

TURKEY IN THE EURASIAN ENERGY GAME

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*Berlin Doctoral Program in Economics and Management Science
Humboldt–Universitt zu Berlin, Germany*



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by Onur obanlı

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FOREWORD

Global Relations Forum community programs aim to advance a culture of intellectual diversity, rational and constructive debate, and analytic coherence.

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This paper entitled “*Turkey in the Eurasian Energy Game*” is authored by Onur Çobanlı. GRF thanks him for his contribution and commitment to this effort.

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His research interests mainly focus on game theory, energy economics, industrial organization, and environmental economics. In his dissertation, he applies cooperative game theory to a quantitative model of Eurasian natural gas trade and addresses topical questions such as the impact of major pipeline projects on bargaining power, the competition between Europe and China for Central Asian supplies, and the interaction of LNG and pipeline gas in European markets.

Awarded DAAD and TEV scholarships, Mr. obanlı received his master's degree from Humboldt University Berlin following his undergraduate studies as a double major student in Mechanical Engineering and Management Engineering Departments at Istanbul Technical University.

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Turkey in the Eurasian Energy Game

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Executive Summary

Turkey is a major natural gas consumer in Eurasia, and its demand is expected to grow rapidly in parallel with its economic performance. However, Turkey has poor production possibilities and relies on imports to serve 98% of its demand. Turkey's high dependency on few suppliers is reflected on its energy bill and proves an obstacle to its ambition to become a major player in Eurasia. Turkey seeks to increase its supply security by diversifying its imports as well as transit routes. Moreover, located between the European markets in the West and the gas rich neighbors in the East, Turkey aims to become an energy corridor in the Eurasian gas trade. To achieve these goals, Turkey has positioned itself in the Eurasian pipeline game. It holds shares in Trans Anatolian (TANAP) and Nabucco-West in the Southern Corridor. However, while South Stream endorsed by Russia rivals the Southern Corridor, Trans Adriatic (TAP) contended with Nabucco-West for transport of Azerbaijani supplies to Europe.

The policy paper investigates the selected pipeline projects' impact on the bargaining power structure in the Eurasian gas trade and derives conclusions for Turkey emphasizing three issues: access to new suppliers, position as a transit country, and third party access (TPA) to pipelines, i.e., who can ship gas through the pipelines. It applies cooperative game theory to a quantitative model of the Eurasian gas trade and quantifies the players' bargaining power via the Shapley value, as presented in Hubert & Cobanlı (2012), Hubert & Orlova (2012) and Cobanlı (2014).

Access to new suppliers will improve Turkey's bargaining power vis-a-vis other players in the Eurasian gas trade. Supplies from Azerbaijan and Northern Iraq will diversify Turkey's imports and will mitigate its dependency on Russia. Increase in supply competition will force Russian and Iranian gas prices down, decreasing Turkey's energy bill.

In the Southern Corridor Turkey misinterpreted the contest between TAP and Nabucco-West to carry Azerbaijani gas to the European markets. Although Turkey endorsed Nabucco-West, the Shah Deniz consortium, i.e., the sole supplier of the Southern Corridor, entitled TAP as the final route. The analysis suggests that the major difference between the projects comes from their TPA regime. Open to all players, Nabucco-West would diversify Turkey's supplies by allowing Norway and Netherlands to ship gas eastward to Turkey. On the contrary, reserved only for Azerbaijani gas, TAP may block their access to the Turkish market.

Although the European Commission (EC) backs the Southern Corridor and European companies participate in the projects' consortia, the European players will benefit from the opening of the Southern Corridor via TAP or Nabucco-West marginally. Major gains from the projects will accrue to the transit country, Turkey and the supplier, Azerbaijan. The findings are in line with the decision of Nabucco's consortium to leave the Southern Corridor's eastern section to TANAP, which is initiated by Turkey and Azerbaijan. Moreover, in July 2013, European companies sold 60% of their shares in TAP to the Shah Deniz consortium, making it the project's major shareholder.

The analysis indicates that South Stream cannot prevent investment in the Southern Corridor. The projects are not rival since they will increase supply security of Turkey as well as Europe through different effects. While South Stream will diversify transit routes of westbound Russian supplies by bypassing Ukraine, the Southern Corridor will introduce new suppliers such as Azerbaijan and Iraq to western consumer markets. Thus, Turkey will benefit from the construction of both projects. This finding justifies Turkey's permission to South Stream to pass through its territorial waters in the Black Sea. However, Turkey rejected Russia's invitation to join South Stream's consortium.

1 Introduction

Turkey is a major consumer of natural gas in Eurasia. In the last decade, its yearly natural gas consumption increased by almost threefold from 17.4 bcm (billion cubic meters) in 2002 to 46.3 bcm in 2012, and its natural gas demand is expected to uphold its rapid growth in parallel with its future economic performance. Becoming the most important fuel in Turkey's energy mix, natural gas constitutes around 35% of Turkey's primary energy consumption and 45% of its electricity generation.

Turkey has negligible indigenous production and relies on imports from a handful suppliers to serve 98% of its consumption. As shown in Table 1, Russia alone accounts for 55% of Turkey's supplies. Moreover, large share of its imports is transported through a few transit countries, i.e., Ukraine and Iran, which are prone to supply disruptions. Turkey's high dependency on a few suppliers and transit countries sets a high price on its gas imports and raise concerns about its supply security. In order to address these concerns and serve its rapidly growing demand, Turkey looks for new suppliers and alternative transit routes.

Turkey's ambitions in the Eurasian gas trade are not limited by the diversification of its supplies. Located between the second largest gas market in the world, i.e., Continental Europe, and gas rich countries in the Caspian Basin and the Middle East, Turkey envisions to become an energy corridor, and hence, a regional player in Eurasia. To realize its ambitions, Turkey takes a strong interest in pipeline projects lying in its near geography. Turkey holds shares in the consortia of Trans Anatolian (TANAP) and Nabucco-West in the Southern Corridor. However, Trans Adriatic (TAP) and South Stream endorsed by other players in the region challenge these projects and hence, Turkey's aspirations (See Figure 1).

Table 1: Turkey's Natural Gas Imports

From	Transit via	Imports ^a	
		[bcm]	[%]
<i>via pipelines</i>			
Russia	Ukraine	10.1	23.7
Russia	Blue Stream	14.4 ^b	33.8
Iran ^c	–	7.5	17.6
Azerbaijan	Georgia	2.9	6.8
<i>via LNG^d</i>			
Algeria	–	4.1	9.6
Nigeria	–	1.5	3.5
Qatar	–	1.2	2.8
Egypt	–	0.5	1.1
Others ^e	–	0.4	0.9
Total	<i>pipelines</i>	34.9	81.9
	<i>LNG</i>	7.7	18.1
		42.6	100

^aIn 2012, taken from BP (2013).

^bTaken from IEA (2013).

^cActually, Iran is a transit country for Turkmen gas. Iran exports gas freed by imports from Turkmenistan to Turkey.

^dLiquefied natural gas.

^eNorway and other Europe.

Initiated by the European Commission (EC), the Southern Corridor will connect suppliers in the Middle East and the Caspian Basin via Turkey to Europe. Thus, it will diversify supplies bound to European and Turkish markets, and Turkey will emerge as an energy corridor in the Eurasian gas trade. In the Southern Corridor TANAP will carry supplies from Azerbaijan's Shah Deniz field to Turkey. Nabucco-West and TAP competed for the transit of Azerbaijani supplies from Turkey to Central and Western Europe. Contrary to Turkey's expectations, in June 2013, the Shah Deniz field's consortium chose TAP as the final route, and Turkey and its partners had to abandon Nabucco-West. Besides Azerbaijan, Northern Iraq is also a potential supplier to the Southern Corridor if political conflicts in Southeast Turkey and Iraq can be solved in the near future.

