



Cartelization in gas markets: Studying the potential for a “Gas OPEC”[☆]

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ABSTRACT

Natural gas is increasingly important as a fuel for electric power generation as well as other uses due to its environmental advantage over other fossil fuels. Using the World Gas Model, a large-scale energy equilibrium system based on a complementarity formulation, this paper analyzes possible future gas cartels and their effects on gas markets in a number of regions across the world. In addition, scenarios related to lower transport costs and decreased unconventional gas supply in the United States are considered.

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1. Introduction

Natural gas markets are currently in the process of dramatic changes, such as globalization of these markets (EMF, 2007; Huntington, 2009), rising shares of LNG trade and spot contracts (WEO 2008, IEA), and, last but not least, a substantial increase in the prospects of unconventional gas supply (Potential Gas Committee, 2010). These changes will alter the playing field for natural gas producers worldwide, and one particular question is whether cartelization in the international gas markets may arise and if so, what kinds of impacts it may have.

In 2001, the Gas Exporting Countries Forum (GECF) was founded in Tehran, as an international body representing the interests of gas-producing nations. Ever since, there have been regular speculations about whether GECF would turn into a gas cartel like OPEC, i.e., a so-called gas-OPEC (Hallouche, 2006; Jaffe and Soligo, 2006; Wagbara, 2007). GECF consists of 11 member countries, including the three biggest in gas reserves: Russia, Iran and Qatar. It also has member

countries in Africa and Latin America.¹ Together, in 2009, GECF accounted for 64% of remaining gas reserves, 34% of current gas production, and 41% and 54% of current pipeline and LNG export, respectively (BP Statistical Review of World Energy, 2008).

The mission of GECF is to “identify and promote measures and processes necessary to ensure that Member Countries derive the most value from their gas resources”, and to “promote the appropriate dialog among gas producing and consuming countries to ensure (...) fair pricing for both producers and consumers” (www.gecforum.org) (Fowler, 2009). This mission can be interpreted in various ways, and recent statements from different member countries show disagreement about issues like coordinated supply cuts.² Currently, however, the two most important member countries Russia and Qatar seem reluctant to such suggestions.³

¹ The current members of GECF are (in descending order of reserves): Russia, Iran, Qatar, Nigeria, Venezuela, Algeria, Egypt, Libya, Bolivia, Trinidad and Tobago, and Equatorial Guinea. In addition, there are two observing members, Norway and Kazakhstan. (Source: www.gecforum.org, accessed June 2, 2010).

² For instance, prior to the GECF meeting in April 2010, Algeria called for coordinated cuts of gas production by GECF members, but this was not agreed upon at the meeting (WGI, 2010).

³ Although Iran has somewhat bigger gas reserves and production than Qatar, its gas consumption is large and currently at the same level as its gas production, implying that Iran is not a net exporter of gas at the moment. This could change in the future if Iran manages to increase its production and export capacity.

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Russia, Iran and Qatar together hold about half of the world's remaining gas reserves, and their positions will obviously determine whether GECF will turn into an effective gas cartel or not in the years to come. More generally, the effectiveness of any gas cartel (GECF or not) will depend on the decisions made by these countries. Both Russia and Iran are also big consumers of natural gas, and it is not in the interest of these countries to raise their *domestic* gas prices above their alternative costs of gas. Thus, what is relevant here is their exports of gas and how export cuts may influence on export profits. Furthermore, this could free up more gas supply for domestic consumers, possibly reducing gas prices within GECF countries.

The question analyzed in this paper is how a potential cartelization of international gas markets could affect these markets in the coming decades. We first consider a gas cartel consisting of the GECF member countries. Then we expand the cartel to also include the Caspian region and subsequently the rest of the Middle East, too. Our aim is to investigate whether such a cartel could significantly alter regional gas prices and production/consumption. Additionally, to what degree the cartel members may benefit from cartelization is examined. The answer to the latter question may be important for the likelihood of a future gas cartel.

Some gas consumers are concerned that a gas cartel will become as effective as OPEC has been in the crude oil market, resulting in higher gas prices due to curtailed production. Comparing GECF to OPEC, there are both similarities and differences to be aware of. First, Middle Eastern countries are central in both organizations. However, whereas Saudi Arabia is the dominant country in OPEC, Russia is the most important country in GECF (see discussion of Russia and “gas-OPEC” in Finon, 2007). Second, both GECF and OPEC have a majority of remaining global reserves, and a large but not majority of global production. Third, the gas market has some important characteristics that differ from the oil market, which affect the impacts and likelihood of cartelization (see below). Finally, OPEC did not play a significant role in the oil market the first decade after it was founded, and now GECF is heading towards its 10-year anniversary.

