The dynamics of natural gas supply coordination in a New World
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Chapter 12
Conclusion and discussion

First and foremost, this study dealt with the scope for Russia’s cooperation with other gas-exporting countries, and how such cooperation can strengthen Russia’s position as a geopolitical player. The first step in this study tackled the question as to whether Russia is still focussed on geopolitical power, or whether it wants to be part of a globalising economy and/or political order. The answer is: A bit of both. On the one hand, Russia’s seeks to restore its place in the international political system and must, in its perception, defend its geopolitical and geo-economic interests. On the other hand, at a global level, Russia seeks to become an important player in international affairs, where it must take into account its own interdependence with other actors in the international political system. Russia’s ideas about that system and its structure are a key element in defining the boundary solutions for cooperation between Russia and other gas-exporting countries.

In that world, gas is swiftly becoming a more strategic commodity. At a state level, Russia’s capability and willingness to collude (with other players in the interregional gas market) can ultimately translate into geopolitical power by securing its economic well-being. Russia’s perception of its potential pipeline investments and how they can act as economic-strategic tools to safeguard Russia’s position in European gas market(s) also matters. For Russia, the potential of gas as a conduit for the re-integration of political ties between Russia and countries in the post-Soviet space as well as in Europe proper, acts as a powerful driver for Russia’s long-run power base in Eurasia. However, a zero-sum view of the world could incline Russia to compete geo-strategically with the US at a global level, possibly leading to adverse economic effects for Russia. It remains constrained by the interdependent nature of the international political system, and is duly aware of this fact.

Gas market oversupply could undermine Russia’s economic security. Given the nature of Russia’s identity as a great power, tacit and strategic collusion with other gas-exporting countries is more favourable than open and explicit cooperation in the form of OPEC because Russia wishes to avoid binding commitments. This can challenge US hegemony by affecting the Eurasian geopolitical make-up in Russia’s favour. Its export position in Europe draws in the US as an important actor, in what is a complex geo-economic game to control and influence gas flows in Eurasia, in terms of both size and direction. Section 12.1 provides a summary and
conclusions of this study. Section 12.2 includes a discussion and deals with recommendations for further research.

12.1 Summary and conclusions
The objective of the research objective was stated in Chapter 1 as being: "To identify, in light of Russia's position in the international political system, what shape and form of collusion with other gas-exporting countries is feasible for strengthening Russia as a geo-strategic player in the structure of the international system." From this research objective, four research questions have been derived. This section is organised into four sections, aiming to give answers to the four research questions posed in Chapter 1, in accordance with parts I through IV. Firstly, the concluding remarks on the positioning of Russia in a changing international political system and the role of gas herein are discussed. Secondly, Russia’s overall position in the interregional gas market and the nature of other gas-exporting countries is summarised. Thirdly, Gazprom’s investment policy and its relationship with Russia as a state are reviewed on the basis of the application of the model in the case studies. Finally, we review the scope and nature of cooperation in an interregional gas market from a Russian vantage point, taking into account the counter policies of the US as geo-strategic adversary.

12.1.1 Russia's perception of the international political system and the role of gas
Part I helped us understand the first research question in Chapter 1: In a globalising world with interdependent actors, does Russia seek to become a geo-strategic player in the structure of the international political system? What is Russia’s perception of this structure and interdependence and how does this perception affect its dealings with the outside world?

Comparatively poor in reserves of oil (but certainly also an important producer thereof today), Russia has discovered a long-run source of economic security in natural gas. Russia realised that while oil revenues fill Russian state coffers in the short run, gas holds the potential to do so in the longer run. For Russia, the fact that gas is a resource it abundantly possesses, offers it ample potential for economic security and enhanced geopolitical power in a world where gas is increasingly a commodity of strategic significance. In gas and gas flows, Russia has found the means to re-integrate, through gas trade and the fixed nature of gas pipelines, its spheres of influence within its own strategic space. Gas, its development and export, can form the basis of Russia’s geo-strategic power also because it can serve as an instrument of political integration with states, not only in the post-Soviet space but also in Europe proper. At the project level, Russia’s gas pipeline investments can serve as tools hence not only of a geopolitical nature, by tying in countries into long-term dependency relationships, but also of a geo-economic one.
A newly emerging Russian gas strategy, combining domestic gas sector reforms with foreign policy and with commercial diplomacy through Gazprom, is coalescing around both internal and external priorities. Indeed, such an economic-strategic approach is common also in the other gas-producing and exporting countries. In order to maximise the value of its gas resources, Russia requires an integrated gas strategy, pertaining to the up-, mid- and downstream components of the gas value chain. This strategy has thus far consisted of 1) reforming and securing the stability of Russia’s domestic gas sector; 2) securing access to Central Asian gas; 3) securing access to gas infrastructure in important transit countries and 4) securing access to existing and possibly new gas export markets. Given the role gas plays in its national interest, Russia’s actions are likely to be more economic-strategic (and politico-strategic) rather than purely market-driven.

