UNIVERSITY OF CAMBRIDGE | Energy Policy Research Group

Markets and long-term contracts: The case of Russian (and Norwegian) gas supplies to Europe

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Key Messages

1. Structural changes in European energy markets in the last five years motivated major suppliers to change their sales strategies.
2. Exports through a single trading and marketing division – ISTM sales strategy – brings higher economic benefits to Gazprom than under 'border sales' strategy
3. Border sales = limited knowledge of 'real prices and market dynamics' - -> limited options to 'correctly' set the highest possible rents for gas resources
4. ISTM is robust against possible changes in LTC structure and possible negative impact of entry by low-cost producers → ISTM carries high intrinsic (options and strategic) value to Gazprom
5. Beside the strategic value, ISTM provides greater upside potential, quantifiable only at micro-level:
   - optimising gas commodity and capacity portfolios
   - arbitraging between locations, time, and products
   - diversifying of sales channels instead of relying on a limited number of counterparties & direct marketing to better capture consumers' willingness to pay for various products

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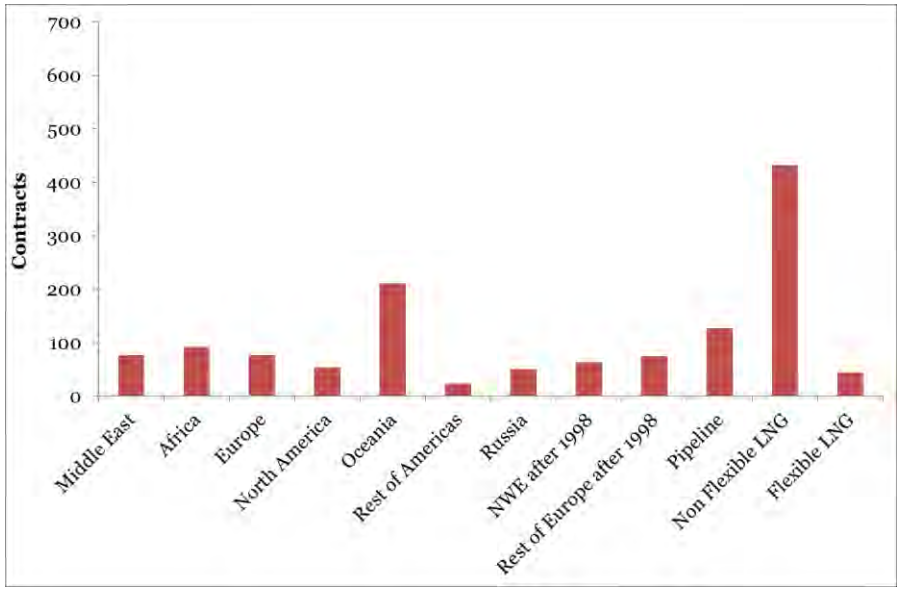
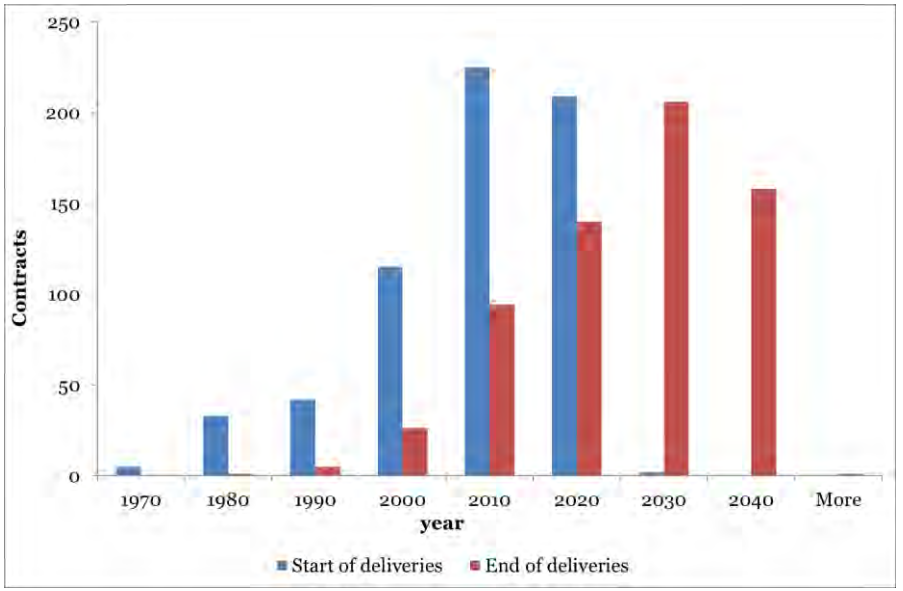
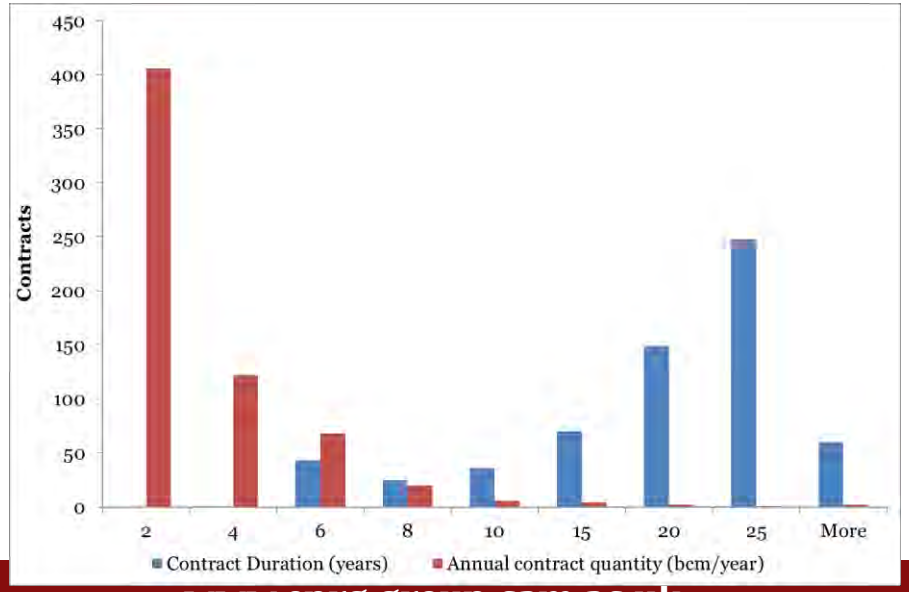
The role of long-term contracts in gas trade

