

Price adjustments and transaction costs in the European natural gas market

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Executive summary

Under the regulatory reforms promoted by the European Commission, hubs with high liquidity play an important role on market integration, reducing price uncertainty and the transaction costs of natural gas trade. Several empirical studies rely on the Law of One Price (LOP) to evaluate the effectiveness of natural gas market integration. Most of these studies do not consider a complete interpretation of what market integration stands for and do not assess transaction costs and price asymmetries.

This study contributes to the literature in different aspects. First, methodologically, when it explicitly models transaction costs in a market integration perspective. Second, it explores price equilibrium through a nonlinear modeling approach, exploring asymmetries that are not perceived by linear models. Finally, the methodological framework relies on a conceptualisation of market integration that is mostly applied in agricultural economics and could be explored by energy economic studies.

In this manuscript, an original method to analyze price asymmetries and the role of transaction costs on the northwestern continental Europe natural gas markets is applied. The method is based on the Threshold Vector Error Correction Model (TVECM) – a model that incorporates nonlinearities to the error correction processes by defining threshold variables that can capture arbitrage possibilities within the LOP. A sample comprising a full European gas year (from April 2013 to December 2014), with 456 observations for the Dutch TTF, the Belgian ZTP, and the German NCG hubs was used to test the hypothesis that asymmetric price responses in the continental European hubs are derived from transaction costs.

The main findings show that the short-term price dynamics suggests that departures from the LOP are quickly corrected for all the three markets. However, even with the German, the Belgian and the Dutch gas markets being integrated, the existence of price differentials implied a nonlinear behavior associated with transaction costs in the German market, characterized by vertically integrated firms.

Keywords natural gas prices; market integration; Threshold Vector Error Correction Model; transaction costs

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