Particularly when it comes to gas and gas flows, Russia’s perception of the world in geopolitical terms shapes its approach in using its gas resources and the gas industry, in the service largely of its national interest. Russia faces many challenges in its domestic gas market and the need to modernise its gas infrastructure. In light of the above, Russia has again become a geopolitical adversary for the West in the post-Soviet space. The realisation also that the US and its Western allies could undermine Russia’s position in Central Asia, and therefore also the gas flows upon which it depends, drives Russia to assert itself in the region. Russia’s approach to international politics is geopolitical in that it hinges on limiting and curtailing the reach of US influence in the post-Soviet space (i.e., within the heartland). This flows forth from a zero-sum perception of the world.

In a way, Wendt’s view of immaterial forces and perceptions pertain to agents’ desires and perceptions of the ‘rules of the game’ in the international political system. It was out of a desire to become a more active player in the international political system that Russia turned to gas as a source of relative economic advantage in an increasingly multi-polar world. The changed perception of the rules of the game and of energy resources as enablers helped shaped Russia’s course(s) of action. With its role as an important potential gas supplier to China and Europe, Russia ensures not its own economic security, but empowers Russia vis-à-vis other great powers at large.

The Russian leadership nevertheless remains mindful of the need to diversify and modernise the Russian economy, amongst other issues. Russia is aware that it lives in an interdependent world, where it cannot act as a ‘loose Hobbesian cannon’, but must seek a less confrontational approach. At a global level, Russia’s perception of the structure of the international political system ultimately feeds into its course of action within the international gas market. The world is changing, its great powers becoming more interdependent, and in this changing world Rus-
sia remains vulnerable with its over-dependence on energy export earning. Aware of this changing international political context and the importance of relative advantages, Russia is bent on modernisation and must take into account the impact on its gas export markets of other exports from other gas-exporting countries.

12.1.2 Russia’s position in the interregional gas market

Part II assisted us in answering the second research question Chapter 1: If gas is to play an important role in Russia’s post-Cold War ambitions, how is the gas market evolving and where, at the company level, i.e., Gazprom, does Russia stand? Which are the most important gas-exporting countries in a dynamic interregional gas market? What platforms for cooperation (already) exist in the interregional gas market?

Russia’s gas strategy is translated from an economic- and politico-strategic dimension to investment policy and strategy at the firm level, where Gazprom acts as an agent of its principal, the Russian government. Gazprom’s emerging export strategy illustrates how Russia is shifting from a captive, regional European setting to a more global one, as it plans to diversify its pipeline gas exports (to Asia and within Europe) and enters the LNG markets with its own projects. Gazprom, which itself is experiencing an important transition at home and abroad, is in the midst of a rapidly changing and dynamic interregional gas market. This interregional gas market is changing in terms of both regional market structures and of gas pricing and trading. Regional, previously isolated gas markets now are becoming steadily more exposed to interregional flows where modes of trade are undergoing profound changes.

Long-term contracts remain predominant, but increased flexibility can be discerned, driven by new business models amongst other factors. The gas industry is thus experiencing a shift from a point-to-point form of trade in gas, with captive suppliers and buyers, to a more interregional, flexible form of trade. Short-term trade in LNG increasingly offers trade between multiple parties and markets. The quick expansion of LNG, during the 1990s and 2000s, has further interlinked and interconnected various regional markets, compelling their demand centres to compete with one another for interregional supplies. The gas market is still interregional and rigid rather than global and liquid.

Of the various regional gas markets, Europe is the most exposed to both pipeline and LNG flows and imports. Europe’s gas import sources include gas supplies from Russia, Norway and Algeria, and it is expected that Europe will become sharply more import-dependent in the coming years. The US is less dependent on gas imports, provided mainly by pipeline gas from Canada and some LNG from other sources. Recently, unconventional gas production in the US seriously impacted prospects for further gas imports. Japan, Korea and Taiwan are net
LNG-importing countries, whereas emerging Asian countries such as China and India are only just becoming more import-dependent. On the gas trade and pricing side, European gas trade is based on long-term take-or-pay contracts, with indexation to oil and oil products, with some spot sales based on gas-to-gas competition mainly in the NWE market. US gas trade, by contrast, is mainly based on spot sales. Asian gas trade is based on long-term take-or-pay contracts, with indexation to oil and coal products, while some Asian buyers buy individual LNG spot cargoes. Together, the European and US markets form the basis for trade in the Atlantic Basin while the Asian markets, with Japan as the most important demand likewise forming the Pacific Basin. The former is characterised by shorter-term trade while the latter sees more long-term trade.

Long-term forecasts of gas demand in the world’s most important regions are also prone to great uncertainties, due to various reasons. These uncertainties are related to the level of economic growth, government policies regarding the use of gas in its energy mix, the relative (oil and) gas price (volatility) development vis-à-vis its substitutes, CO$_2$ emission costs and CCS developments, and the development of different (price) regulatory regimes. Due to declining indigenous supplies in Europe, it is expected that European imports will grow. However, there are also scenarios that assume a decrease in European gas imports in the mid term, which illustrates the uncertainty prevailing in the market. In the coming decades, though uncertain, largely due to the development of unconventional gas, some additional LNG import may be required in the US. It is expected that gas imports will grow in Asia. However, in absolute terms Asian consumption is expected to remain relatively low, when comparing it to the US and European markets.

