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Is the Ukrainian-Russian Gas Consortium in the Economic Interest of Ukraine?

Executive Summary

Our paper analyzes the economic effects of the recently concluded gas consortium between Russia and Ukraine, which aims at the joint management of the Gas Transit System (GTS). In particular, we are concerned about whether or not this decision is in the economic interest of Ukraine given expected changes on the market for natural gas in Western Europe. We therefore use a model in which Russia competes with Norwegian and Algerian gas exports on the European market, and where Ukraine sets its transit fee either a) separately from Russia (as it is currently the case); or b) jointly with Russia within the consortium. For a projection period between 2010 and 2015 we find that:

- Increased competition within the EU weakens both Russia and Ukraine, as Algeria and Norway will expand their market shares.
- Higher bypass capacities around Ukraine (56 bcm through Belarus) are favorable for Russia but cut profits for Ukraine by almost 50%.
- An expansion of demand levels in Western Europe slightly benefits Ukraine, but expected gains are not high enough to compensate for losses from the two previous effects.

The aggregate outcome of all those developments is that if Ukraine continues setting transit fees separately from Russia its annual net profits will drop by around USD 80 m compared to 2001. In contrast, operating the GTS jointly within a consortium will reduce transit costs thereby allowing for higher volumes. As a result, overall profits of the pipeline will increase so that both, Russia and Ukraine can make higher profits than in 2001. Assuming that Ukraine receives an appropriate share of those joint profits, additional annual revenues might exceed some USD 500 m. At the end, we discuss necessary conditions to ensure such a fair and transparent profit-sharing agreement between the two countries. In particular, we emphasize that the entire gas transit system should be operated by a separate legal entity with full access to all

pipelines and well-defined obligations for both sides. Furthermore, gas transit through Ukraine needs to be separated from gas deliveries to domestic markets and an additional external investor should—if necessary—be included on the basis of a competitive tender based on investment plans and revenue expectations proposed by potential candidates. Finally, returns from the consortium to Ukraine's budget need to be specified in a transparent way.

1. Introduction

In fall 2002, Russia and Ukraine signed an agreement on the creation of a consortium for the management of the Ukrainian Gas Transit System (GTS). A techno-economic study on investment requirements is currently under way, as are discussions of including a third, Western partner into the consortium. The economic effects of the consortium on Ukraine are debated controversially. The German Advisory Group (GAG) and the Institute for Economic Research (IER) have already analyzed the consortium,[1] but so far the analysis was qualitative only. This paper provides the first quantitative estimation to-date on the economic effects of the consortium, taking into account the context of European competition. Section 2 sketches out the point of inception, Section 3 presents our model of the GTS, Section 4 discusses our simulations and interprets the results, and Section 5 summarizes and concludes.

2. Point of Inception—A Changing Environment

The European gas market is among the fastest growing in the world, and also one that is increasingly dependent on imports. Import dependency is expected to rise from the present 40% to almost 70% by the year 2020. For the time being, Russia is clearly the dominant supplier of gas, and Ukraine has been, until 3 years ago, the only transit path of Russian gas towards Western Europe. The rent of this transit activity for Ukraine is huge, estimated at about USD 650 m to 700 m annually (around 1.6% to 1.8% of GDP).

However, the situation has changed for two structural reasons:

First, Russia is actively seeking alternative transit routes to Europe. It has finished the Yamal-Europe pipeline through Belarus into the EU, and is currently studying, together with Finnish and German partners, a pipeline through the Baltic Sea into North Germany

[1] See policy paper S 21 "The EU Natural Gas Market and Ukrainian Policy on Russian Natural Gas Transit", and several earlier papers cited therein.

(Vyborg-Greifswald). Thus, the Ukrainian position as a transit country is substantially weakened.

