Discussion of "Market Power Across the Channel: Are Continental European Gas Markets Isolated ?" by O. Massol, TIGER 2014

Michel Le Breton

Toulouse School of Economics

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What this Paper Tries to Achieve ?

It develops en empirical methodology to assess the arbitrages performed between two regional markets for wholesale natural gas linked by a capacity-constrained pipeline system. This methodology is designed:

- To detect if markets are integrated i.e. if all arbitrage opportunities are being exploited and
- To decompose the observed spatial differences into factors such as transportation costs, transportation bottlenecks and the oligopolistic behavior of the arbitrageurs.

The method is applied to the interconnector pipeline which connects two oldest spot markets for natural gas. It is concluded that arbitrage opportunities between the two zones are being exploited and that market power is present.

- The paper consists of a theoretical background, an empirical methodology and an application.

Road Map of My Discussion

- How the theoretical background looks like ?
- How the econometrics (empirical strategy) looks like ?

How the theoretical Model (Background) Looks Like ? The key Ingredients

Two regional markets related by a capacited transportation infrastructure
Competive consumers and producers
Competitive (Case A) *or* Monopolistic Arbitrageurs (Case B)

How the theoretical Model Looks Like ?

Case A : Arbitrageurs are "price takers". If there was no capacity constraint, the price differential would equal to the transportation cost. In case of congestion, the price differential is distorted by a factor. We could instead let the price to regulate the access to make sure that the price differential is just matched by the new transportation cost. Here, this is not what is done. Here, the price differential remains the same and only a fraction of the demand is satisfied.

How the theoretical Model Looks Like ?

Case B: Arbitrageurs behave collectively as a monopoly. The authors write down the first order conditions
Price differential = transportation cost + 2 terms (constant $\times$ volume of trade 'market power component)+ positive variable (congestion component)

How the theoretical Model Looks Like ?

The FOC lead to a taxonomy of several mutually exclusive trade regimes . The authors propose in fact to cross two criteria:
Criterion 1: marginal profit to spatial arbitrage (the sign can be either 0, + or -)
Criterion 2: Trade Flow Considerations (0 or +)
Some (in fact 3) regimes of these $3 \times 2 = 6$ regimes are inconsistent with their theory. The authors add a seventh regime also inconsistent with their theory.

Minor Points: #1

Why do you call the case described by equations (1), (2) and (3) perfectly competitive ? In these case arbitrageurs receive two signals : a price signal τ_{jit} and a quantity signal K_{jit}. Since the price τ_{jit} is rigid, we are not in a Walras like situation but in a Benessy-Drèze fixed price equilibrium setting. Another option to deal with the capacity constraint could have been to adjust the price until the arbitrage opportunity is cancelled. In your fixed price story, the rationing process selects some *happy few* arbitrageurs who end up making some money out of that.

Minor Points: #2

The previous point is (may be) not so minor as it call the attention on two things:

- The importance of the mechanism to allocate access to the capacity infrastucture when the constraint is active : priority rights, reservations, randomness, auctions,...In the current paper this dimension is occulted as the arbitrageurs are described as an *aggregate representative agent*.
- The necessity of describing the heterogeneity across the arbitrageurs. What is strange is that you recognize this heterogeneity in the empirical part as on pages 9-10, you assume that the marginal arbitrage cost can be decomposed into an observable portion and an observable one which is assumed to be explained by a vector of observable exogeneous factors. It is true that none of them on page 15 (in your empirical analysis) is idiosyncratic but in principle some of them could.

Minor Points: #2 continued

If arbitrageurs were heterogeneous in terms of transaction costs, then it would be important to describe in details how the rationing mechanism works. Rationing could be efficient or instead random. As far as I can see, the equations describing the equilibrium are sensitive to the scenario which is considered. I suspect that the econometrics of the model will then also be sensitive to that.

Less Minor Points: #3

In your model, there is a unique player : the arbitrageur. In one case, he is non strategic (price-taker up to the correction suggested in minor point #2) and in the other case he is strategic (he anticipates the impact of the volumes on the prices in the two markets; in finance, this is called a liquidity effect). In contrast, the suppliers and the consumers are totally non strategic.
To be honest, I would have opted for a model where the suppliers are strategic and the arbitrageurs are not strategic. A Stackleberg game where first, the suppliers in both markets select their prices (or outputs) and then then arbitrageurs respond. The arbitrageurs are modeled in that alternative model as a continum of negligible actors without market power. Solving backward means of course that the suppliers anticipate rationally the reaction of the arbitrageurs.

Less Minor Points: #3 Continued

I started to work out the equilibrium equations of this new model in the case where there is one monopolistic supplier. As far as I can see (I have not completed the algebra as there are also several regimes) the equations are not same. Again, I would suspect that the econometric approach would be impacted too.
Why should I prefer your model to the one that I suggest ? Dont you think that the data should decide among the two ? If so, how to do it ?

The Econometrics : What the Authors do

The authors have considered 7 regimes in which the system can be (each regime itself can be either competitive or monopolistic in their terminology)
The authors estimate (maximum likelihood equation (23)) both the parameters θ of the model (there have several versions more or less sophisticated) and the vector λ of probabilities of the different regimes.
They use a data set : daily transaction price data for day-ahead wholesale natural gas traded during working days (the authors honestly report what they did concerning trade flows and capacity utilization.

The Econometrics : Questions and Suggestions

Among the regimes there are some which are inconsistent with your equilibrium theory ! You even addd one ! Why ? On table 4, I can see that the estimated probability of being in that regime is 2.5% ! We have a model where the equilibrium could be of type1; type 2,...., type 7 depending upon behavioral parameters and exogeneous random and non random variables. This is the way I understand the econometrics of fixed price equilibria in the eighties (Fair and Jaffee, Ito, Quandt, Laroque, Gourieroux, Laffont, Monfort,..).

The Econometrics : Questions and Suggestions

Why not to do the same here...?
Could the authors elaborate more on the likelihood density of marginal profit from spatial arbitrage (equation (23)).
Dont you think that scholars in international economicss have already developed empirical strategies to evaluate the respective weights of alternative explanations of commodity price differential across countries : transportation costs, barriers to trade (quotas, taxes,..), imperfect competition, Is it not the case that an import quota is the same thing as a congested pipeline ?