Russia anticipates that the eastern suppliers' entry to its export markets will hurt its dominance. Russia countered threats from the Southern Corridor with South Stream, which will connect Russia via an offshore pipeline under the Black Sea directly to the Balkans and Central Europe. Bypassing the transit countries, i.e., Ukraine and Belarus, the project will diversify the transit routes for westbound Russian supplies, but it will not introduce any new suppliers to western markets. The project disquiets the EC since it might strengthen the Russian dominance in European markets and forestall investment in the Southern Corridor by interlocking necessary supplies to fill its capacities.

The country's high import dependency on Russia and its desire to become an energy corridor between Europe and the eastern suppliers impel Turkey to take conflicting positions in the Eurasian pipeline game. On one hand, Turkey holds stake in the Southern Corridor. On the other hand, it gave the "rival" South Stream permission to pass through its territorial waters in return for discounts on its gas imports from Russia and reliefs of take-or-pay commitments on its long term contracts (FT, 2011).

In the Southern Corridor, Turkey misinterpreted the competition between Nabucco-West and TAP. Although the discussion about the projects centered on topics such as target markets and price competition, the major difference between these pipelines lies in their third party access (TPA) regime, i.e., who can ship gas through the pipelines. While Turkey favors gas shipment through the pipelines by each player in both directions, the Shah Deniz field's consortium and the European consumers prefer reserving the pipeline capacities only for westbound Azerbaijani gas.

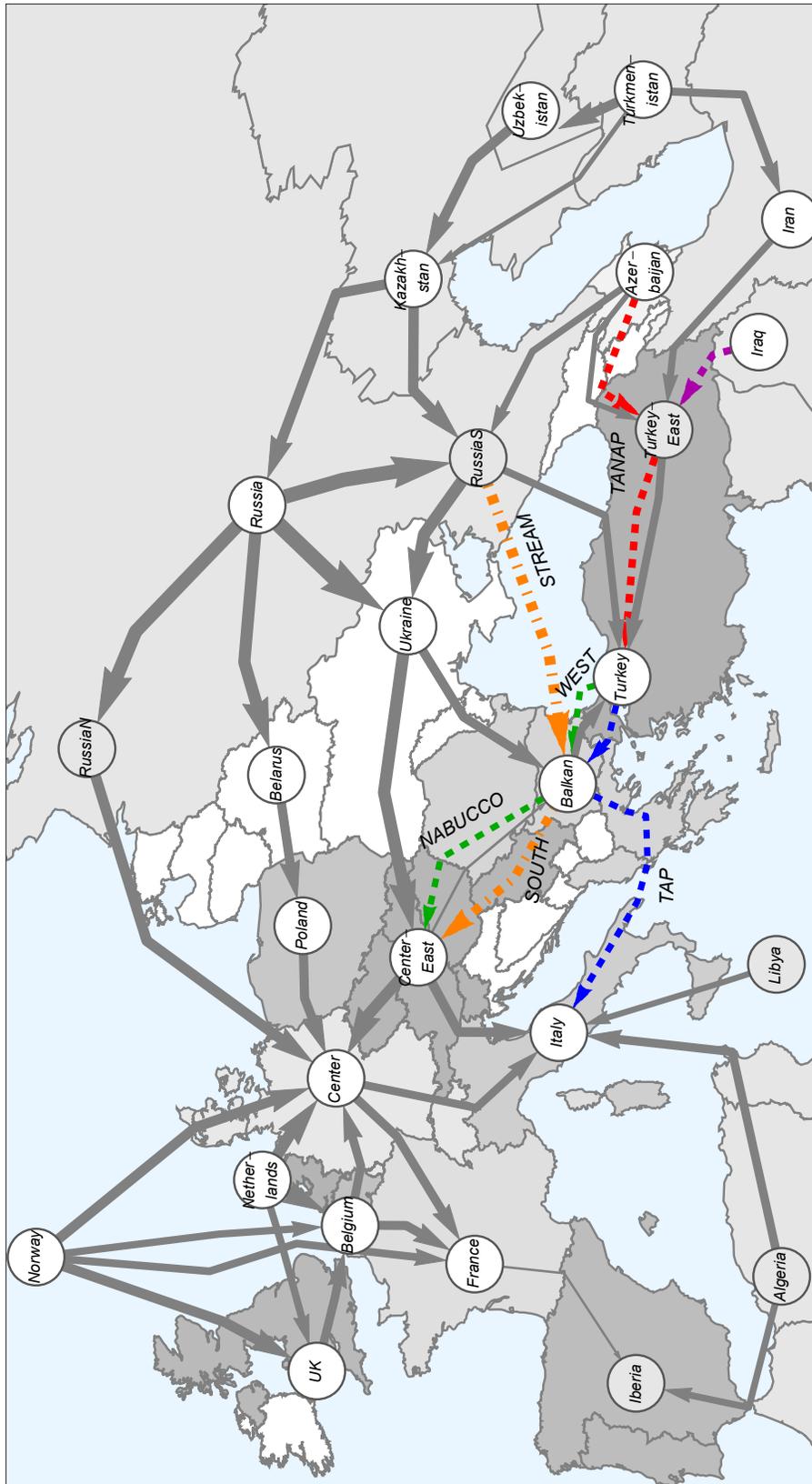
Turkey's interest in the mentioned projects can be summarized in three issues: access to new suppliers, position as a transit country and TPA to the pipelines. With reference to these issues, the study evaluates the pipeline projects' impact on Turkey and other major players. First, the study analyzes the projects in the Southern Corridor and compares the impact of the Nabucco-West and TAP on the stakeholders. Next, benefits accruing to Turkey from tapping Northern Iraqi fields are investigated. Lastly, South Stream and its impact on the investment in the Southern Corridor are assessed.

The study employs the disaggregated quantitative model and the approach presented in Hubert & Cobanli (2012), Hubert & Orlova (2012) and Cobanli (2014). Applying cooperative game theory, it analyzes the interaction among the players in the Eurasian gas trade. In the model, all players cooperate for production, transit and consumption of gas and maximize the total surplus from the Eurasian gas trade via pipelines. Then, the Shapley value, also called (bargaining) power in this study,

solves the game and allocates the total surplus among the players by taking their interdependence into account.

The focus of this study is the pipeline projects' strategic impact on the players' bargaining power. As a result of the model's calibration, given the consumer demand and costs related to production and transport, current Eurasian pipeline network has sufficient capacity to carry gas from production fields to consumer markets efficiently. Thus, the pipeline projects do not create value in the East-West gas trade, and a grand coalition containing all players would not invest in any of them. However, a pipeline project may alter the interaction between the players and thus, the allocation of power among them significantly. With the pipeline projects the players seek to alter the pipeline network to their benefit.

Figure 1: The Eurasian Pipeline Network



The pipeline projects studied in the paper are shown in color: South Stream in dashed Orange, Nabucco-West in Green, Nabucco-East in Red, Trans Adriatic (TAP) in Blue and the interconnector between Iraq and Turkey in Magenta. The international pipeline network as existing in 2013 is represented in gray solid lines. White circles stand for transit nodes which are connected to local production fields, local consumer markets and local LNG regasification plants if there is any. Gray circles are there only for transport purposes. Iberia, Algeria and Libya are out of the paper's scope and are not considered as strategic instruments.

2 Pipelines

This section presents the selected pipeline projects in their historical and political context. For convenience, the basic information about the projects is summarized in Table 2.

