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## Electricity Market Coupling in Europe: Price Effects of Flow-Based Market Coupling Extension

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The European electricity market has made significant progress in liberalization and regional integration. These efforts aim to reduce costs, improve grid efficiency, and support decarbonization. One of the key tools in achieving these goals is Flow-Based Market Coupling (FBMC). FBMC replaces the older Net Transfer Capacity (NTC) method by using real-time physical grid constraints, rather than fixed capacity values, to manage cross-border electricity flows.

FBMC was first implemented in 2015 in the Central Western Europe (CWE) region, which includes Germany, France, Belgium, the Netherlands, and Luxembourg. In June 2022, the system was extended to 13 countries in Central Eastern Europe, creating the CORE Capacity Calculation Region (CORE CCR). This expansion is intended to enhance market efficiency by improving how cross-border capacity is allocated. It also supports greater price alignment across countries and encourages the use of renewable energy sources.

While the move to FBMC comes with numerous advantages, a few challenges have been posed by this transition. Policymakers and market operators support FBMC for its efficiency improvement potential (Schittekatte et al., 2020). The evidence is mixed from the expansion of the CORE region. For instance, Zachmann et al. (2022) demonstrate that price divergences in Eastern Europe, particularly in Poland, Hungary, and Slovakia, have either persisted or intensified since the FBMC rollout. This contradicts the theoretical expectations of harmonization.

This study aims to assess whether the extension of FBMC has achieved its intended effects over the CORE region- specifically in terms of electricity prices and market integration. Price impact evaluation is critical, especially in the context of the ongoing debate on the electricity market design and further market integration.

By incorporating post-expansion data from CWE to the CORE-Region, this study contributes new insights into the impact of FBMC on electricity prices and market integration. The study also uses high-frequency, hourly electricity price data to capture short-term price movements and congestion patterns, which are often missed in studies relying on daily or monthly averages (e.g., Corona, Mochón, and Sáez, 2022). In addition, it moves beyond the conventional focus on price convergence by estimating the causal effects of the CORE CCR expansion on absolute price levels and market value. Methodologically, the study applies both Regression Discontinuity (RD) and Difference-in-Differences (DiD) approaches to identify causal impacts. This dual strategy addresses endogeneity concerns and strengthens the reliability of the findings, improving on earlier studies that rely on a single method (e.g., Felten et al., 2021).

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