For the purpose of this study, those gas exporting countries that are destined to shape this interregional gas market can be separated roughly into two camps: the inner and the outer gas market integrators. The inner integrators consist of Russia and the Caspian Sea/Central Asian gas-exporting countries, namely Azerbaijan, Turkmenistan, Kazakhstan, Uzbekistan as well as Iran. All four post-Soviet countries pursue gas export market diversification opportunities even as they appear to leave to Russia the role of aggregator of gas flows on the Eurasian continent. In addition, the fact that they are landlocked leads them to continuously seek diversity in their exports to Asian markets as well as Europe. However, they remain strongly tied to Russia and are important in the latter’s gas balance.

For Russia, Iran is of geo-economic significance within the Eurasian gas ellipse and plays an important role as a fellow potential gas exporting country. Russia and Iran also have a number of geopolitical interests with regard to one another. The post-Soviet countries, together with Russia, account for the bulk of interregional pipeline gas trade. The structure of the interre-
gional gas market will continue to change as import-dependencies widen and as gas exporters such as Russia possibly expand pipeline gas exports to Asia even as its own LNG export plans materialise. The Russian pipeline gas export expansion plans are mirrored by significant increases in interregional LNG flows, mainly from the Persian Gulf, North and West Africa. The outer integrators see their greatest interregional gas market potential fulfilled by LNG exports, being countries with access to the open sea.

In the long run, Qatar and Russia are the most important integrators at an interregional level; with Qatar far and away in the lead as far as LNG exports to various regional gas markets are concerned. The discussions between Russia and Qatar on potential cross investments and gas trading highlight the awareness of both countries of each other’s long-term roles in an interregional gas market. The partnership between these countries is likely to have significant long-term effects on the market structure of regional gas markets, particularly when shared investments and further the coordination of capacity expansion come into play. Meanwhile both Iran and Qatar have the potential to affect long-run market structures in various regional markets, with Qatar doing so through LNG through a multi-market export strategy and Iran by means of possible combination between LNG and pipeline gas exports. However, for the foreseeable future, Iran’s gas export potential is likely to remain dormant.

For Gazprom, Europe still offers the most growth opportunities in the long run. In its traditional European market, Gazprom faces competition mainly from other pipeline suppliers: Norway, Algeria, and the Netherlands. These countries, except for the Netherlands, are expected to retain their market share and power. From Gazprom’s perspective, these are significant partners in the European gas market. Other important players in the Atlantic Basin include Nigeria, Libya, the UAE, Yemen, Egypt and potentially in the long run, Iraq. Together with Qatar, some of these countries are bound to play an important role as liquid LNG hubs, midway between the Asian and Atlantic LNG markets. The Pacific region has seen the rising share of LNG exports from Australia, next to more traditional suppliers in the region such as Indonesia, Malaysia and Brunei.

Gas reserve concentration and market power are an indication of which countries have the most potential to affect market conditions in the long run. As for concentration in reserves and the market power of these key gas-exporting countries, some 70 percent of world’s conventional gas reserves are located in the strategic gas ellipse, while three countries possess over half of the world’s conventional gas reserves: Russia, Iran and Qatar. Market power can be measured at a regional and an interregional level. In the Atlantic basin, the most important LNG players in terms of market power are Algeria, Trinidad and Tobago and Nigeria. Qatar will play an increasingly important role in various regional gas markets, swiftly becoming an im-
portant interregional player, both in the Atlantic and Pacific LNG suppliers. Private international LNG players, the IEFs, are not to be underestimated: through vertically integrated value chains, technological know-how and expertise, these players engage in commercial trades potentially at the expense of the bigger government-driven national champions.

Currently, the GECF is the only platform with broad membership that draws most gas-exporting countries together within a single platform. Until 2006, little interest was shown in this organisation, and it was not taken seriously by either industry observers, or key gas-exporting countries such as Russia. Since then, the attention to the GECF has reached new levels. Russia, Qatar, Iran, Algeria and Venezuela appear to be the most active members, though Russia’s interest has only been recent. In late 2008, Russia, Iran and Qatar formed the Gas Troika, a ruling body of three, where perhaps a number of key long-run decisions are decided upon tacitly. The GECF and the Gas Troika can hardly be referred to as attempts to cartelise the interregional gas market. The comparison between the GECF and OPEC is a layman’s mistake. Nevertheless, potential for future cooperation between gas-exporting countries exists; it is merely the form and definition of such cooperation that differs from OPEC. Rather, it is shared gas production and export projects that take relations between the various gas-exporting countries a step further. An assessment of both regional and interregional gas market trends and the position of key gas-exporting countries aids in answering the overall research objective.

12.1.3 Gazprom’s gas investment strategy and the Russian state

Part III contributed to answering the third research question in Chapter 1: Based on the empirical analysis of a number of case studies, what factors influence Gazprom’s gas investments? What are some of the uncertainties and complexities Gazprom must deal with at the firm level?