Table 2: Pipeline Projects

Links		Capacity ^a old+new [bcm/a]	Flow ^b [bcm]	Capacity Cost ^c		Required for Access
from	to			[bn €]	[bn €/a]	
<i>Trans Anatolian (TANAP)</i>						
Azerbaijan	TurkeyE	7 + 16	3.4	2.4	0.4	Azerbaijan, Turkey
TurkeyE	Turkey	20 + 16	11.6	2.4	0.4	Turkey
<i>Trans Adriatic (TAP)</i>						
Balkan	Turkey ^d	16.3 + 10	12.2	1.0	0.2	Turkey
Balkan	Italy	0 + 10	–	2.3	0.3	Azerbaijan
<i>Nabucco-West</i>						
Balkan	Turkey ^d	16.3 + 10	12.2	1.0	0.2	Turkey
Center-ENab	BalkanNab ^e	0 + 10	–	4.0	0.6	Azerbaijan
<i>Iraqi Interconnector</i>						
Iraq	TurkeyE	0 + 10	–	1.6	0.2	Iraq, Turkey
<i>South Stream</i>						
RussiaS	Balkan	0 + 63	–	10.0	1.5	Russia
Center-EastSS	BalkanSS ^e	0 + 30	–	5.5	0.8	Russia

^aExisting capacity as compiled from ENTSOG (2010) and public sources + planned capacity.

^bFigures for 2012, compiled from IEA (2013).

^cCapacity expenditure (left column) is converted to annualized capacity-cost (right column) using a discount rate of 15%.

^dCurrently gas flows from Balkan to Turkey. The projects plan to revert the flow.

^eCurrently gas flows from Center-East to Balkan through the link (Center-East, Balkan), which has a capacity of 1.7 bcm/a. The projects plan to revert the flow.

2.1 The Southern Corridor

The European Union (EU) relies on few Non-European suppliers to serve more than half of its gas demand.¹ Russia alone accounts for a quarter of EU's total gas consumption and for more than 40% of its imports. Although the newly inaugurated Nord Stream links Russia directly to Continental European markets, large share of westbound Russian supplies are still transported through the transit countries, i.e., Ukraine and Belarus.

¹In 2012, the EU's consumption totaled 443.9 bcm. 237.9 bcm of this amount was imported via pipelines from Non-EU suppliers such as Russia (94.7 bcm), Norway (105.9 bcm) and Algeria (30.9 bcm). 57 bcm was served in form of LNG from overseas suppliers such as Qatar (29.7 bcm), Nigeria (8.1 bcm) and Algeria (9.5 bcm) (BP, 2013).

Being former Soviet republics, the transit countries still rely economically on Russia, especially for most of their energy imports. For their gas imports they pay favorable prices compared to European consumers and receive generous tariffs for westbound gas transit through their pipeline network.

However, Russia has had difficult relations with its transit countries, especially with Ukraine. In the last decade, Russia and Ukraine have disputed over gas prices, import tariffs and the latter's accumulated debt. In the high winters of 2006 and 2009, the Russia-Ukraine gas disputes led to short-lived but severe disruptions of gas transit; causing dire consequences in the regions dependent on Russian gas, especially in the Balkans. The Russia-Ukraine gas disputes and the consequential supply disruptions have demonstrated Ukraine's unreliability as a transit country and constitute a threat to supply security of Europe and Turkey.^{2,3}

Europe's high dependency on Russia and Ukraine's unreliability as a transit country raise concerns about Europe's supply security. In order to address these issues, the EC endorsed Nabucco to open the Southern Corridor and listed it as a project of European interest in its Trans European Energy Networks (TEN-E) (EC, 2006). In the Southern Corridor, Nabucco would carry gas from rich fields in the Caspian Region and the Middle East through Turkey to the Balkans and Central Europe. It was initiated by the national champions of the importer and transit countries, i.e., Austria's OMV, Hungary's MOL, Romania's Transgaz, Bulgaria's Bulgargaz EAD, and Turkey's BOTAS, but none of the potential suppliers was presented in its consortium. The project had experienced several delays due to lack of commitments from its potential suppliers. Its long range and large capacity of 31 billion cubic meters per annum (bcm/a) were reflected on its cost of 17.6 billion €. In 2012, considering the project's high cost as well as poor demand forecasts for Europe, Nabucco's consortium downscaled the project's scope and capacity.

Although Nabucco aimed to link several suppliers in the Caspian Region and the Middle East to Europe, currently, Azerbaijan's Shah Deniz field is the only supplier in the Southern Corridor. In the Caspian Basin, the legal status and demarcation of the Caspian Sea has not been cleared yet, and Russia as well as Iran strongly object an offshore pipeline which will link Turkmenistan to the Southern Corridor. In the Middle East, conflicts and uncertainties following the Arab Spring preclude any pipeline project, such as the Arab gas pipeline.⁴ Western objections block any involvement of Iran in the Eurasian gas trade.

Being one of the largest gas fields in the world, the Shah Deniz field's proven gas reserves amount to 1 trillion cubic meters (tcm). Located off the Azerbaijani coast in the Caspian Sea, the field is operated by an international consortium led by UK's

²For a detailed presentation of the Russia-Ukraine gas disputes see Stern (2006) and Pirani et al.(2009).

³At the time of this writing, the Euromaidan, a pro-European civil uprising in Ukraine against the Russian interventionism, was continuing. The uprising started in November 2013 after the Ukrainian government abandoned the Association Agreement (AA) with the EU, bowing to Russian sanctions through custom regulations. One of the major arguments of the Ukrainian government for its about-turn was the International Monetary Fund's (IMF) condition on its loan, a 40% increase in Ukrainian gas bills. The Euromaidan is the latest example of the Russian influence and the importance of gas in Ukrainian politics.

⁴The Arab gas pipeline would carry supplies from Egypt to Israel, Jordan, Syria and Southeast Turkey. From there the Southern Corridor would transport the gas to the European markets.

BP and Norway's Statoil. Azerbaijan's SOCAR, France's Total, Russia's and Italy's LukAgip, Iran's NIOC and Turkey's TPAO constitute other partners in the project. Completed in 2006, the Shah Deniz field's first stage produces up to 9 bcm/a. The second stage will expand its production capacity by 16 bcm/a. While 10 bcm/a of the additional supplies targets the Turkish market, 6 bcm/a will be delivered to Europe. Currently, with a capacity of 7 bcm/a the South Caucasus pipeline (SCP) carries Azerbaijani supplies to the Turkish market. The Shah Deniz consortium plans to enlarge the pipeline's capacity by 16 bcm/a to ship supplies from its second stage to Turkey and the Southern Corridor (BP, 2012).

2.1.1 TANAP

Following Nabucco's failure, Azerbaijan's SOCAR and Turkey's BOTAS launched TANAP and demonstrated their determination to proceed with the Southern Corridor without any involvement of Nabucco's European partners. With a capacity of 16 bcm/a TANAP will link Turkey's Georgian border to its European border and will carry Azerbaijani gas to markets in Turkey and the Balkans. The cost of linking the Shah Deniz field to Turkey-EU border is estimated at 4.8 billion €. The project's major shareholder, i.e., Azerbaijan's SOCAR invited UK's BP and the Shah Deniz field's other partners to join TANAP's consortium (Bloomberg, 2013). However in December 2013, Norway's Statoil and France's Total renounced their option to join the project (FT, 2013).

