64; Benston and Smith (1976), pp. 228-229; Geranio (2018), p. 99

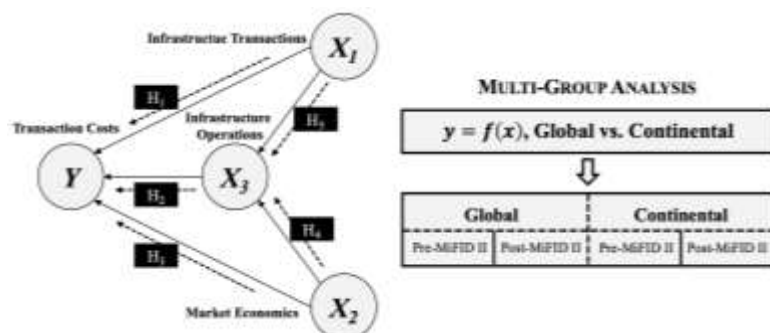
⁹ ESMA-50-165-1355 (2020)

¹⁰ Laudénbach (2025d); Laudénbach (2025c); Laudénbach (2025a)

¹¹ Hair Jr., Hult, Ringle, Sarstedt, Danks and Ray (2021)

cross-jurisdictional comparison enables the assessment of heterogeneous regulatory and strategic effects in European and international market infrastructures. Figure 1 represents the conceptual design of the TCE-FMI-Model.

Figure 1: The Theoretical Research – TCE-FMI-Model¹²



Based on the theoretical model and expected regulatory and technological differences between Global and Continental infrastructures, the following hypotheses are formulated:

- H₁: The impact of infrastructure transactions on transaction costs is significantly lower in Global financial market infrastructures than in Continental infrastructures, reflecting higher scalability and greater automation among globally oriented FMIs.
- H₂: The influence of infrastructure operations on transaction costs does not differ significantly between Global and Continental FMIs, indicating a convergent cost structure for personnel, technology, and operating expenditures across jurisdictions.
- H₃: Market economics exert a stronger influence on transaction costs in Global FMIs compared to Continental FMIs, reflecting the broader scale, higher international listings, and cross-border capital flows in globalized markets.
- H₄: Market economics have a significantly stronger effect on infrastructure operations in Global FMIs compared to Continental FMIs, driven by higher operational complexity, regulatory obligations, and data-related processing requirements.
- H₅: Infrastructure transactions exert a stronger influence on infrastructure operations in Continental FMIs compared to Global FMIs, reflecting greater operational sensitivity to trading activity among regionally focused exchanges.

4. FINDINGS: GLOBAL VERSUS CONTINENTAL

4.1. Explanatory Power of the Structural Model (R²)

The structural model demonstrates very high explanatory power in both groups. For the Global FMIs, the R² for Transaction Costs is 0.995, while for Infrastructure Operations value is 0.798. Similarly, the Continental FMIs show strong explanatory power with R² values of 0.975 for Transaction Costs and 0.862 for Infrastructure Operations. These consistently high R² values indicate that the TCE-FMI model captures the structural cost and economic mechanisms in FMIs with substantial accuracy across jurisdictions.

4.2 Relationship Between Variable Construct (β)

Across both groups, the estimated path coefficients reveal meaningful differences in how trading activity, operational load, and market structure influence transaction costs. Global FMIs exhibit a weak link between Infrastructure Transactions and Transaction Costs (β = 0.013), whereas this relationship is much stronger for Continental FMIs (β = 0.362). Conversely, Market Economics exert a substantially stronger effect on Transaction Costs in Global FMIs (β = 0.744) than in Continental FMIs (β = 0.378). These differences indicate that globalized infrastructures rely more heavily on market scale and listing breadth, whereas continental infrastructures remain more sensitive to trading intensity.

4.3 Measurement Model: Indicator Loadings

All indicators across both groups exhibit loadings well above the conventional 0.70 threshold, confirming strong indicator reliability. The constructs Infrastructure Transactions, Infrastructure Operations, Market Economics, and Transaction Costs consistently demonstrate high internal cohesion. This supports the robustness of the measurement model and confirms that the indicators appropriately reflect the underlying conceptual dimensions of the TCE-FMI framework.

4.4. Permutation Multi-Group-Analysis (MGA) with Permutation P-Value (PP) and Summary of Sub Hypotheses-Test Conclusion

The MGA results reveal statistically significant structural differences between Global and Continental FMIs for four of the five relationships. Significance is determined using the Permutation p-value (PP) at a 5% level. Table 1 and Table 2 summarizing the results.