Given demand uncertainty and possible actions taken by entrants, a firm may thus choose to invest early to pre-empt a potential competitor. However, a fundamental aspect of the real-option game approach is that the combination of interaction between downside demand risk and potential entry may, in various scenarios, warrant a wait-and-see approach, i.e., postponement of investment in gas transport infrastructure. As a result, the corresponding investment decisions involve a trade-off between the values of postponement and pre-commitment. In Chapter 8, we argued that the decision to invest in accordance with the aforementioned three levels of planning is, therefore, based on an overall NPV criterion that integrates the net strategic (game-theoretic) value and the flexibility (option) value. Based on these value components, we can distinguish between the value of having a strategic option to compete (strategic ‘option-game’ value) and foregoing this option to compete now (the value of the option to
These values collectively are an addition to the traditional direct (static) net present value, which is equal to the future expected cash flows from investing immediately.

At the project level, Gazprom can potentially affect the market structure to its advantage, if it invests in certain projects early on. In this manner, Nord and South Stream as well as—from a historical point of view—Blue Stream, act as expensive and lumpy options on future gas demand growth ahead of potential competitors. On the basis of the different case studies, an analysis was made of the various strategic investment decisions available to Gazprom, primarily as an incumbent in sub-regional European markets. For Gazprom, early commitments in the form of early gas infrastructure investments hence ensure access to its commodity position in its export markets. These infrastructural investments pertain primarily to growth opportunities, where additional room in the market is created due to, for example, rising demand or declining domestic production in various consuming markets. In so doing, these gas pipelines can also act as deterrents with regard to other potential gas suppliers or gas-exporting countries.

The application of the real-option game has shown that value can be derived from an increase in economies of scale in transport capacity for long-distance gas pipelines, which can act as a deterrent against possible entry. In the model, the economies of scale reduce unit costs in the long run (and in short-run marginal costs), i.e., the direct strategic value of the project. Due to the economies of scale of its pipelines and the corresponding value chains, Gazprom is in a strong position to deter a potential entrant’s investment (i.e., the strategic reaction value). In the end, it can capture a relatively high market share and influence the market structure ex-post over a long period of time (i.e., the strategic pre-emption value). Conversely, postponing investment may prove to be just as attractive in the face of downside demand risk(s), for example. These elements together make up the real value of such investments, in addition to the actual static value. Regional gas market structures can thus be influenced by individual projects, which are particularly inherent to an industry characterised by an oligopolistic market structure, and a capital-intensive value chain.

The case studies began their analysis at a country- or project-level, moving on to a sub-regional, and then ultimately moving to a European regional level. On the basis of case-study 1, which pertained to Blue Stream, the pipeline acted as a deterrent with regard to potential gas flows from Iran and Turkmenistan. According to Case study 1, the project backfired both commercially as well as strategically, due in part to the pipeline’s limited economies of scale and the pipeline's utilisation rate after its completion. As far as the real-option game model is concerned, the pipeline may well have had a greater direct and strategic value if its economies
of scale had been higher (and thus its operating costs per unit would have been lower), combined with higher gas demand growth in Turkey. Despite the pipeline’s commercial and strategic failure on the basis of the model’s application, in reality it successfully deterred other potential gas suppliers as a result of its construction. In a way, Gazprom’s economic-strategic behaviour manifested itself first with Blue Stream, affording it a dominant market share in the Turkish gas market.

The SSEE market and NWE markets were also dealt with in case studies 2 and 3, respectively, where the South and Nord Stream pipelines came into play. These sub-regional gas markets currently account for almost 85 percent of current aggregate European gas demand. Their expected import requirements are making these regions potential growth markets for Gazprom via both the existing Blue Stream, and the proposed South Stream for the SSEE market and Yamal-Europe, and the Nord Stream (which is planned and currently under construction) pipelines, respectively. From Gazprom’s vantage point, the SSEE markets are exposed to potential competition from pipeline suppliers in North Africa and the Caspian region (especially Azerbaijan and Iran) as well as to more distant LNG suppliers. In the case of gas supplies from the Caspian Sea region, other factors of geopolitical nature come into play. In the case of Nord Stream, the future threat to Gazprom’s position in NWE markets will come mainly from LNG supplies (especially Qatar and Nigeria), where it currently competes with indigenous (especially Dutch and British) and Norwegian pipeline supplies.

According to the model application’s results, when Gazprom decides to build the South Stream pipeline early on, it results in a positive overall net project value, owing partially to larger economies of scale and large upward demand potential. Depending on the upward demand potential in NWE, the Nord Stream pipeline also has a deterrence effect on LNG flows for example. However, the project’s overall value is negative according to the Case study 3. Additionally, the acceptance on the part of the investor of a lower required rate of return vastly aids in facilitating this strategic investment, and improves its overall net project value. The regional European case provides the rationale behind Gazprom’s investments and the impact on market structure in the European gas market as a whole. Gazprom can use its pipelines to protect and/or expand market share by investing strategically early on. In turn, this recapitulation serves as a backdrop to a conceptual discussion on possible demand and supply scenarios involving extremes of either undersupply or oversupply. On a regional gas market level, Gazprom ends up either as a dominant or a non-dominant supplier. At sub-regional levels, in Europe, Gazprom can end up as quasi-monopolist.