2.1.2 Nabucco-West vs. TAP

In May 2012, Nabucco's consortium downsized the project's capacity from 31 bcm/a to 10 bcm/a and left its eastern section in Turkey to TANAP. Called Nabucco-West, the new project would follow the same route as its predecessor in the European territory, i.e., from the Turkey-Bulgaria border to Austria. Nabucco-West's shorter range and smaller capacity decreased its cost remarkably to 5 billion € (Nabucco, 2012).

However, TAP contended with Nabucco-West for the transit of Azerbaijani supplies from the Turkey-EU border to Continental Europe, but through a different route. With a capacity of 10 bcm/a the pipeline will cross Greece and Albania, and then, will reach Italy via an offshore pipeline under the Adriatic Sea. Initiated by Switzerland's Axpo, Norway's Statoil and Germany's EON, TAP is estimated to cost 2.3 billion €, cheaper than Nabucco-West.

Poor pipeline capacities between the Balkans and the rest of Europe split Europe in two markets: Continental Europe and the Balkans. While Continental Europe's supplies are well diversified, the Balkans relies heavily on Russian gas transported through Ukraine. The isolation from the rest of the European markets and the high dependency on Russia threaten the Balkans' supply security and make the region vulnerable to a disruption of gas transit through Ukraine. Connecting the Balkans to Continental Europe with 10 bcm/a, Nabucco-West and TAP promise to address these concerns. Moreover, unifying the markets, the projects will also serve the EC's ultimate goal of a well-functioning internal gas market in Europe.

However, TAP and Nabucco-West are subject to different TPA regimes. According to the European TPA regulation, all pipelines in the European territory are open to all third-parties. Thus, without any obstruction of the pipeline owners, gas can flow freely between the European markets, encouraging competition and supply security in Europe (EC, 2003, 2005, 2009). However, in order to foster investment in the projects, the EC exempted Nabucco-West's half and TAP's full capacity from the European TPA regulation [(EC, 2013), (TAP, 2013)]. Thus, the projects' consortia may derive bargaining power by blocking third-parties' access to the exempted capacities.

On the contrary to Turkey's expectations, in June 2013, the Shah Deniz consortium turned down Nabucco-West and opted for TAP to transport its gas to the Continental European markets. In July of the same year, it took the control of TAP's consortium by acquiring 60% of the shares (TAP, 2013). Thus, the Shah Deniz consortium commits to supplying gas to European markets and will bear a share of the project's cost. The incorporation of Belgium's Fluxys, a transit operator in Europe, in TAP's consortium indicates that Italy, whose supplies are already well diversified, will not be the final market for Azerbaijani gas, but a transit country to Central and Western European markets.

2.1.3 Northern Iraqi Fields

Since 2012 Turkey has been cooperating with the Iraqi Kurds in Northern Iraq to diversify its gas imports as well as to meet its rapidly growing gas demand. Relying on the expensive Russian and Iranian supplies, Turkey seeks to decrease its energy bill with Northern Iraqi gas, which is expected to be 40% cheaper than the Russian gas (Businessweek, 2013). Northern Iraqi gas would also serve Turkey's intention to be an energy hub in the East-West gas trade. However, in order to tap the Northern Iraqi fields, Turkey has to solve its long-standing Kurdish conflict and has to balance its relations with the Kurds in Northern Iraq and the central government in Baghdad.

In spite of strong protests of the Iraqi central government in Baghdad, Turkey and the Kurdistan regional government have reached several agreements on upstream development and transit of rich hydrocarbon sources in Northern Iraq. Upon the eve of peace in Southeast Turkey, in November 2013, the parties signed the final agreement on a gas pipeline which will carry 10 bcm/a of Northern Iraqi gas to the Turkish market. From there, the Southern Corridor may carry the Northern Iraqi gas to Europe. The first gas through the pipeline is expected to be commissioned in early 2017 (Reuters, 2013a). The project is estimated to cost 1.6 billion €.

2.2 South Stream

Responding to the pipeline game, Russia's Gazprom initiated South Stream in 2007. The project is composed of two sections: offshore and onshore. With a capacity of 63 bcm/a, the offshore section under the Black Sea will cross through Turkey's territorial waters and link Russia directly to Bulgaria. The onshore section will have only the offshore section's half capacity (30 bcm/a) and carry Russian supplies through Serbia and Hungary to Austria as well as Northern Italy. The project's initial

plan contained a southern branch similar to TAP, but it was abandoned in 2012. The project's large capacity and its lengthy offshore section inflate its cost to 15.5 billion €. If the upgrade of the domestic network needed to supply the project is taken into account, its cost raises to 28.5 billion € (Reuters, 2013b). While Russia's Gazprom controls the majority of the shares, France's EDF, Italy's ENI and Germany's Winter-shall hold smaller shares in the project's consortium.

It is often reckoned that South Stream aims to address Russia's two major concerns: Ukraine and the Southern Corridor. Bypassing Ukraine, the offshore pipeline will introduce a new route for westbound Russian supplies. Flooding Europe and Turkey with Russian gas, the project may forestall investment in the Southern Corridor. Thus, Russia will prevent entry of new suppliers to its export markets and safeguard its dominance in Europe and Turkey.

In December 2012, before the Shah Deniz consortium made its decision about the final route in the Southern Corridor, Russia's Gazprom and its partners began the offshore section's construction although the project's vital stages such as the final route's communication with the EU, environmental impact studies, source of financing, etc. had not yet been finalized (FT, 2012). Similarly, the onshore section's construction is hastened in Bulgaria and Serbia although the final decision about the onshore section's TPA regime is still open. Since the onshore section lies in the European territory, it will be subject to the European TPA regulation. However, like TAP's consortium, Russia seeks the onshore section's exemption from the European TPA regulation. Blocking third-party access to the onshore section, Russia aims to safeguard its supply dominance in Turkey and Europe. South Stream's consortium expects commissioning of the first supplies in 2015, and the pipeline will reach its full capacity in 2018-2019 (South Stream, 2013).

3 The Model

Contrary to the widely applied non-cooperative approach, the study employs the cooperative approach to analyze players' interdependence in the Eurasian gas trade. The cooperative approach evades two major drawbacks of its non-cooperative counterpart: (i) The Eurasian gas trade is a vertical structure with market power at different stages, leading to inefficiencies in the network.⁵ Widely used in gas trade, long term contracts set both quantity and the price of gas delivered through the network and hence secure efficient use of the capacities. In line with long term contracts, the cooperative approach assumes that players use the pipeline network efficiently. However, the non-cooperative approach limits the players' action space to counterfactual prices or quantities. Thereby, players cannot exploit the network efficiently. (ii) In the Eurasian gas trade, the bargaining among the players occurs behind-the-scenes, making the bargaining process indefinite. Thus, the order of actions does not follow a standard procedure. Accordingly, the cooperative approach considers possible coalitions of the players and derives the players' bargaining power from their role in the Eurasian gas trade. In contrast, the non-cooperative approach assumes a detailed procedure in which the first mover has an advantage.⁶ A change in the procedure alters the outcome of the non-cooperative game considerably.

In the model, the Eurasian gas network is represented by sets of nodes R and links L . A link $l = \{i, j\}$, $i \neq j \in R$ connects the node i with j . A typical player consists of four nodes. Production field R_p , LNG regasification plants R_{LNG} and consumer market R_c are linked to transit node R_t . Players' transit nodes are connected with links to each other, which represent the international pipeline network. A positive x_{ij} designates gas flow from the node i to j through the link l_{ij} while a negative value describes a flow to the opposite direction. Gas flow through the link l_{ij} is constrained by the link's capacity k_{ij} and is subject to a link specific piecewise linear transportation cost $T_{ij}(x)$ which depends on the volume of gas shipped. Since flows from production node R_p and LNG node R_{LNG} to transit node R_t and the flow from transit node R_t to consumption node R_c indicate production, LNG imports and consumption, respectively, they have to be positive ($x_{ij} \geq 0$, $\forall i \in R_p$ or $i \in R_{LNG}$ or $j \in R_c$). The inverse demand is denoted as $p_j(x_{ij})$.

