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European gas hubs price correlation: barriers to convergence?

Executive Summary

Beatrice Petrovich

In the previous October 2013 paper 'European Gas Hubs: How Strong is Price Correlation?', integration of main European gas hubs appeared to have been more or less accomplished and supported the argument that prices at these hubs are the result of demand and supply forces. Hubs in the early stage of development, such as PSV and CEGH, in fact, were becoming more aligned over the time period analysed and it was therefore expected that, with more recent data becoming available, correlation scores would improve.

New evidence for 2H 2012 and January to October 2013 unexpectedly showed a drop in overall correlation, casting some doubts on whether the integration of the main European gas wholesale markets was in fact in place and that all hub price signals could be viewed as reliable. Analysis demonstrated periodical misalignments of some hubs and a degree of market segmentation (i.e. a subgroup of hubs which feature closely parallel price movements without being in line with those of the other hubs). In particular, there is a group of geographically proximate hubs that shows very good cross correlations: TTF, German hubs and ZEE. When focusing on this region, we see no decline in correlation from 2012 to 2013 and the correlation remains almost perfect.

Correlation against this "core group" decreases however for:

PEGS in 2H 2012, the correlation improves in 2013 but not back to the levels achieved in the beginning of 2012

PEGN, slightly in 2013

CEGH in 2H 2012 and, to a greater extent, in the summer of 2013.

PSV, whose correlation with TTF in 2013 is down again at 1H 2012 levels

NBP in 2013.

Moreover, the correlation between the Northern and Southern French hubs strengthens in 2013, and more interestingly, PSV-CEGH correlation increases in 2H 2012 and becomes strong in 2013.

Is this evidence of a slowing down in the process of wholesale market integration? Periods of extraordinary low correlation would not be an issue if they could be explained by a combination of local demand/supply shocks and identifiable temporary physical events preventing gas to flow from one hub to the other, such as planned maintenance. We argue that if there is a temporary shock to fundamentals in a market at the same time as physical disconnection and prices consequently delink, then this still supports the thesis that prices are the result of supply/demand forces.

However, some issues are raised when either the physical congestion is long-lasting or when the driving force behind de-linkages cannot be identified in shutdowns of the connecting infrastructure. In



the former situation, there may be an infrastructure capacity problem that needs to be addressed and possibly has not been undertaken due to high investment costs. If utilization rates were always near to 100%, this may indicate some un-met need for investment in incremental capacity. In this case, price integration is not observed simply because the markets are not interconnected.

The problem may also be due to non-physical barriers to cross-border trade. Such barriers are market imperfections that influence players' behaviours leading to suboptimal use of cross-border interconnection capacities which in turn prevents market players responding effectively to price differentials and eventually restoring good price correlation after a supply/demand shock.

Non-physical barriers include:

- * inconsistency in the adjacent market systems (for instance definition of interruptible and firm capacities not harmonised either side of the borders);
- * market power abuse (for instance capacity hoarding practices);
- * too high transaction costs or information asymmetry (for instance lack of transparency in the capacity allocation procedures, including possibly insufficient disclosure to market players regarding available capacity).

When this is the case, a revision of commercial arrangements and/or regulatory provisions to use transport capacity is required to alleviate the bottleneck.

Among the identified de-linkages those affecting NBP and PEGN proved to be the consequence of identifiable temporary lack of physical connections and so do not indicate a slowdown in the integration process. PEGS misalignment is instead the result of sub-optimal infrastructural physical capacity, suggesting that here pipeline capacity needs to be expanded to achieve integration, but perhaps there is no incentive or framework to do so. As mentioned previously, the need of further investment in the network has been identified and addressed.

Lack of reliable and consistent data on gas flows prevent us firmly concluding that non-physical barriers to integration and, in particular issues with capacity accessibility, were the driving force behind CEGH and PSV de-linkages. However, some evidence points in this direction. This being the case, we should consider whether further policy measures are needed to achieve the declared EU goal of gas wholesale market integration. In this debate, it is key to decide first whether a perfect correlation is needed to achieve the EU objectives and whether other metrics may be more adequate or desirable.

We argue that if all de-linkages may be explained by temporal physical constraints, ensuring constant alignment may come at too high a cost for society in terms of transport facilities. However, price de-linkages that persist due to market inefficiencies represent a poor use of assets for which investment has been made in the past, with consumers suffering a financial burden for such inefficiencies. We suspect this may be case with the CEGH and PSV de-linkages.

Therefore, if good price correlation is desirable, we pose the question as to whether the current EU initiatives for the Single Gas Market will solve these problems, by creating adequate incentives to expand interconnecting capacity and/or by solving contractual congestion problems and other non-physical barriers to trade.

We argue that the precondition to answering this question is having access to reliable evidence in terms of gas flows and interconnecting capacity at IPs. Some effort seems to be needed in this direction. Only reliable data and transparency allows the correct identification of these problems and consequently what is required to address them.

It appears quite probable (but not proven) that the changing scale and geographic pattern of LNG imports into Europe over the past four years and (possibly) the start-up of Nord Stream are triggers or at least mitigating factors in creating/exposing such bottlenecks and their expression in the form of price de-linkages. It is quite possible therefore that a return to an equally well LNG-supplied Europe in the future could alleviate such bottlenecks, at least for a while.



However, debottlenecking intervention and remedy perhaps should be viewed as a necessary ongoing cost to allowing arbitrage to function in an inevitably evolving supply pattern situation. The EU Regulators and system operators may still have work to do to eliminate barriers to cross-border trade, in particular the non-physical ones.

About the Author

Beatrice Petrovich is a Research Fellow at the Oxford Institute for Energy. Beatrice joined the Institute in November 2012, after conducting research with the Gas Programme in August 2012 focusing on European gas hubs. Beatrice is currently based in Milan where she works as a researcher with REF-E. Beatrice holds an M.Sc in Economics from the University of Milan-Bicocca and is an alumna of the Erasmus Programme at the University of Glasgow.