THE DETERMINANTS OF TRADING IN EUROPEAN GAS HUBS

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Overview

Gas wholesale markets are being restructured throughout Europe in order to foster liquidity, competition and market integration. Following the efforts by the European Union to promote market liberalisation and integration natural gas hubs are increasingly developing, there are continuous regulatory improvements and increased transportation capacity and interconnection between countries. The creation of new, market-based balancing rules has been a further step towards hubs' development. The adoption of a unified code for balancing activities, as required by EU legislation (EU, 2009), should further enhance the integration and the efficiency of European spot markets. The economic rationale behind these reforms is that the more players are in the market, the more search costs and transaction costs are reduced and competition increased. However, the mere existence of the hub does not guarantee the presence of an efficient market: it is equally important that alongside the creation of hubs an adequate market structure is designed for the market to perform efficiently. The fundamental expression of market performance is its liquidity, i.e. the ability of the market to convert a physical commodity or asset into cash without any price discount.

Anecdotal evidence on volumes traded within European hubs shows that the countries which have actually reformed their gas balancing systems according to the marked-based solution envisaged by EU and ACER have actually increased their traded volumes. However, to our knowledge, there is no empirical study that proves that this increase is the direct consequence of such policies. The causal relationship that we want to investigate is the one between marked-based balancing and traded volumes (TV) in European hubs.

The development of a liquid wholesale gas requires defining and implementing a set of rules and mechanisms that are crucial to its success. The aim is to exploit, through commercial transactions, the flexibility margins that the different sources of injection and withdrawal put at disposal. The specific solutions are therefore conditioned by the different features of the national gas systems in terms of flexibility tools (imports, production swings, line-pack, storage, interruptible demand). The most adequate regulatory framework to translate physical flexibility into commercial flexibility requires to address quite similar issues, including the definition of a transmission system model, the design of the balancing rules and the setting up of transparency requirements. As Miriello & Polo (2014) highlight, together with a proper regulatory framework, the natural endowment of a country also matters in defining the development of gas transactions. The availability of gas supply not constrained by long term contracts obligations, that constitutes the primary source to fuel the liberalisation process in its early stages, is larger where local gas production plays an important role in the overall supply to the system. The issue of supply is an understudied topic in the debate on gas market liquidity, despite the fact that having a reliable but flexible supply of gas is an essential condition for the effective development of a dynamic wholesale market. If a market supply is rigid, the creation of a competitive market will be more complicated. Diversifying the country's supply is thus a strategy to enhance both security of supply (as the recent Russia-Ukraine crisis has well highlighted) and the development of a competitive wholesale market.

This paper analyses the policy impact of European Commission's reform on the wholesale natural gas market for a selection of European countries, focusing on the volumes of spot transactions.
In particular, the paper tests the following questions:
-        Is there a causal relationship between EU policies for marked-based balancing and markets integration and development of short term trading?
-        How is this related to the structure of supply and to the existence of LTC?

Methods

The research questions will be addressed empirically, building the testable propositions on the theoretical analysis carried on by Miriello & Polo (2014). We build a unique dataset, for the hubs of seven countries (Austria, Belgium, France, Germany, Italy, Netherlands, United Kingdom), using monthly data from 2008 to 2014. We build an

econometric model to test whether the determinants of the development of wholesale markets are the ones suggested by the literature and anecdotal evidences.

Data are collected from a wide variety of sources in a unique dataset, which includes (but it is not limited to): traded volumes; prices (chiefly focusing on OTC market data as, in general, OTC remains the predominant source of trading in Europe, however where relevant we also consider the exchange price); physical volumes; consumption; production; import and LTC data; regulatory regimes.

Our identification strategy consists of comparing the pattern of traded volumes at hub level for countries which have adopted the policy change and countries which have not, using the differences-in-differences estimation popularized by Card and Krueger (1994). This strategy entails comparing the difference between the outcome of the population which has adopted the policy change (treated population) with and without treatment, given that we cannot observe both outcomes for the same hub at the same time. The assumption that we make is that the policy change (D) has caused the change in the variable of interest (traded volumes, TVi, where i is the hub), and therefore that, in absence of the policy change, the outcome is determined by the sum of a time invariant state effect s (given by a country's endowment of gas, internal demand etcetera) and a year effect, t, that is common across states. Therefore, the observed traded volumes are given by:

$$TV_{ist} = \gamma_s + \lambda_t + \delta D_{st} + \varepsilon_{ist}$$

The coefficient that we want to estimate is $\delta = E[TV_{1ist} - TV_{0ist}|s, t]$.

Results

We expect to find a positive effect of market-based balancing regimes and traded volumes. Such volumes tend to develop in gas hubs close to final users and corresponding to the different national gas systems. Hence, we expect more dynamic hubs in gas systems where local production is significant. The relation between wholesale markets and the final demand for gas is ambiguous. Intuitively, these two variables should be related, but this does not necessarily happen in wholesale markets.

Our results all point to a strong policy effect of market-based balancing and, in general, EU policies for gas markets development and hubs development, suggesting that the development of trading within European Union has been largely policy driven. Our results differ according to the groups of treated countries and according to the different timing of policies implementation, but are always significant. Including countries with a certain available supply (namely, Netherlands and UK), greatly influences the results, suggesting that the initial endowment of countries and their supply availability also matter in the development of spot trading.

Conclusions

We analyse the determinants of formation of wholesale gas markets in Europe, on the basis of country regulations, without overlooking the importance of physical endowment. Gas transactions in short term wholesale market have been traditionally motivated by balancing needs and subsequently by second sourcing needs with respect to traditional import channels. Regulation and appropriate policies can dramatically smoothen this process; it is not by chance that the first country who introduced a wholesale market has been the UK, i.e. the first European country that liberalized its energy markets. The emergence of many fragmented market operators which needed to balance their positions has given impulse to the creation of the National Balancing Point and the creation of the Flexibility Mechanism, that has served as a paradigm for all EU reforms of the gas market. Our results point out that EU policies are being so far successful, when correctly implemented, in fostering spot trading.

References

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