The value function $v : 2^{|N|} \rightarrow R_+$ represents the interaction among the players and assigns a maximal surplus, i.e., value, to each possible coalition of the players $S \subseteq N$, where N is the set of strategic players. The access right regime sets the links, i.e., production fields, LNG regasification plants, pipeline network and consumer markets, available to each coalition. The value function is calculated as:

$$v(S) = \max_{\{x_{ij} | \{i,j\} \in L(S)\}} \left\{ \sum_{\{i,j\} \in L(S), j \in R_c} \int_0^{x_{ij}} p_j(z) dz - \sum_{\{i,j\} \in L(S)} T_{ij}(x_{ij}) \right\} \quad (1)$$

⁵e.g., Russia in production and Ukraine in transit.

⁶e.g., first, the producer announces the price. Then, the transit country decides the tariff for the gas transported through its territory. Last, the consumer determines the demand, or vice versa.

subject to constraints:

$$\sum_i x_{it} = \sum_j x_{tj}, \quad \forall t \in R_T(S), \quad (\text{node balancing})$$

$$|x_{ij}| \leq k_{ij}, \quad \forall \{i, j\} \in L(S), \quad (\text{capacity})$$

$$x_{ij} \geq 0, \quad \forall i \in R_P \text{ or } i \in R_{LNG} \text{ or } j \in R_C. \quad (\text{non-negativity})$$

Once the value function is calculated, the Shapley value solves the game. It stands out among other solution concepts in the cooperative game theory.⁷ Its solution is unique and always exists, making it appropriate for policy analysis. Moreover, it is intuitive: A player's Shapley value, also called bargaining power in the study, is the sum of its weighted marginal contribution to each possible coalition. A player contributes to a coalition by amending the set of production fields, LNG facilities, pipelines and consumer markets, to which the coalition has access. The Shapley value Φ_i of a player $i \in N$ is calculated as:

$$\Phi_i(v) = \sum_{S:i \notin S} P(S) [v(S \cup i) - v(S)] \quad (2)$$

where $P(S) = |S|! (|N| - |S| - 1)! / |N|!$ is the weight of coalition S .

A pipeline project modifies the pipeline network and changes the interaction among the players, resulting in a new value function and hence a new Shapley value. The change in a player's Shapley value quantifies the project's gross impact on the player's bargaining power and can be compared with the project's cost to derive conclusions about its strategic viability.

The study's geographical scope spans from the UK in the West to Central Asia in the East. The countries are grouped into players, according to the differences in their energy policies and gas balances.⁸ In Europe Italy, Netherlands, and UK stand for themselves. Central Europe represents Germany, Denmark and Switzerland. Eastern Europe is composed of Austria, Czech Republic, Hungary, Poland and Slovakia. Western Europe is formed by France and Belgium. The Balkans stands for Bulgaria, Greece and Romania. In Europe, all players, except Netherlands, are net-importers and rely on supplies from Norway, Russia, Netherlands, North Africa and LNG.⁹ In the East, Turkey is a major market and the transit country in the Southern Corridor. Azerbaijan, Iraq and Iran are the potential suppliers to western markets. Central Asia represents landlocked Kazakhstan, Turkmenistan and Uzbekistan. In the North, Russia and Norway are the major suppliers to European markets. Ukraine and Belarus are transit countries for westbound Russian supplies.

⁷See Myerson (2004) and Peleg & Sudholter (2007) for alternative solution concepts, e.g., core, kernel, nucleolus, etc.

⁸A more detailed presentation of the countries would not alter the results and the conclusions derived in the study.

⁹Iberian Peninsula, the Baltic states, Scandinavia and North African producers such as Algeria and Libya are out of the study's scope since they are strategically irrelevant for Turkey.

The access right regime defines who can use the links constituting the network. In other words, it describes who is able to ship gas between markets, serve consumers in a market and produce gas in a field. According to the European TPA regulation, the international pipeline network lying in the European territory is open to all players (EC, 2003, 2005, 2009). However, outside of Europe a player may derive bargaining power by blocking third parties' shipments through its network. European or Non-European, all players control their consumer markets and production fields exclusively. An example might make the access right regime clear to the reader: consider a coalition composed by Russia, Ukraine, Eastern Europe and Central Europe. In the absence of Eastern Europe, Russian supplies flow freely through Eastern Europe westwards to Central European markets. However, in the absence of Ukraine, the transit of Russian supplies through Ukraine is blocked, and Central and Eastern European markets do not receive Russian supplies. In the absence of Central Europe, Russian supplies are carried to Central Europe, but its consumers do not consume Russian gas. Similarly, in the absence of Russia, the Russian fields do not produce gas although the European markets and the transit network between the Russian fields and the European markets are there.

The short-sighted view of 2-3 years is employed in the study. The time scope allows the players to make the network bidirectional, but prohibits them from investing in new pipeline links and from enlarging the existing capacities. Moreover, it disregards effects of seasonal demand and storage. As the name "short-sighted" implies, the players consider benefits from the existing pipeline network, but they ignore options to invest in other pipeline projects. Hubert & Ikonnikova (2011) provide a good discussion about the short- and far-sighted views. Cobanli (2014) compares results of a similar setup for both views.

The study uses the data for 2009 presented in Hubert & Cobanli (2012) and Hubert & Orlova (2012). Reproducing Cobanli (2014), the data is projected to 2015 since the pipeline projects are expected to become operational earliest in that year. Production, consumption and LNG imports in 2009 are taken from IEA (2010b), IEA (2011a) and GIE (2010). Gas flows at the European border points which serve as a benchmark for the calibration are collected from IEA (2010b). Forecasts for production, consumption and LNG in 2015 are provided by IEA (2010a), IEA (2011b) and GIE (2011). Table 3 presents the data and the sources in detail.

The model's calibration makes simple assumptions about demand functions and wellhead production costs about which poor information is available. Demand in consumer markets is represented by linear demand functions with a common intercept. Wellhead production costs are piecewise linear and constant up to the production levels in 2015. They differ regionally in accordance with Table 13.5 in IEA (2009). Then, given consumption in 2015, demand intercept and production cost, slope parameters of demand functions are estimated. Technical appendices in Hubert & Cobanli (2012), Hubert & Orlova (2012) and Cobanli (2014) present the numerical calibration of the model in detail.

Selection of the common demand intercept is decisive for conclusions regarding the pipeline projects' strategic viability. Since the area under the aggregate demand curve determines the surplus from the international gas trade, an increase in the common demand intercept results in a higher surplus and thus, higher absolute Shapley values. However, relative Shapley values are robust with respect to the demand intercept. Therefore, the study employs relative Shapley values to analyze the projects' impact on the players' bargaining power and avoid statements about their strategic viability.

