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RUSSIAN MARKET POWER ON THE EU GAS MARKET: CAN GAZPROM DO THE SAME AS IN UKRAINE?

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Overview

In the course of 2006, Russia's gas monopolist Gazprom more than doubled the gas prices charged to Ukraine, Georgia, Moldova and Belarus. In the case of Ukraine, Gazprom enforced the price increase by effectively cutting off gas supplies to Ukraine for the first few days of 2006. The interruption was also felt in several EU countries and sparked political concerns about the EU's dependence on Russian gas: are European gas consumers exposed to the abuse of market power by Russia? In other words, is Europe at risk of undergoing forced Russian gas price increases and/or supply disruptions, similar to what happened in Ukraine? This paper aims to answer this question. At the same time, the paper assesses whether Europe should make specific investments (in particular, investments in strategic gas storage) to reduce its vulnerability.

Methods

The market for gas imported from non-European suppliers is described using a partial equilibrium model, in which risk-averse European consumers conclude long-term gas contracts with Russia and with a range of other non-European suppliers[1]. Inspired by the recent events in Ukraine, *Russia* is assumed to be unreliable, and is therefore modeled to have a certain probability δ of 'defaulting', i.e., suddenly reducing supply and increasing the price monopolistically above the price fixed in long-term contracts. European consumers can anticipate Russia's unreliability by contracting more gas from the *other (non-European) suppliers* instead of from Russia. These other (non-European) suppliers are modeled together as one monolithic player and are assumed to be reliable. The assumption of reliability is a strong one, but it can be justified because non-Russian gas will increasingly be imported through LNG, which is costly but offers diversified – and hence more reliable – access to a large range of potential gas sources.

Besides purchasing gas from other non-European suppliers (i.e., *diversification*), the set-up of this paper provides Europe with another tool to reduce its vulnerability: investment in *strategic gas storage*. Stored gas can be used as a short-term buffer in case of supply reductions by Russia. Other potential measures such as import tariffs and quota are not considered, given that the landmark paper of Nordhaus (1974) describes storage as the specific response against supply insecurity. Storage and diversification are also emphasized in the section on supply security in the recent energy policy communication of the European Commission (2007). Given this European interest in strategic gas storage, this paper assumes that the decision to build storage capacity is made by an overarching European government. The decision is assumed to be made before any of the contracts with Russia or the other (non-European) suppliers are closed.

The model is thus structured as a game in three stages: (i) EU decision to build storage; (ii) differentiated Cournot competition between unreliable Russia and reliable other (non-

[1] Note that this excludes Norway, which is considered equivalent to an internal EU supplier.

European) suppliers; (iii) Russian 'default' or Russia sticking to its contracts, with probabilities δ and 1-δ, respectively. Russia and the other non-European suppliers are considered risk-neutral profit maximizers, while Europe has a utility function with constant relative risk aversion. EU consumer demand for imported gas is assumed to be linear, as is typical in literature such as Von Hirschhausen et al. (2005). Elasticities are obviously different between short and long run.

Results

Analytical results are derived from a Cournot-Nash duopolistic equilibrium between the suppliers, and the model is calibrated to produce realistic numerical results for the EU25, based on 2005 market data and actual long-run marginal production and transportation costs. Figure 1 shows the evolution of gas quantities and prices as a function of the 'default' probability δ.

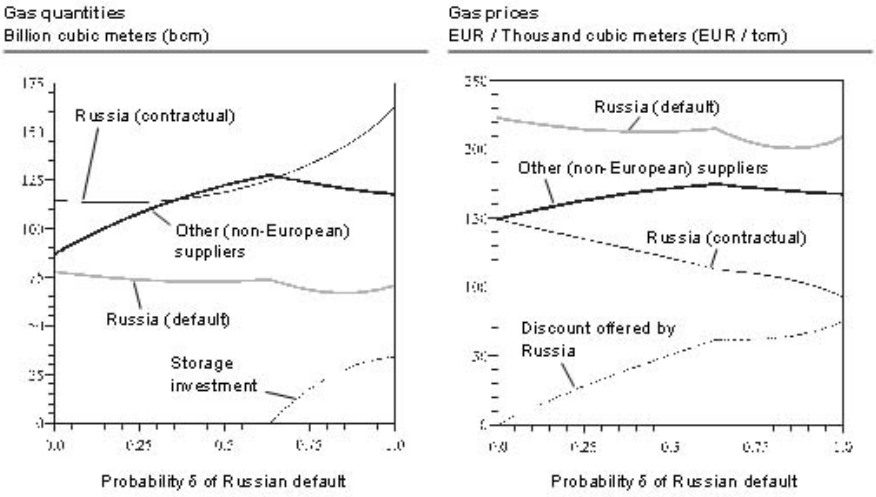

Figure 1: Gas quantities and prices for EU25 as a function of Russian default probability δ

Note that when Russia defaults, its optimal price increase – for reasonably low levels of the default probability δ – is only ~50%, and the corresponding quantity decrease only ~1/3, i.e. no full supply interruption. Based on the results of figure 1, it can be shown that Russia's expected profits (i.e., a weighted average of contractual and 'default' profits) decrease monotonically with increasing δ. Finally, the evolution of quantities and prices as a function of the ratio between long-run and short-run elasticity is similar to figure 1.

Conclusions

The results show that Russian market power is limited, because demand is not completely inelastic, even in the short run. Moreover, as Russia's default probability increases – or European short-run demand elasticity decreases – Russia gives away more and more of its expected profits to the other suppliers. The reason is that Europe buys more gas from these other suppliers, while at the same time Russia needs to give a steep discount on its gas contracts to compensate for unreliability. For Europe, buying gas from reliable suppliers (at an appropriate price premium) is more attractive than building storage capacity. The latter option turns out to be 2-3 times too expensive to be a viable alternative, unless Russia's

default probability is extremely high, or European short-run demand elasticity is extremely low.

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