One important difference between the oil and gas markets is that transport costs are much higher for gas than for oil. As a consequence, it has been more common to talk about regional gas markets than a global gas market. In addition, gas sales in Europe and Asia have been dominated by long-term contracts, with only a small share of spot sales. Similar market structure is true also in the United States where long-term contracts dominate over spot market sales. Volumes of LNG purchased in spot market are low but show relative increase in market share. In 1987 the share of international LNG trade was 1.5% while in 2002 it increased up to 8% (Brito and Hartley, 2007). The current trend, however, is towards a more globalized gas market with more spot sales, partly due to lower costs of LNG transport over the last decade. Nevertheless, the significant transport costs have some important implications for the cartelization issue. First, it presumably implies that the effects of cartelization will differ across regions, as regional prices will differ because of the transport costs. For instance, the U.S. market is located further away from most GECF countries than the European and Asian markets. Furthermore, the United States is no longer expected to import significant amounts of gas in the coming decades, which was the common thinking a few years ago (see below). Thus, we should expect less impact in the U.S. market than in the European and Asian markets.

Second, the gains from cartelization will not only depend on the total cut in supply from the cartel as a whole, but also how much each member country cuts back. For instance, it could be the case that it is optimal for the cartel as a whole that one member cuts back its production substantially whereas another member hardly at all, if they export gas to different regions. Clearly, this makes it more challenging to share the cartel benefits compared to in the oil market, where OPEC's total revenues are more or less unaffected by which

member country cuts back on supply.⁴ If transfers of profit are difficult to agree upon, divergence of interests among cartel members could put an additional restriction on the cartel's optimal behavior. Thus, several authors have argued that effective cartelization in the gas market may not be readily accomplished (Energy Business Review, 2005; Finon, 2007; Finon and Locatelli, 2008). Others have argued against this, positing that the natural gas “troika” composed of Russia, Iran, and Qatar could “produce more natural gas at a much cheaper cost for the U.S. market, effectively shutting down the Barnett Shale and other similar resource plays” (Fort Worth Business Press, 2008).

The likelihood of a gas cartel obviously depends on how the gas market develops over the next years and decades. Here it is important to emphasize two important drivers for the future gas market: unconventional gas and gas transportation, and to investigate how sensitive the impacts of cartelization may be to the development of these two factors.

Recently, the role of unconventional gas has greatly increased due to engineering advances such as hydraulic fracturing and horizontal drilling (NPC, 2007).⁵ The projected role of shale gas in particular, especially in the United States but also elsewhere (Skagen, 2010), has lately been a major force in the increasing prominence of unconventional gas. In 2008, Cambridge Energy Research Associates indicated that this unconventional gas production could help delay by a decade the United States' need for substantial LNG imports (The Economist, 2008). Indeed, the Potential Gas Committee has concluded that the United States proved reserves of gas increased from 2006 to 2008 by a huge 35.4% from 43,387 to 58,739 billion cubic meters (Potential Gas Committee, 2010). Others such as the petroleum geologist Art Berman are more cautious about the ultimate supply due to the economics of producing shale gas (Cohen, 2009) or steeper decline rates for shale wells (Steffy, 2009). Additionally, there are also environmental risks with drilling for shale gas having to do with elevated levels of benzene in the water (National Public Radio, 2009a,b) potentially due to the fracturing process for shale gas. These environmental considerations may inhibit future shale production. Indeed, the U.S. Congress has introduced two bills to

“require the energy industry to disclose the chemicals it mixes with the water and sand it pumps underground in the fracturing process, information that has largely been protected as trade secrets.” (Propublica, 2009)

These bills could have wide-ranging effects on the gas industry.

This rise in unconventional gas should be contrasted with a similar anticipated large increase in liquefied natural gas (LNG) trade worldwide. In order to reach demand regions often far from the supply location gas must be shipped by pipeline or increasingly as LNG. As indicated in Fig. 1, LNG's share of inter-regional gas trade is anticipated to rise, with the International Energy Agency forecasting that more than 60% of internationally traded natural gas will be shipped as LNG by 2030 (WEO 2008, IEA). The increase in LNG trade observed over the last couple of decades is partly due to cost reductions in liquefaction and shipping during the 1990s and a few years into the new century (see for example, Jensen, 2004). Since then, LNG costs have risen along with the general cost increase in the energy sector. If transportation costs should start to decline again, relative to other supply costs, the international gas market may become more integrated than today.

A natural question is how will these two trends—increased unconventional gas supply and increased LNG trade—affect the global

⁴ Of course, different costs of extraction can imply that it is more profitable for the cartel as a whole that the high-cost producers cut back (this applies to both gas and oil).

⁵ Unconventional gas is defined as gas from tight sands, coalbed methane, and gas shales, and covers more low-permeability reservoirs that produce mostly natural gas (no associated hydrocarbon liquids) (NPC, 2007).

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