Table 3: Players

Players	Consumption [bcm]		Production [bcm]		LNG Capacity [bcm]		Import Dep ^d [%]	
	2009 ^b	2015 ^c	2009 ^{ad}	2015 ^e	2009 ^f	2015 ^g	2009	2015
Turkey	36.4	40.9	0.7	0.7	12.2	12.2	98.1	98.2
Balkan ^b	20.2	22.7	10.8	10.8	5.3	7.3	46.5	52.4
Central Eur. ^f	104.6	117.7	23.7	23.7	0	0	77.3	80.0
Western Eur. ^f	44.1	49.6	0.9	0.9	23.8	36.8	98.0	98.2
Eastern Eur. ^h	57.4	64.6	10.7	10.7	–	5.0	81.4	83.4
Italy	75.6	85.1	8.1	8.1	11.4	14.2	89.3	90.5
United Kingdom	90.5	101.8	62.1	37.0	51.1	51.1	31.4	63.7
Netherlands	48.3	54.3	78.7	83	0	16.0	–	–
Norway	6.0	–	106.3	109.0	–	–	–	–
Russia	426.4	467.0	550.5	679.0	–	–	–	–
Belarus	17.9	20.1	0.2	0.2	0	0	98.9	99.0
Ukraine	53.3	60.0	21.9	21.9	0	0	58.9	63.5
Azerbaijan	10.0	11.0	14.9	20.0	–	–	–	–
Iran	136.5	136.5 ⁱ	137.4	137.4 ^m	–	–	–	–
Iraq	1.1	–	1.1	9.0	–	–	–	–
Caspian R ⁿ	93.3	133.0	131.1	204.0	–	–	–	–

^aNet imports/Consumption

^bData is compiled from IEA (2010b) and IEA (2011a).

^cFigures for Russia are taken from IEA (2011b). Figures for Caspian region (Azerbaijan, Kazakhstan, Turkmenistan and Uzbekistan) are taken from IEA (2010a). IEA (2011b) forecasts that European demand will increase by 12.5% from 2009 to 2015. Therefore, consumption of the European countries, Belarus, Ukraine and Turkey in 2009 are multiplied by 1.125.

^dExports to countries which are left out in the geographical scope are deducted from figures

^eFigures for Iran, Iraq, Netherlands, Norway, Russia and UK are taken from IEA (2011b).

^fFigures for the Caspian region are taken from IEA (2010a). IEA (2011b) expects that production levels of other European countries, Belarus, Ukraine and Turkey remain unchanged from 2009 to 2015.

^gCompiled from GIE (2010).

^hCompiled from GIE (2011).

ⁱBulgaria, Romania, Greece.

^jGermany, Denmark, Switzerland.

^kFrance, Belgium.

^lAustria, Hungary, Czech Republic, Slovakia, Poland.

^mAssumed equal to the consumption in 2011 although IEA (2011b) projects an increase of 17.2% in Middle East's demand.

ⁿAssumed equal to the production in 2011 although IEA (2011b) forecasts 137 bcm.

^oKazakhstan, Turkmenistan, Uzbekistan.

4 Impact of Pipelines

4.1 *The Status Quo*

In 2012, Turkey consumed 46.3 bcm of natural gas. While its indigenous production amounted to only 0.7 bcm, Turkey imported 98% of its consumption from a few suppliers (See Table 1). With 24.5 bcm (53%) Russia dominated Turkey's consumer market. Russian supplies to Turkey follow two routes. While with a capacity of 16 bcm/a the offshore Blue Stream under the Black Sea links Russia directly to Turkey, the rest of Russian shipments has to cross Ukraine and then, the Balkans to reach the Turkish market.

With 7.5 bcm (16%), Iran was the second largest supplier of Turkey. Although Iran owns the second largest proven conventional gas reserves in the world, its indigenous production barely covers its domestic demand. The western embargo hinders technology as well as capital intensive investments in its production fields and pipeline network. Actually, Iran serves as a transit country for Turkmen gas. Iranian supplies substituted by Turkmen gas are shipped to Turkey. Several interruptions in Iranian gas deliveries as well as political conflicts in the region due to Iran's nuclear program cast shadow on its reliability as a transit country.

Azerbaijan supplied 3.8 bcm (8%) via Georgia to Turkey. It is expected that the inauguration of the second stage of the Shah Deniz field and the associated TANAP will increase Azerbaijan's share in the Turkish market remarkably. So far, Georgia has been a reliable energy partner by the transit of Caspian hydrocarbon resources to Turkey and the western markets via SCP as well as the Baku-Tbilisi-Ceyhan oil pipeline. Georgia seeks to become a member of NATO and the EU in long-term and has been moving away from Russian influence. However, several civil and ethnic wars in the recent history of Georgia and the Russia-Georgia War of 2008 have put Georgia's reliability as a long term partner in the transit of westbound gas into question.

The rest of Turkey's demand was served in form of LNG from overseas suppliers such as Algeria (4.1 bcm), Nigeria (1.5 bcm), Qatar (1.2 bcm) and Egypt (0.5 bcm). In strategic terms, LNG is more secure than pipeline gas. Special LNG vessels carry supplies from overseas producers directly to consumer markets. Thus, there are no transit countries and no expensive pipeline projects which need commitment from all partners.¹⁰ LNG regasification plants are flexible since they can be served by several suppliers. In case of a disruption of pipeline imports, gas from international LNG spot markets may cover the deficit.

¹⁰Once a pipeline project is completed, its cost is sunk. The pipeline cannot be relocated and used for other purposes. After the project's completion, its stakeholders may renegotiate the distribution of the surplus created by the pipeline. The lack of ability to commit may cause a hold-up problem, and the pipeline project may not be realized. For example, Russia built the expensive Nord Stream under the Baltic Sea to ship its supplies directly to the European markets although an update of the existing pipeline system through Ukraine was a cheaper option. Since Ukraine could not commit not to renegotiate the distribution of the surplus after the update's completion, Russia chose the expensive offshore option to bypass Ukraine.

Table 4: The Southern Corridor's Impact on Bargaining Power

Players	Benchmark	Impact of pipelines [pp ^d]			
		TANAP	TANAP+TAPEX ^b	TANAP+NabWEX ^c	TANAP+TAP ^d
Turkey	7.15	0.31	0.4	0.6	0.74
Balkan ^e	0.68	0.03	0.06	0.14	0.15
Central Europe ^f	17.49	0.02	0.03	.	-0.02
Western Europe ^g	4.96	0.01	0.01	-0.01	-0.02
Eastern Europe ^h	8.63	0.01	0.02	.	-0.01
Italy	3.34	.	.	-0.01	-0.01
United Kingdom	6.5	0.01	0.01	-0.01	-0.02
Netherlands	6.36	-0.04	-0.07	.	0.04
Norway	12.7	-0.07	-0.13	-0.02	0.04
Russia	16.85	-0.32	-0.33	-0.33	-0.34
Belarus	5.61	.	-0.03	-0.03	-0.04
Ukraine	7.92	-0.16	-0.31	-0.46	-0.53
Azerbaijan	0.61	0.31	0.46	0.30	0.21
Iran	0.96	-0.10	-0.11	-0.16	-0.20
Caspian R ⁱ	0.24	-0.01	.	.	.

^app: percentage points.

^bTAP is exempt from the European TPA regulation. Only coalitions containing Azerbaijan can ship gas through the pipeline.

^cHalf of Nabucco-West's capacity (5 bcm/a) is exempt from the European TPA regulation and reserved for coalitions containing Azerbaijan.

^dTAP is subject to European TPA regulation. All players can employ the pipeline to ship gas among markets in both directions.

^eBulgaria, Romania, Greece.

^fGermany, Denmark, Switzerland.

^gFrance, Belgium.

^hAustria, Hungary, Czech Republic, Slovakia, Poland.

ⁱKazakhstan, Turkmenistan, Uzbekistan.

Although Turkey's supplies are poorly diversified, its high demand as well as strategic location between the suppliers in the East and the markets in the West give Turkey some leverage at the bargaining table. In the status quo scenario, also called the benchmark, Turkey receives a share of 7.15% in the Eurasian gas trade, as presented in column 1 of Table 4.¹¹ Participating in the pipeline projects, Turkey aims to shape the pipeline network in its favor and thus, to increase its bargaining power vis-a-vis other players in three ways: diversifying its suppliers, bypassing transit countries, and becoming a transit country in the East-West gas trade.

