

Market power and spatial arbitrage between interconnected gas hubs

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Executive Summary

In Europe, the restructuring of the natural gas industry has favored the emergence of a collection of wholesale markets, the “gas hubs”, interconnected throughout the pipeline network. Though these hubs were initially developed to cope with local network balancing needs, they turned out to become a source of gas procurement as the previously monopolized industry structure gradually became more fragmented. Crucially, EU-led reforms also allowed gas arbitrageurs to purchase intermarket transportation rights and compete to exploit spatial price differences between these interconnected markets. These spatial arbitrages are central to ensuring an efficient supply of natural gas, especially in the EU. Indeed, Europe is predominantly served by a small oligopoly of foreign producers and the spatial integration of the national wholesale markets can dilute the concentration observed in some countries within a wider economic market.

Defining and measuring spatial integration, though, is not straightforward. It is usually argued that two geographical markets for a tradable good are integrated if the spatial price difference between these two markets equals the unit transportation cost. However, empirically, assessing the spatial integration of wholesale gas markets remains a challenging task because price spreads could also reflect other factors, including transportation bottlenecks and, more importantly, oligopolistic pricing by the arbitrageurs. To overcome this problem, we define integration using the equilibrium notion that all spatial arbitrage opportunities between the two markets are being exploited, i.e. that price spreads are consistent with the traders’ profit maximization behavior. This notion is derived from the theoretical and modeling literature on spatial price determination.

This paper develops a new empirical methodology to assess the arbitrages between two regional markets for wholesale natural gas linked by a capacity-constrained infrastructure. This methodology is designed to (i) detect if these markets are integrated, i.e., if all the spatial arbitrage opportunities are being exploited, and (ii) decompose the observed spatial price differences into factors such as transportation costs, transportation bottlenecks, and the oligopolistic behavior of the arbitrageurs. Our framework considers the possibility that arbitrageurs have market power and incorporates a test for the presence of market power. It is thus able to distinguish between physical and strategic constraints to marginal cost pricing.

As an application, we use the spatial arbitrages conducted during the period 2003–2006 in the “Interconnector” pipeline which connects Europe’s two oldest spot markets for natural gas: the UK’s National Balancing Point and the Zeebrugge market in Belgium. This analysis provided us with an opportunity to obtain a series of original findings. The estimated probability of spatial market equilibrium conditions holding is very high, suggesting high degrees of wholesale natural gas market integration, consistent with previous research on IUK price co-movements. But, the empirical evidence also document the presence of imperfect competition in the observed spatial arbitrages. Although our discussion is centered on this specific infrastructure, it should be clear these results imply that some care is needed when interpreting the high degree of co-movements which is typically documented in the empirical studies conducted on European spatial market price data. Though these co-movements can be interpreted as objective signs of market integration, they do not necessarily reveal the existence of a perfectly competitive internal market.

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