Second, the liberalization of the European gas market is proceeding slowly but surely, and it is likely to bring about changes in the supply situation as well: Competition between the main suppliers, i.e. Norway, Algeria, and Russia will be enhanced. Liberalization should lead to decreasing transportation costs within Europe through the introduction of "open access" according to the EU Directive). This is likely to lead to higher competition levels in a market where monopolies prevailed before. For example, Algerian gas can now travel all the way to Berlin, where Russia was monopolist before. On the contrary, Russian gas can travel down to Bordeaux, previously Algeria's "backyard".

The growth of Liquefied Natural Gas (LNG) imports may prove to be an additional element of competition. LNG is slightly more expensive than pipeline gas, but costs are coming down (whereas pipeline gas prices are going up). LNG also offers higher flexibility of supply. An intensification of international trade is expected, eventually even including a spot market. Though the role of LNG for EU imports is currently small (5%), it is rapidly rising. Already, LNG plays an important role in specific countries such as Italy, Spain, and France.

All in all, the role of Russia as the swing supplier to Europe is likely to diminish, and so will the role of Ukraine as the transit country. Basically, Ukraine is now facing the option to either continue its strategy of a monopolistic transit country, or to adapt to the changing context and pursue a more cooperative strategy with respect to Russia and the European Union countries. The economic consequences of these strategies are analyzed in the next section.

3. Model, Results and Interpretation

3.1 Background

As we argue in a previous paper,[2] the future **profitability** of Ukraine's GTS is determined by **sales perspectives** of Russian gas in Europe as well as by the **transit strategy** chosen by Russia:

Sales perspectives of Russian gas are determined by two key developments on European markets:

A) **Expansion of European demand**: According to the relevant forecasts, the exit from nuclear energy as proposed by European leaders will incur a dramatic expansion in demand for natural gas. The official EU forecast states that natural gas consumption of current EU members and applicant states will increase from 504

[2] The EU Natural Gas Market and Ukrainian Policy on Russian Natural Gas Transit – Will Ukraine Be a Gas Bridge to Europe?", S21, February 2003.

bcm in 2000 to 646 bcm and 880 bcm till 2010 and 2030, respectively. In a long-run forecast by the International Energy Agency (IEA) natural gas demand in the EU is projected to grow from 442 bcm in 2000 to 812 bcm in 2030.[3] At the same time natural gas consumption in 30 European countries (except former USSR) will be in a range 758-889 bcm depending on the GDP growth rate in 2020, as the Energy Information Administration (EIA) predicts.[4] Undoubtedly, such expansions will also strengthen the sales perspectives of Russian gas. This view is fully confirmed by expert evaluations. E.g., the IEA estimates that inter-regional net trade flows will more than double.[5]

B) **Increased competition** on the European gas market: During the past 30 years the structure of European gas markets has transformed towards a more mature level where the need to extract profits in order to finance large initial investments (e.g. for distribution networks etc.) has diminished as such projects have been amortized. Hence, competitive pressure is increasingly gaining importance and continuous liberalization of the gas market has become an official target of the EU Energy Council. With respect to the sales perspective of Russian gas in Europe—crucial for the profitability of Ukraine's GTS—this basically means that a switch from traditional long-term take-or-pay contracts to spot market transactions will increase the competition between Russia and other exporters, mainly Norway and Algeria. Given that for Russia, extraction and especially transportation is much more costly and that gas supply is less flexible, Norway and Algeria are expected to expand their market shares at the expense of Russia.

Russia's **transit strategy** depends on the availability of alternative options to transport gas to European markets. Since 1992, Gazprom approved a number of projects to bypass Ukraine. The largest existing bypassing transit route—completed at the end of 1999—goes through Belarus. In 2001 Russia exported 17 bcm of natural gas through this pipeline and its planned capacity is scheduled to reach 28 bcm per year in 2004. In addition, the construction of an additional trunk line will allow expanding the capacity to 56 bcm.

All factors mentioned thus far are external developments from the Ukrainian perspective. Nevertheless, its policy makers face the task

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[3] International Energy Agency (IEA) 2002: World Energy Outlook 2002.