The real-option game model is a stylised ‘product’ of industrial organisation theory, economic game theory, and financial theory concerning the valuation of investments. Because of the
stylised nature of the model, a conceptual toolbox has also been introduced in Chapter 8 to accompany the model. The model’s value lies in its exact application, whereas the toolbox is more conceptual. The model’s added value lies in the quantitative underpinning of a more intuitive understanding of strategic investments. The toolbox is designed to bring in a number of other factors which are at play with regard to investments in gas infrastructure projects, such as organisational and financial feasibility issues regarding gas infrastructure investments and geopolitical factors. A joint application of the two broadens our insight into the phenomena under consideration.

In reality, Gazprom is backed by the Russian government and its efforts to secure a project’s access to market through vertical energy diplomacy. Here political ties between Gazprom, Russian government officials and key (former) government officials in existing and potential consuming countries play a key role. This is part and parcel of Gazprom’s strategic-economic approach, which is intertwined with the interest of its principal, the Russian government. Having said that, it may well be that Russia as a state pursues export policies and projects from within its geopolitical and geo-economic perception of the outside world. Particularly its perception of Europe as an important gas market, upon which it depends for important export revenues, also plays a role.

While the model’s strength lies in its quantitative underpinning, a number of qualitative factors may thus also be at play. The pursuit of these projects’ construction, and their impact on gas market structures, are in essence also linked to Russia’s identity and self-perception as a geo-economic competitor for gas flows from the Caspian Sea region. This perception on Russia’s part feeds into its investment strategy, potentially making it more proactive and aggressive than would be the case for rational economic agents. This is an example of a factor which the model cannot capture, of course. In fact, the economic analysis used in the case studies shows that there are economic and strategic rationales underpinning the projects in question. These projects can impact regional and sub-regional gas markets, serving as economic-strategic tools to enhance Russia’s geopolitical clout. It is Russia’s perception of the necessity to strengthen its geopolitical position that may feed into and affect economic decisions taken, as described in the case studies.

By extension, a strong geo-economic competitive position vis-à-vis other gas exporters, can ultimately be translated into geopolitical power. This process occurs through the impact on market structures in consuming countries of gas pipelines and flows. In addition, political relations with consuming countries are deepened with increased long-term gas import-dependency. Greater market share leads to greater economic security, we could say, and hence strengthens Russia as a great power. Indeed, this can be seen as an extension of geopolitical
perceptions discussed in Chapter 3. Here, from a Russian perspective, greater market share is translated into geopolitical power. ‘Strategic pipelines’ are hence not just tools designed to capture market share, but also act as political integrators with import/consuming markets, more often than not located in countries with which Russia has important political ties. An integrated economic-strategic approach to Russia’s and Gazprom’s gas investment strategy helps us pursue the research objective.

12.1.4 The scope for cooperation between gas-exporting countries

Part IV helped us answer the fourth set of research questions in Chapter 1: Given Gazprom’s and Russia’s investment strategy, how and to what extent can collusion take place in an interregional gas market? How does Russia’s perception of the international political system affect the desire for and feasibility of collusion or cartelisation? What geopolitical boundary solutions affect Russia’s possible gas strategy?

If demand does not recover soon, competition between gas-exporting countries may ultimately lead to price erosion in the long run. Yet it is expected that the situation of plentiful supplies, or better said ‘under demand’, will continue for several years. The dynamic and interregional nature of the gas market is illustrated by the reduced projected need for LNG in the US and the knock-on effect on LNG flows to European gas markets it has had, which in turn have displaced traditional pipeline gas supplies in that market, albeit to a limited extent. In any case, the expected rise in demand and import-dependencies in the world’s main regional markets during the coming decades will precipitate the need for comparatively greater interregional gas flows in the medium-term and beyond (from 2015 onwards).

For the foreseeable future, the minimum contracted amount of gas—or even less—will be provided through long-term oil-linked contracts, and there will be limited space for pipeline spot and LNG supplies and/or new long-term contracts, for the time being that is. Clearly, Russia’s pipeline gas must increasingly compete with other gas flows, both in the form of pipeline gas and LNG. Indeed, gas-exporting countries have become increasingly interlocked and interdependent in their export strategies. Yet a prolonged period of oversupply could pressure gas producers into acting to support prices, one way or another. The question is how and in what form and whether Russia is willing to partake in or join some form of cooperation, i.e., is Russia willing ‘to play ball’ with other gas-exporting countries.

Swaps between intra-regionally flexible pipeline gas supplies and interregional LNG, and short-term optimisation by allocating gas volumes between regional gas markets, offer the best mechanism for cooperation in the short-term. A number of mechanisms for cooperation between gas-exporting countries are imaginable, depending on the level of gas market develop-
ment in terms of dynamic market theory. Shutting in short run production on a scale similar in scope and nature to the one OPEC employs to manage its supply to the world oil market, is currently both technically and economically unfeasible. However, gas flows accountable for short-term volumes traded on various spot markets could be limited or trimmed to a limited extent.