¹¹According to the model's calibration, cooperation of all players in the Eurasian gas trade via pipelines brings in 374.5 bn €/a. A share of 1% amounts to 3.7 bn €/a. With a share of 7.15% Turkey receives 26.8 bn €/a from the cooperation.

Following sections present how projects alter the power structure in Eurasian gas trade. First, the projects in the Southern Corridor and their TPA regimes are investigated (Table 4). Later, leverage accruing to Turkey from Northern Iraqi supplies is studied (Table 5). Lastly, South Stream and its impact on the Southern Corridor are evaluated (Table 6).

4.2 The Southern Corridor

In Table 4, first, TANAP will carry Azerbaijani gas to the Turkish market and the European border (column 2). Then, TAP or Nabucco-West will deliver the gas to Continental Europe (columns 3-5). Although Nabucco-West is abolished by its consortium, it is included in Table 4 to clarify the Shah Deniz consortium's recent decision in favor of TAP as well as to present the impact of different TPA regimes on the player's power. Figures in each column are given in differences with respect to the benchmark (column 1), and all figures are quoted in percentage points (pp).

4.2.1 TANAP

Carrying Azerbaijani gas to Turkey, TANAP will diversify Turkey's supplies. As shown in column 2 of Table 4, increase in supply competition yields Turkey a benefit of 0.31 pp and harms its current suppliers, i.e., Russia and Iran by 0.32 and 0.1 pp respectively. The European players' power changes marginally due to the small pipeline capacities between the Balkans and Continental Europe.

4.2.2 TAP vs. Nabucco-West

With the same capacity of 10 bcm/a, TAP and Nabucco-West will unite the Balkans with Continental European markets. If their TPA regimes were the same, they would alter the power structure in the same way. However, they are subject to different TPA regimes and hence, their impact on the players' power diverges considerably.

Column 3 of Table 4 presents the current state of the Southern Corridor. TAP is entitled to carry Europe-bound Azerbaijani supplies and exempted from the European TPA regulation. TAP's all capacity is reserved for Azerbaijani gas. Thus, Azerbaijan may block entry of Norway and Netherlands to the pipeline to protect its market share in Turkey and the Balkans while enjoying access to the Continental European markets.¹² Hence, the supply competition is only strengthened in Continental Europe. A comparison of columns 3 and 2 in Table 4 shows that entry to the European markets benefits Azerbaijan by 0.15 pp. TAP gives Turkey the transit position between the East and the West, for which Turkey has yearned so long; however it also increases the demand competition between the Turkish and the European consumers for westbound Azerbaijani supplies. Therefore, TAP yields Turkey only 0.09 pp. Marginal benefits accrue to the European consumers since TAP's capacity is small compared to the total European consumption and imports.¹³

¹²Actually, not only Azerbaijan, but TAP's consortium controls access to the pipeline. For simplicity, Azerbaijan represents the consortium since the project aims to deliver westbound Azerbaijani gas.

¹³In 2012, the EU consumed 443.9 bcm and imported 294.3 bcm from the Non-European suppliers (BP, 2013).

Column 4 of Table 4 shows a counterfactual case. Instead of TAP, Nabucco-West is selected to carry Azerbaijani supplies in the European territory. Only half of the pipeline's capacity (5 bcm/a) is reserved for coalitions containing Azerbaijan. All players can use the other half of the pipeline's capacity to ship gas in both directions. Thus, Netherlands and Norway can send gas eastwards to Turkey and the Balkans. In this case, the supply competition intensifies in Continental Europe as well as in Turkey and the Balkans. Supplies from Norway and Netherlands bring in an additional 0.2 pp to Turkey over its gains from the transit of westbound Azerbaijani gas (column 4 vs. 3), and its gains from the Southern Corridor add up to 0.6 pp (column 4 vs. 1). The supply competition with Norway and Netherlands in the Turkish and Balkan markets, harms Azerbaijan by 0.16 pp, wiping out its gains from the entry to the Continental European markets (column 4 vs. 3). The European consumers suffer marginally from the project due to demand competition with Turkey for Dutch and Norwegian supplies.

Column 5 of Table 4 displays another counterfactual case. TAP is chosen to carry Azerbaijani gas, but the EC rejects the application of TAP's consortium for exemption from the European TPA regulation. In this case, Azerbaijan cannot control access to the pipeline, and the pipeline's full capacity is available for every player in both directions. The effects observed by Nabucco-West are amplified since Norway and Netherlands may use the pipeline's full capacity to serve demand in Turkey and the Balkans. Thus, Turkey's gains from the Southern Corridor increase by 0.14 pp, and Azerbaijan suffers by 0.09 pp (columns 5 vs. 4). Again, the impact on European consumers is marginal and negative.

A close investigation of columns 3-5 of Table 4 displays TPA regime's impact on the power structure. Although the European TPA regulation requires open access to pipeline network in the European territory, the projects' exemption from this regulation yields the European consumers larger benefits. This finding is in accord with TAP's exemption by the EC from the European TPA regulation in May 2013.

In line with the Shah Deniz consortium's decision in favor of TAP, a comparison of columns 3 and 4 in Table 4 shows that Azerbaijan benefits from TAP (0.46 pp) more than from Nabucco-West (0.3 pp). The EC concurs with the Shah Deniz consortium's decision since TAP protects the European consumers from demand competition with Turkey. However, Turkey is in disaccord with its partners in the Southern Corridor. It would prefer Nabucco-West (0.6 pp) to TAP (0.4 pp).

Opening of the Southern Corridor via TAP or Nabucco-West yields no significant gains to European players although the EC endorses the Southern Corridor and the European national champions are shareholders in the projects' consortia. The EC does not need TAP or Nabucco-West to enhance the supply security of the Balkans, which is the most vulnerable region in Europe to a disruption of gas transit through Ukraine. Although the Balkans will remain isolated from Continental European markets, TANAP will carry Azerbaijani gas to the Balkans and diversify its imports. The analysis suggests that the European companies will not invest in the Southern Corridor's European section any time soon. This conclusion accords with the recent changes in the projects' consortia. In April 2013, Germany's RWE left Nabucco-

West's consortium.¹⁴ In July of the same year, the Shah Deniz consortium joined TAP and acquired 60% of the project's shares. Hence, TAP's major beneficiary, i.e., its supplier, will bear most of the project's cost instead of the European companies.

Table 5: Iraq & the Southern Corridor's Impact on Bargaining Power

Players	Benchmark	Impact of pipelines [pp ^a]				
		<i>with Iraq</i>				
		Iraq	TANAP	TANAP+TAPex ^b	TANAP+NabWex ^c	TANAP+TAP ^d
Turkey	7.15	0.56	0.93	1.02	1.20	1.33
Balkan ^e	0.68	.	0.04	0.07	0.15	0.16
Central Europe ^f	17.49	-0.02	0.02	0.04	0.02	.
Western Europe ^g	4.96	.	0.01	0.01	.	.
Eastern Europe ^h	8.63	-0.01	0.01	0.03	0.02	0.01
Italy	3.34	.	.	0.01	.	-0.01
United Kingdom	6.5	-0.01	0.01	0.02	.	-0.01
Netherlands	6.36	-0.05	-0.11	-0.16	-0.10	-0.07
Norway	12.7	-0.10	-0.21	-0.31	-0.22	-0.16
Russia	16.85	-0.32	-1.03	-1.04	-1.04	-1.04
Belarus	5.61	.	.	-0.03	-0.03	-0.04
Ukraine	7.92	-0.16	-0.26	-0.42	-0.55	-0.60
Azerbaijan	0.61	-0.15	0.17	0.34	0.20	0.13
Iran	0.96	-0.27	-0.21	-0.21	-0.24	-0.27
Iraq	.	0.58	0.65	0.65	0.62	0.61
Caspian R ⁱ	0.24	-0.06	-0.03	-0.02	-0.02	-0.02

^app: percentage points.