[4] Energy Information Administration (EIA) 2002: Annual Energy Outlook 2002.

[5] Nevertheless, since additional volumes can also be transported through new pipeline systems, transit quantities through Ukraine are expected to rise only moderately (see e.g. expert statements in: National Security and Defence, #3 2002, Ukrainian Center for Economic and Political Research named after Razumkov).

to respond to those developments. Basically, there are two possible **strategic options**:

1. Maintaining the **current situation** in which Russia determines the quantity exported and Ukraine the transit fee without any further collusive agreement. Although this strategy allows Ukraine to keep the entire control of natural gas transit through its territory, the high transit tariffs might negatively result in the competitiveness of Russian gas in Europe. In particular, if—everything else being unchanged—long-term 'take-or-pay' contracts as well as the gas and oil price peg cease to exist then higher prices of Gazprom (due to higher costs) compared to the prices of its major competitors Sonatrach (Algeria) and Norwegian companies will result in declining market shares for Gazprom and, consequently, lower transit quantities through Ukraine.
2. The alternative strategy is to operate the GTS together with the Russian side (and possible additional investors) within a **consortium**. Given that exports are determined in a truly joint way, then costs are reduced to a minimum thus preventing a further drop in competitiveness of Russian gas against other exporters as discussed above. The rationale of this strategy for both sides is that lower overall costs allow for higher exports and thus higher aggregate profits. Given that an appropriate profit-sharing agreement is found, this might be beneficial for all sides.

3.2 Our Model

For Ukrainian policy makers, the choice of the right strategy should be based on a comparison of profits under all possible constellations. However, such an evaluation is missing in the current discussion about the proposed consortium. As already indicated above, it is therefore our intention to provide a first quantitative assessment of this kind. We therefore proceed as follows: We model two main markets for natural gas—the European Union (EU15) and Central and Eastern Europe plus Turkey (CEE+T)—and three suppliers of gas exports—Algeria, Norway and Russia. This structure is demonstrated in figure 1.[6] While Algeria and Norway solely export to EU15, Russia also supplies gas to CEE+T. By assumption, each exporting country can—to some degree—control the import price for natural gas in Europe, and they all have similar bargaining positions. Therefore, all three exporting countries set their export quantity simultaneously so as to maximize their profits given by revenue from gas exports minus variable costs of gas extraction and transportation. While Algeria and Norway can

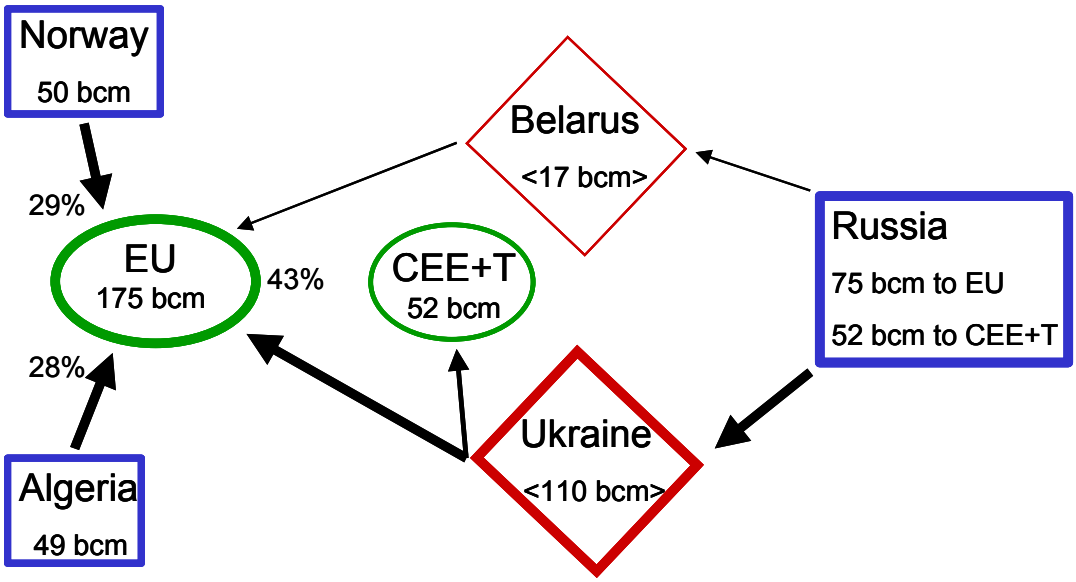
[6] In technical economic terms, the model assumes profit-maximizing behavior throughout and compares the outcome of a combined Cournot-Nash-Stackelberg equilibrium with a Cournot-Nash equilibrium.