When the model and its application come into play in the line of reasoning taken above, it is the resulting postponement value that expresses the economic boundary solutions for cooperation, which is essentially derived from conceptual market outcomes. Mutually agreeing to postpone investments either tacitly (through parallel behaviour) or openly (through formal forums such as GECF) is a form of collusion, in the sense that investments could be coordinated (coordination games). In the longer run, shared investments aimed at avoiding interregional price competition with regard to gas-to-gas prices. These shared investments are centred on the Atlantic Basin and European gas markets, where the price uncertainty and share of flexible gas supplies is the largest. This also reflects the membership of the GECF.

So from the point of view of these different market outcomes, cooperative outcomes may result if the players involved manage to avoid making strategic investments. Supposing cooperation is possible, colluding gas-exporting countries still face competition in different ways from other sources of gas, i.e., a competitive fringe. The much acclaimed revolution in unconventional gas production, primarily in the US, has helped foster the impression that this type of market behaviour is possible. However, colluding gas-exporting countries also face competition from IEFs, which have better control over the gas value chain (for now) and access to advanced gas exploration and production technologies. What is more, gas-exporting could always become each other’s competitors. For example, as a relative newcomer or entrant in various regional gas markets, Qatar appears not to act as a team player, even competing for market share. Other gas-exporting countries may act just as much as rivals as private energy firms in both volume- and price-based competition in a dynamic interregional gas market. The market structure of the interregional gas market will be determined by the complex interplay between players with mature gas infrastructures versus those which are still expanding their export capacities amidst both volume and price games via contractual renegotiations and gas-to-gas markets.

The laying of strategic pipelines could ultimately provide Russia with the means to engage in price competition as the industry matures through lower, short-run marginal cost. Russia’s willingness to do so depends on whether it acts as a profit or an income maximiser, that is better able to bear the cost of strategic investments (in contrast to private international energy companies). In essence, from a Russian perspective, Gazprom could become an important
swing supplier to markets with great liquidity and flexibility, primarily through intra-regional (pipeline) gas volumes by pipeline, in various sub-regional gas markets. Much depends on how Russia desires to position itself when gas demand recovers in Europe and elsewhere. Herein, gas infrastructures are key elements, as the case studies have shown. The investments associated with these infrastructures fundamentally affect the market structure of regional gas markets.

From a Russian vantage point, the GECF and Troika act as potential platforms for further coordination between important gas suppliers. Direct bilateral relations between Russia and other oil and gas-producing countries play an part in such energy diplomacy. Security platforms such as the SCO and the CSTO offer Russia the means to re-integrate relations in Eurasia, hand-in-hand with energy interests. The Troika has the advantage of a small number of members, which include the top three reserve-holders of conventional natural gas. Within this group, Russia and Qatar have the greatest ability to affect the interregional gas market’s structure in the medium-term, beyond 2015. For Russia, Qatar, and to a lesser extent Iran, will be key players in determining the long-run balance of the interregional gas market, i.e., a balance between inner and outer integrators. Cooperation between few, very large countries within the Troika offer Russia the possibility of deciding upon the most pipeline and LNG flows together with Iran and Qatar by tacit means. Russia’s cooperation with Central Asian (consider Russia’s inclusion of these countries into its own Commonwealth of Independent States or CIS frameworks) countries differs fundamentally from its behaviour with regard to Iran and Qatar, as well as other gas exporters (consider the GECF). Explicit and formal cooperation is likely to face a number of obstacles, including differing interests between the various key gas exporting countries, pricing issues (oil versus spot indexation) and Russia’s desire to maintain its policy independence (as its abstention from membership of OPEC illustrates). Russia is likely to prefer ad hoc, tacit or ‘strategic’ collusion to open, formal and binding commitments, making any form of formal collusion involving binding agreements redundant.

In the end though, how Russia positions itself in this interregional gas market will hinge on geopolitical factors. A greater gas market share in Europe and other regional markets can provide Russia with geopolitical power as well as economic security. In addition, it would provide Russia with the means to compete directly with the US in Eurasia as a geo-strategic player. While Russia could pursue its pipeline investments as instruments to secure greater market share, with the aim of enhancing its geopolitical power (by altering regional and sub-regional market structures to its advantage), this type of behaviour may also lead to the gas market oversupply currently observed in gas markets. After all, other gas-exporting countries may behave similarly for want of greater gas market share.
Given the discussion above, if it is to successfully maximise the long-run value of its gas resources, and thus ultimately ensure and buttress Russia’s geopolitical power, Russia must also take into account other potential gas flows in its gas markets. If Russia’s view is driven by an awareness of its interdependence with these actors, where rivalry and cooperation can co-exist, and where energy diplomacy is a key element, Russia’s collusion with other gas-exporting countries can be successful. In other words, if Russia successfully balances the idea of being a geo-strategic competitor to the US with the realisation that its economic security is at stake, then Russia will lean towards a view involving relative—rather than absolute—advantages. The geo-economic tug of war over gas flows from the Eurasian gas ellipse is in that sense a game of relative advantage where each geo-strategic player seeks to reduce the options available to its adversary. Russia will seek a more calibrated investment strategy in which coordination with other gas-exporting countries is possible. If Russia decides to compete, because it perceives its geopolitical position in Eurasia as more important than its stable coordination with other gas-exporting countries, than all formal and informal coordination is useless. In other words, Russia’s perception of the international political system and its ideas, as well as its identity as a great power, directly influences the likelihood, shape and form of cooperation between itself and other gas-exporting countries. Thus Russia’s geopolitical perception and ideas act as the political boundary solutions to such cooperation between gas-exporting countries.