^bTAP is exempt from the European TPA regulation. Only coalitions containing Azerbaijan can ship gas through the pipeline.

^cHalf of Nabucco-West's capacity (5 bcm/a) is exempt from the European TPA regulation and reserved for coalitions containing Azerbaijan.

^dTAP is subject to European TPA regulation. All players can employ the pipeline to ship gas among the markets in both directions.

^eBulgaria, Romania, Greece.

^fGermany, Denmark, Switzerland.

^gFrance, Belgium.

^hAustria, Hungary, Czech Republic, Slovakia, Poland.

ⁱKazakhstan, Turkmenistan, Uzbekistan.

4.3 Northern Iraqi Interconnector

An interconnector between Turkey and Northern Iraq will link rich fields in the region to the Turkish market. Then, the Southern Corridor may carry Northern Iraqi supplies to European markets. As presented in column 2 of Table 5, Northern Iraqi supplies improve Turkey's bargaining power by 0.56 pp. Supply competition with

¹⁴However, GDF Suez joined in Nabucco-West's consortium in May 2013.

Iraq in Turkey harms Russia, Iran and Azerbaijan by 0.32, 0.27 and 0.15 pp respectively. The following columns in Table 5 have the same structure as columns in Table 4 and show the impact of the Southern Corridor having Iraq as an additional supplier. Iraqi supplies do not alter the gains accruing from the Southern Corridor to European consumers, Turkey and Azerbaijan significantly.

4.4 South Stream

Initiated by Russia, South Stream will link Russia via an offshore pipeline under the Black Sea to the Balkans and will open a new transit route for Europe-bound Russian supplies. As shown in column 2 of Table 6, the project brings Turkey and the Balkans 0.14 and 0.16 pp respectively since the bypass of Ukraine increases the supply security in their gas trade with Russia. Contrary to European scepticism that South Stream will enhance Russian dominance in European markets, the diversification of the transit routes benefits the European importers significantly, especially Central Europe (by 0.47 pp). Gains accruing to Russia (0.99 pp) explain the country's insistence on the project while Ukraine suffers by 1.08 pp.

Turkey benefits more from the Southern Corridor (0.4 pp, column 3 in Table 4) than from South Stream (0.14 pp, column 2 in Table 6). The projects are not rival since they alter the power structure through different effects: transit and supply competition. South Stream increases Turkey's power by bypassing Ukraine, but it does not change its supply portfolio. The Southern Corridor introduces additional volumes of Azerbaijani supplies to the Turkish market and endows Turkey with a potential transit role in the East-West gas trade. Therefore, Turkey will gain from the construction of both projects. This is in line with Turkey's permission for South Stream to pass through its territorial waters in the Black Sea.

By the same token, the EC's concern that South Stream might forestall investment in the Southern Corridor is dispelled. A comparison of columns 3-6 in Table 6 and columns 2-5 in Table 4 evinces that South Stream's presence does not alter the Southern Corridor's impact on the power structure significantly.

Table 6: South Stream's Impact on Bargaining Power

Players	Benchmark	Impact of pipelines [pp ^a]				
		South Stream	<i>with South Stream</i>			
			TANAP	TANAP+TAPex ^b	TANAP+NabWex ^c	TANAP+TAP ^d
Turkey	7.15	0.14	0.38	0.47	0.63	0.74
Balkan ^e	0.68	0.16	0.16	0.18	0.23	0.22
Central Europe ^f	17.49	0.47	0.49	0.51	0.51	0.52
Western Europe ^g	4.96	0.16	0.16	0.16	0.16	0.16
Eastern Europe ^h	8.63	0.22	0.23	0.24	0.25	0.25
Italy	3.34	0.12	0.12	0.13	0.13	0.14
United Kingdom	6.5	0.20	0.20	0.21	0.21	0.21
Netherlands	6.36	-0.31	-0.34	-0.37	-0.32	-0.29
Norway	12.7	-0.61	-0.67	-0.71	-0.63	-0.59
Russia	16.85	0.99	0.60	0.58	0.51	0.49
Belarus	5.61	-0.22	-0.22	-0.25	-0.25	-0.27
Ukraine	7.92	-1.08	-1.09	-1.23	-1.34	-1.42
Azerbaijan	0.61	-0.08	0.16	0.29	0.17	0.09
Iran	0.96	-0.15	-0.19	-0.21	-0.24	-0.26
Caspian R ⁱ	0.24	-0.01

^app: percentage points.

^bTAP is exempt from the European TPA regulation. Only coalitions containing Azerbaijan can ship gas through the pipeline.

^cHalf of Nabucco-West's capacity (5 bcm/a) is exempt from the European TPA regulation and reserved for coalitions containing Azerbaijan.

^dTAP is subject to European TPA regulation. All players can employ the pipeline to ship gas among the markets in both directions.

^eBulgaria, Romania, Greece.

^fGermany, Denmark, Switzerland.

^gFrance, Belgium.

^hAustria, Hungary, Czech Republic, Slovakia, Poland.

ⁱKazakhstan, Turkmenistan, Uzbekistan.

5 Conclusions

The study applies cooperative game theory to a quantitative model of the Eurasian natural gas trade. The Shapley value, also interpreted as bargaining power here, solves the game and quantifies the selected pipeline projects' impact on players' bargaining power. Focusing on Turkey, the paper analyzes pipeline projects in the Southern Corridor, as well as South Stream in detail.

As shown in Tables 4 and 5, Azerbaijani gas through TANAP and Northern Iraqi gas through an interconnector will diversify Turkey's supplies and yield the country large benefits. As the transit country in the East-West gas trade, Turkey will collect a large share of gains from the Southern Corridor while negligible benefits will accrue to the European consumers. The analysis suggests that the Shah Deniz consortium and Turkey will undertake TANAP, but the European companies will not invest in the Southern Corridor's European section. In line with this conclusion, Germany's RWE dropped out of Nabucco-West's consortium in April 2013, and the Shah Deniz consortium, i.e., the supplier of the Southern Corridor, acquired the majority of TAP's shares from the project's European shareholders in July of the same year.

Although the discussion about TAP and Nabucco-West centered on price competition and target markets, the major difference between the projects stems from their TPA regimes. Table 4 shows that Azerbaijan and Europe prefer TAP while Turkey favors Nabucco-West. In line with these results, the EC exempted TAP from the European TPA regulation in May 2013, and the Shah Deniz consortium entitled TAP as the final route in June of the same year.

In contrast to the popular view, South Stream and the Southern Corridor are not rival projects. Both will increase supply security of Turkey and Europe, but through different effects. Bypassing Ukraine, South Stream will enhance transit competition for westbound Russian supplies, but will not introduce any new suppliers to the western markets. The Southern Corridor will connect the eastern suppliers to Turkey as well as Europe and will increase supply competition in western markets. Therefore, as presented in Table 6, South Stream cannot prevent investment in the Southern Corridor, and Turkey benefits from construction of both projects. In line with these conclusions, in December 2011, Turkey gave South Stream its permission to pass through its territorial waters in the Black Sea. However, Turkey rejected invitation of Russia's Gazprom to join the project's consortium.

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