supply directly to the market, Russian gas has to travel through either Ukraine or Belarus. With the focus of our work on the Ukrainian pipeline system, tariffs through Belarus are kept fix. In contrast, the situation between Russia and Ukraine is specified in two different ways:

First, tariffs through Ukraine are set to maximize Ukraine's profits given by transit revenue minus variable costs of gas transit. Russia in turn anticipates this tariff set by Ukraine when assessing its total costs for exporting gas to Europe. This constellation corresponds to the current **status quo**.

Second, Russia and Ukraine operate the GTS jointly. Then, exports are set so as to maximize profits over the entire system while no transit fee in excess of true costs is charged. Instead, both sides share total profits based on a pre-determined agreement. This constellation corresponds to the proposed **joint consortium**. Thus, we do not define a specific legal form for the consortium (e.g. concession). Rather, our analysis solely concentrates on demonstrating the pros and cons of operating the GTS jointly with the Russian side in general. We will however discuss some aspects of appropriate legal form of cooperation in our final conclusions.

Figure 1 Structure of the Model (data for 2001)



Source: own figure (data taken from BP statistical review of world energy 2002)

Our quantitative estimations are based on exports of the three countries in 2001 as well as on estimated Long Run Marginal Costs of gas supply to European markets as given in a study prepared for the European Commission, DG Energy & Transport (Table 1). Those cost estimations demonstrate the key structural problem of Russian gas on European markets; its high supply costs in particular due to the extremely long transport lines. Having this in mind, Russia's current position as largest exporter appears to contradict economic intuition. In fact, it can only be explained by political motivations

and by low levels of competition that have prevailed on the EU gas market thus far. However, with competitive forces becoming more and more important, the cost estimates of Table 1 clearly demonstrate the vulnerability of Russian gas or—in other words—the drastic need to reduce supply costs as much as possible. This will also be the main driving force for our simulations as presented in the next section.

Table 1 Costs of gas supply to the EU 15

Exporting country	Russia (NadymPurTaz) through… …Ukraine*	…Belarus	Algeria	Norway
Long Run Marginal Costs (including investment costs; in USD per tcm)				
Extraction	14.3	14.3	16.1	44.6
Transportation	75.4	61.4	28.5	30.4
Variable Costs (excluding investment costs; in USD per tcm)**				
Extraction	2.1	2.1	2.4	6.7
Transportation	11.3	9.2	4.3	4.6
Transit	10.0	5.7	3.8	
Total variable costs	23.4	17.1	10.4	11.3

* Variable costs of trasportation through Ukraine are USD 5.1 per tcm and transit fees are USD 6 per tcm.

** For extraction and transportation we assume a share of 15% in Long Run Marginal Costs.

Source: http://europa.eu.int/comm/energy/library/executive-summary.pdf.

4. Scenarios and Results

Based on our model we simulate four different scenarios. The first three simulate the effect of each external development—demand expansion, increased competition, high bypassing capacity—on profitability of the GTS in an isolated fashion ("everything else remaining constant"), while in scenario four all developments occur at the same time. Within each scenario we also show how profitability can be affected by Ukraine's strategic decision (building or not building the consortium). Figures in Table 2 are to be interpreted as estimated annual values over a medium-run perspective, approximately for the period from 2010 to 2015. For all scenarios we assume that the Yamal1 pipeline through Belarus operates at a capacity of at least 28 bcm.