In trying to address the last research question, and therefore to pursue the research objective, we can conclude that Russia’s cooperation with other gas-exporting countries can be explained to a largely extent by means of an economic-strategic approach, lodged in a geopolitical framework. However, the theoretical toolbox is an insufficient explanatory tool when it comes to in identifying and evaluating Russia’s cooperation with other gas-exporting countries, because of its limitations. Although, the conceptual toolbox tries to fill gap between theories and the practical application, further research is required, such as games involving prices and other dynamics, in order to understand factors which influence Russia’s scope for cooperation with other gas-exporting countries (see also 12.2.2 for further research).

12.2 Discussion and future research
This section evaluates and positions the findings, which are yielded from the underlying research objective. The objective also serves as a way to contribute to the decision-making process of policy- and strategy-makers in respect to cooperation between gas-exporting countries from a Russian perspective, and its implications for Europe. Therefore, a number of recommendations are made. Given the limitations of this study, various recommendations for future research are provided.
12.2.1 Discussion and recommendations

The discussion about the shape, form and nature of cooperation between gas-exporting countries has been a vividly debated one throughout the industry, academic circles and amongst policy-makers. What we contribute to the general discussion is an illustration behind the reasoning towards and underpinning of greater cooperation between gas-exporting countries in an interregional gas market. Russia’s investment strategy, characterised by an economic-strategic approach, can have a long-lasting impact on the structure of the interregional gas market. The impact of geopolitical factors must also be taken into account, and hence an exclusively economic approach to this topic is inadequate. The impact of investments on geopolitical relations and vice versa cannot be captured by any single model and cannot be quantified.

In a dominant strand of the literature within the field of political science, gas infrastructural investments are largely rationalised from a political point of view, whereas economic reasons are given less attention. In the dominant strand of the economic literature, stylised models are applied in order to understand investment strategies of actors in the gas market. However, these models are inherently limited in analysing real-world cases because of their assumptions and abstractions from real-world behaviour of actors involved. Our results tell a different story. The model helps to explain the economic-strategic value of gas infrastructures, which transcends the commercial value as far as deterring entry and the option value are concerned. In addition, our qualitative tools offer a reality check on the model’s results. Functioning as a prism through which to perceive the economic-strategic behaviour of key actors involved, the model acts as a bridge between purely economic reasoning and the geopolitical dimension involved. The model’s results demonstrate the uncertainties which gas-exporting countries face in an increasingly interregional gas market, and how geopolitical factors can influence decision-making.

The application of the conceptual and real-option game framework have yielded a number of recommendations to Russian strategy-makers regarding Russia’s positioning with respect to other gas exporting countries. Moreover, lessons can be learned of this study for European policy- and strategy-makers.

1) Recommendations regarding Russia’s position with respect to other gas-exporting countries:
   a. The real-option game model and real-world restrictions: The real-option game cannot account for the geopolitical forces which invariably affect gas infrastructure investments. Also, the model cannot account for the complexities of the interregional gas market. Nev-
Nevertheless, the economic and financial crisis of 2008-2009 highlights the need for greater long-term coordination between gas suppliers. If Russian policy-makers aim to develop an approach to domestic gas investments, they must take into account similar decisions in other gas-exporting countries. If at the firm and state levels decision-makers decide to apply a stylised model for real-world strategic investments, they should embed this model in a conceptual framework, which covers other internal and external investment indicators.

They must also take into account the geopolitical complexities pertaining to some important gas-exporting countries. The development of new business models and market circumstances in the interregional gas market calls for a reassessment of the limitations of strategic investments, in order to avoid an excessively risky financial exposure and organisational difficulties, both in the midstream and upstream section (especially in the case of a buyer’s market). In order to manage such risks and financial exposure, a firm-level stylistic approach to major gas investments should be accompanied by state-level political commitments to other gas-exporting countries.

b. Factors influencing the level of formality of cooperation: Cooperation between gas-exporting countries is not a topic to be seen in a vacuum. It is a topic that is strongly interwoven with various developments. The form and nature of cooperation between gas-exporting countries depends on Russia’s and Gazprom’s choice of business models, which go hand-in-hand with political commitments to other gas-exporting countries and companies (as discussed above) on the one hand, and to gas-consuming countries on the other. The liberalisation and de-integration of European gas markets during the 1990s and 2000s has driven actors in the gas markets towards new business strategies. For Gazprom, the role of mid-streamers and off-takers is as important as potential relations with fellow gas-exporting countries. Such factors will undoubtedly influence the institutionalisation and level of formality of cooperation between gas-exporting countries. The uncertainties borne of liberalisation in European gas markets have encouraged greater discussion amongst gas-exporting countries. Shared capacity investments along the gas value chain are one way in which gas-exporting countries try to regulate uncertainties and supplies in the long run.