¹² Authors own figure based on Laudenbach (2025d); Laudenbach (2025c)

Table 1: Permutation Multi-Group Analysis (MGA): Path Coefficients and Permutation Statistics¹³

Permutation Multi-Group Analysis (MGA) Path coefficients with Permutation P-Value	Original Global	Original Continental	Original Difference	Permutation Mean Difference	2.50%	97.50%	Permutation P Value
H ₁ : Infrastructure Transactions → Transaction Costs	0.013	0.362	-0.349	0.000	-0.160	0.160	0.000
H ₂ : Infrastructure Operations → Transaction Costs	0.277	0.294	-0.018	0.001	-0.182	0.178	0.853
H ₃ : Market Economics → Transaction Costs	0.744	0.378	0.366	-0.001	-0.127	0.123	0.000
H ₄ : Market Economics → Infrastructure Operations	0.472	0.252	0.220	0.000	-0.128	0.125	0.001
H ₅ : Infrastructure Transactions → Infrastructure Operations	0.482	0.707	-0.224	0.000	-0.123	0.124	0.000

Table 2: Hypotheses (H₁–H₅) – Global versus Continental¹⁴

Hypotheses (H _{1,g}) - Global vs. Continental	Permu. P-value (PP)	Result (PP-value)	Original Difference	Null Hypothesis	H-Test Conclusion
H ₁ : Infrastructure Transactions → Transaction Costs	0.000	Significant	-0.349	Rejected	Preliminary confirmed
H ₂ : Infrastructure Operations → Transaction Costs	0.853	Not significant	-0.018	Failed to reject	Not confirmed
H ₃ : Market Economics → Transaction Costs	0.000	Significant	0.366	Rejected	Preliminary confirmed
H ₄ : Market Economics → Infrastructure Operations	0.001	Significant	0.220	Rejected	Preliminary confirmed
H ₅ : Infrastructure Transactions → Infrastructure Operations	0.000	Significant	-0.224	Rejected	Preliminary confirmed

H₁: Infrastructure Transactions → Transaction Costs: Global FMIs show a significantly lower dependence of transaction costs on trading activity than Continental FMIs, indicating higher scalability and automation in global infrastructures.

- H₂: Infrastructure Operations → Transaction Costs: No significant difference exists between Global and Continental FMIs, meaning both groups share a similar operational cost structure for personnel, technology, and overhead.
- H₃: Market Economics → Transaction Costs: Market economics exert a significantly stronger influence on transaction costs in Global FMIs, reflecting their higher international integration and broader listing base.
- H₄: Market Economics → Infrastructure Operations: Global FMIs experience a significantly stronger operational impact from market size and listings, indicating greater complexity in managing large-scale, cross-border market structures.
- H₅: Infrastructure Transactions → Infrastructure Operations: Continental FMIs show a significantly stronger operational sensitivity to trading activity than Global FMIs, suggesting a less scalable operational framework.

The MGA findings reveal substantial structural differences between Global and Continental financial market infrastructures, with four out of five hypotheses supported. Global FMIs are more strongly shaped by market size and international listing dynamics, whereas Continental FMIs remain more sensitive to trading activity and operational load. Overall, the results demonstrate that globalized infrastructures benefit from greater scalability and automation, while continental infrastructures retain a more volume-dependent operational structure.

4.5. Limitations

A key limitation of this study arises from the required anonymization of institutional data, which, while necessary for ethical and confidentiality reasons, reduces contextual specificity and restricts direct comparisons across individual market operators or national environments. Moreover, potential endogeneity is inherent in observational financial data and cannot be fully resolved within a PLS-SEM framework; consequently, the identified relationships should be interpreted as associative rather than causal. Finally, the analysis includes only two institutional groups, limiting broader generalizability.

5. CONCLUSION

This study provides a cross-jurisdictional assessment of how transaction costs arise within Global and Continental financial market infrastructures by applying the TCE-FMI framework through PLS-SEM and permutation-based Multi-Group Analysis. The results demonstrate that while both groups exhibit consistently strong explanatory power, their structural cost drivers differ markedly. Global FMIs show a reduced dependence on trading volume and a stronger linkage between market economics and both transaction costs and infrastructure operations, reflecting higher scalability, broader market integration, and more advanced technological infrastructures. In contrast, Continental FMIs remain more sensitive to trading intensity and operational load, indicating a more volume-dependent cost structure.

Overall, the findings highlight that institutional scope, technological maturity, and market breadth materially shape transaction cost dynamics. The study extends TCE by illustrating how regulatory and technological environments condition the relationships among trading activity, operational complexity, and market scale. These results contribute to academic understanding of FMI cost structures while providing a replicable methodological template for future cross-jurisdictional research on regulatory transformation and digitalization in financial markets.

DISCLAIMER: Data Usage and Research Intent, Financial Instrument Projections, and Artificial Intelligence

Data Usage and Research Intent: This study relies exclusively on publicly available data and serves purely academic purposes. No business, strategic, or institution-specific conclusions are intended. The accuracy of external data sources cannot be guaranteed.

¹³ Authors own figure

¹⁴ Authors own figure

Financial Instrument Projections: Any references to financial developments are illustrative and based solely on historical information. Past performance does not predict future outcomes, and no responsibility is assumed for future market conditions.

Artificial Intelligence: Generative AI (ChatGPT-5.1, OpenAI) was used solely for linguistic refinement and clarity. All conceptual, analytical, and empirical components of the research were developed independently by the author.

COMPETING INTERESTS

Author has declared that no competing interests exist.

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