Demand Expansion (Scenario 1) in Europe will boost gas exports for all participating countries thus leading to higher quantities and consequently, also transit quantities. As competition on EU markets remains unchanged in this scenario, Russia still has the largest export share and its exports almost double. Consequently, also profits of Russia and Ukraine increase substantially. Concerning

Ukraine's strategic choice those prosperous results can be even further improved by forming a joint consortium with Russia as it reduces supply costs of Ukraine thus allowing for higher transit quantities. However, an expansion up to almost 200 bcm through Ukraine's GTS as projected in this scenario appears to be very unrealistic (the same holds true for projected price increases).

In contrast, **Increased Competition** (Scenario 2) on the EU15 market changes the role different exporters play and particularly, reduces Russian exports from 75 bcm to about 50 bcm. Although exports to CEE+T increase at the same time, this is by far insufficient to compensate for lower profits for both, Russia and Ukraine. In this situation, forming a consortium would even be crucial in order to make up for at least some of the profit losses for both parties.

For Ukraine, the same negative perspectives arise if Russia uses **Higher Bypass Capacities** (Scenario 3) by expanding capacities of Yamal1 and Yamal2 up to 56 bcm. In this case, Russia would be able to increase its position as biggest exporter to EU15 clearly at the expense of Ukraine whose profits would—just as in the previous case—shrink by about one half. However, also in this case the formation of a joint consortium would—at least partially—allow to compensate for those losses.

Finally, we look at the net effects from **all those developments combined** (Scenario 4). In this case, results are consistent with widespread expert predictions concerning prices and transit quantities through Ukraine. In particular, all exporters are able to substantially expand their volumes due to higher demand in EU15 while price increases are rather modest because EU gas markets become more competitive at the same time. However, with capacities of Belarus expanded to 56 bcm, higher exports from Russia do not necessarily translate into higher transit volumes through Ukraine. Rather, if both the Russian and the Ukrainian side continue to bargain on transit fees (status quo) supply costs of Russian gas through Ukraine remain relatively high so that the transit amount even declines when compared to 2001. Consequently, there is also a slight fall in Ukraine's profits. If, however, both sides manage to establish the joint consortium, supply costs can be reduced considerably so that transit volumes and thus, profits increase considerably (to more than USD 1100 m for Ukraine). Thus, it becomes evident that given expected developments on European markets as well as continued efforts of

Table 2 Model Results

	Benchmark (2001 data)	*Scenario 1* Demand Expansion		*Scenario 2* Increased Competition		*Scenario 3* High Bypass Capacities		*Scenario 4* All Developments Together	
		status quo	consortium	status quo	consortium	status quo	consortium	status quo	consortium
Import price of natural gas (USD/tcm) in									
EU15	81.7	139.5	133.1	66.9	64.7	80.5	77.5	112.6	109.8
CEE+T	54.5	57.6	48.5	52.8	48.5	52.7	48.5	54.1	48.5
Transit quantity (bcm) through									
Belarus	17.0	28.0	28.0	28.0	28.0	56.0	56.0	56.0	56.0
Ukraine	109.9	166.7	202.4	78.8	95.9	77.8	94.5	102.8	125.0
Exports (bcm) from…									
Russia to CEE+T	51.6	45.2	64.0	55.1	64.0	55.2	64.0	52.4	64.0
Russia to EU15	75.2	149.4	166.5	51.7	59.9	78.5	86.5	106.3	117.0
Norway to EU15	50.3	91.5	86.9	70.5	67.7	49.4	47.3	128.4	124.9
Algeria to EU15	49.3	89.3	84.9	71.5	68.8	48.5	46.4	129.5	125.9
Profits (revenue minus variable costs in m of USD) of…									
Russia (total)*	6094.6	18541.8	18547.0	4173.1	4302.1	6589.7	6628.5	11482.8	11668.2
Russia (Ukraine)**	4995.6	15114.9	15298.6	2779.2	2968.4	3038.2	3243.5	6133.8	6476.4
Ukraine	659.1	1516.9	2699.7	339.2	523.8	330.2	572.4	576.7	1142.9
Ukraine/Russia***	5654.7	16631.8	17998.3	3118.4	3492.2	3368.4	3815.9	6710.5	7619.3
Norway	3542.2	11725.9	10589.2	3918.2	3620.8	3419.9	3132.5	13014.2	12303.4
Algeria	3516.0	11519.3	10409.5	4034.2	3732.3	3395.9	3113.8	13224.9	12508.3
Supply costs (USD/tcm) to EU15									
through Ukraine	23.4	26.5	17.4	21.8	17.4	21.7	17.4	23.1	17.4