2) Implications for European policy-makers: While security of supply and affordable supplies is a European priority from a consumer’s perspective, export earnings (i.e., security of demand) are important to the economic security of gas-exporting countries. European gas market policy-makers should be aware of such interests. The ongoing liberalisation of European gas markets, and the accompanying regulatory uncertainties, is encouraging greater cooperation between gas-exporting countries. The 2008-2009
international financial and economic crisis has arguably further underlined the importance of further discussion amongst gas-exporting countries in making investments that affect regional and sub-regional gas market structures. European policy-makers must balance what they see as the political impact of a large market share for Russia in Europe against security of supply concerns. On the one hand, a greater gas market share in Europe for Russia, on the back of successful energy diplomacy between European governments and companies, can greatly enhance Europe's gas security of stable and affordable supplies. On the other, from a competition point of view, such a large share in the European gas market for Russia could have adverse political and regulatory ramifications.

The financial and economic crisis of 2008/2009 has shown that sudden demand-side shocks can also create significant oversupplies. In a seller's market scenario, a successful energy policy depends on obtaining competitive supplies from outside Europe, i.e., a focus on external policy of the EU and its member-states. Europe must find a delicate balance between avoiding an overbearing Russian dominance in European gas markets and securing enough gas supply. Encouraging EU-level policies that induce competition could backfire and lead to more coordination between gas-exporting countries. And if gas-exporting countries postpone investments because of growing demand-side risks, by colluding for example, then security of gas supply is jeopardised. Ultimately, creating the lure of greater market share by ensuring long-term security of demand may incline gas-exporting countries to lean towards strategic competition, leading to a regional and interregional gas balance and avoiding undersupply. Consumers and policy-makers should remain mindful of the fact that the crisis and its impact on gas demand may now steer gas-exporting countries toward greater cooperation in the long-term. If it desires to avoid such an outcome, European policy-makers must develop a more successful integrated energy policy.

12.2.2 Future research
Further research with regard to interregional gas market developments is certainly desirable from an academic perspective. While some of the research questions in Chapter 1 cover many aspects of such developments, a great deal can be done in order to more adequately understand the underlying complexities. It also appeared that some problems, that have emerged when addressing research questions, should require further research. Therefore, we have the following recommendations for future research:

1) **Volume-based modifications of the real-option game model:** As mentioned in Section 9.4, the application of the real-option game model to gas infrastructural investments has shown some clear limitations. For example, the model is limited to only two players and the dynamics in the model is restricted to a two-stage game. In addition, both players are fully informed about their dominant strategies and cost information, i.e., there is no
asymmetric information involved. The incumbent makes an investment decision on the basis of information it fully possesses. It is a dynamic game with complete information, relatively simple in game-theoretic terms. The basic structure of Smit and Trigeorgis' [2004] real-option game model, that combines valuation of strategic moves with market structure outcomes, could be expanded to take into account more complexities. Multi-stage games involving more than two players, with incomplete information about each other's cost functions and strategies, and involving more than two sub-games, could be combined with Smit and Trigeorgis' [2004] valuation approach.

2) **Interregional price dimension and shared investments**: Just as in many other industries, gas firms must develop strategies in anticipation of market developments that are dynamic. That firms compete in the first instance on the basis of capacities, or volumes, before way is given to price competition coincides with a widely held view in industrial organisation. Given the research objective, this study focuses primarily on capacity expansions. The stylised and conceptual components of the approach developed in Chapter 8 cannot possibly account for the complexities of the interregional gas market, complexities which pertain largely to price and trade developments. In light of evolution of the different regional gas markets, further research, for example by employing a Bertrand price framework, may offer additional insights, i.e., where both price and volume games are considered. In the context of price competition, further quantitative research is desirable with regard to shared investments between gas-exporting countries in order to mitigate price competition. The strategic impact of shared investments on interregional LNG market is an enticing topic for research on long-run gas market developments (research on price competition is also interesting in light of the current gas demand crunch).

3) **Russia’s geopolitical relations with other key gas-exporting countries**: Only Russia’s geopolitical interests regarding Iran were briefly covered in Chapter 6. In Chapter 11 it was suggested that diverging interests between gas-exporting countries can impact the likelihood and shape of cooperation between gas-exporting countries. Russia’s bilateral relations with other key gas-exporting countries have been left out of the equation in this study. Of course, such relations can greatly impact state-level and project-level horizontal energy diplomacy. They can therefore greatly impact interregional gas market developments in the long run. Geopolitical and economic relations between Russia and various gas-exporting countries and between other gas-exporting countries are elements which merit more in-depth academic investigation.