* Total profits of Russia from gas sales transported through Ukraine and Belarus
** Profits of Russia from gas sales transported through Ukraine only
*** Aggregate profits of Russia and Ukraine from sales transported through Ukraine

Source: own calculations

Gazprom to expand bypass capacities, the formation of a joint gas consortium is not just a strategy to increase additional future profits but rather, it is a crucial step to sustain current profit levels of the GTS for Ukraine and to prevent it from loosing its current level of profitability.[7]

5. Summary and Conclusions

For all four scenarios it appears that forming a consortium is always the best alternative, regardless of the specific developments on the gas market. The basic logic underlying this observation is that if Ukraine does not charge transit fees in excess of its real costs, the Russian side will find it favorable to transit higher volumes through Ukraine's GTS. In turn, this allows for higher aggregate profits for Russia and Ukraine together, and—provided a fair and transparent sharing agreement is set up—higher profits for Ukraine. Given magnitude and direction of external developments as discussed and simulated by our model, we demonstrate that this cost-reducing aspect of a joint consortium with Russia is crucial for sustaining profitability of Ukraine's GTS. In particular, we find that—given expected developments on European gas markets as well as continuing Russian efforts to bypass Ukraine—profits for Ukraine will deteriorate if they fail to establish such a joint effort. **Thus, the fundamental policy implication is that forming a consortium is in the economic interest of Ukraine!** However, an essential pre-condition for it to be favorable for Ukraine is that profits are shared in an appropriate way (see footnote 7). Therefore, the Ukrainian side should insist on a number of crucial issues within the consortium contract. For example, the consortium as registered in Kiev earlier this year should operate the entire GTS as a separate legal entity. Furthermore, both sides, Ukraine and Russia have to have well-defined obligations. For example, the consortium needs to have full access to the pipeline system over its full distance in order to monitor costs, to measure gas quantities at any point and to decide on necessary investments. Also, gas transit through Ukraine needs to be separated from gas deliveries to domestic markets in order to avoid interest conflicts as they frequently occurred in the past. This in particular means that the consortium should be legally separated from both, Gazprom and Naftogaz. Then, profits as well as financial obligations could be distributed between the two parties in correspondence to their respective shares in capital stock of the consortium. Furthermore, if both parties find it favorable to include an additional external investor, this should be done on the basis of a competitive tender based on investment plans and revenue expectations

[7] Estimating separate profits for Russia and Ukraine under the consortium also requires an assumption on how joint profits are shared between the two countries. In our simulations we assume that 85% of total profits of Russia and Ukraine are distributed to Russia and 15% to Ukraine, which is slightly more favorable for Ukraine than the observed ratio in 2001 (90%:10%). As our results show, this ratio is always sufficient to make the consortium the dominant strategy for Ukraine, without that the Russian side looses its incentive to cooperate as well. In reality, however, such a rule will be determined by the bargaining power of both sides and the detailed contract specification, respectively. We discuss some of those issues in the final section.

proposed by potential candidates. Finally, returns from the consortium to Ukraine's budget need to be specified in a transparent way. It appears, that the cleanest and most efficient way to achieve this intention would be to register the consortium as an independent company and to give the GTS into concession to this company.

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