results from statistical analysis of more than 630 contracts







The role of long-term contracts in gas trade

results from statistical analysis of more than 630 contracts

$$L_i = Constant + \beta_1 Q_i + \beta_2 Q_i^2 + \beta_3 Dummy_i^{NWE\_Post98} + \beta_4 Dummy_i^{Rof\_EU\_Post98} + \beta_5 Dummy_i^{FlexibleLNG} + \beta_6 Dummy_i^{LNG}, \quad (1)$$

- where L_i is the duration of contract i,
- Q_i is the annual contract quantity (ACQ),
- $Dummy_i^{NWE\_Post98}$ is a dummy variable taking the value 1 if the contract was for deliveries to the UK, Germany, Belgium, France or the Netherlands after 1998 and 0 otherwise,
- $Dummy_i^{Rof\_EU\_Post98}$ is a dummy variable taking the value 1 for a contract delivered to the rest of the EU (excluding the north-west European markets mentioned above) after 1998 and 0 otherwise,
- $Dummy_i^{FlexibleLNG}$ is a dummy variable taking the value 1 for contracts delivered from portfolio LNG suppliers (such as BG, Shell or BP), i.e. contracts not tied to a particular production location, and 0 otherwise, and
- $Dummy_i^{LNG}$ is a dummy variable taking the value 1 for all LNG contracts in the sample and 0 otherwise.

The role of long-term contracts in gas trade

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Regressors	L_i **– Contract duration (Eq. 1)**
Constant	19.248
	(0.754)
β_1	0.836***
	(0.172)
β_2	-0.022***
	(0.008)
β_3	-6.007***
	(0.867)
β_4	-1.905**
	(0.775)
β_5	-2.594***
	(0.976)
β_6	-1.841***
	(0.679)
R-squared	0.129
Adjusted R-squared	0.120
No. observations	631

Standard errors are reported in parentheses; *** indicates significance at the 99% level; ** indicates significance at the 95% level.

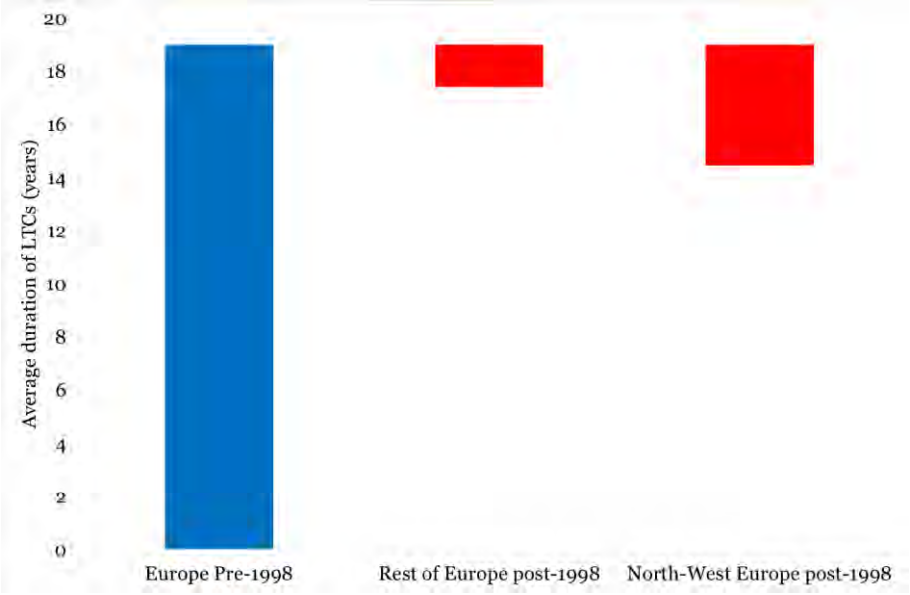
The role of long-term contracts in gas trade

results from statistical analysis of more than 630 contracts

The role of long-term contracts depends on

(i) organization of vertical relationships along the value chain, and

(ii) Industry structure and competition along the value chain



Note: these differences are statistically significant at least at 95% level

(i) After the launch of market liberalization in Europe, contracts became shorter:

- contracts delivered to North-west European gas markets are, on average, 6 years shorter than duration of the other contracts in the sample;
- Contracts to NWE are also significantly shorter than those delivered to other European markets, where spot markets are substantially underdeveloped

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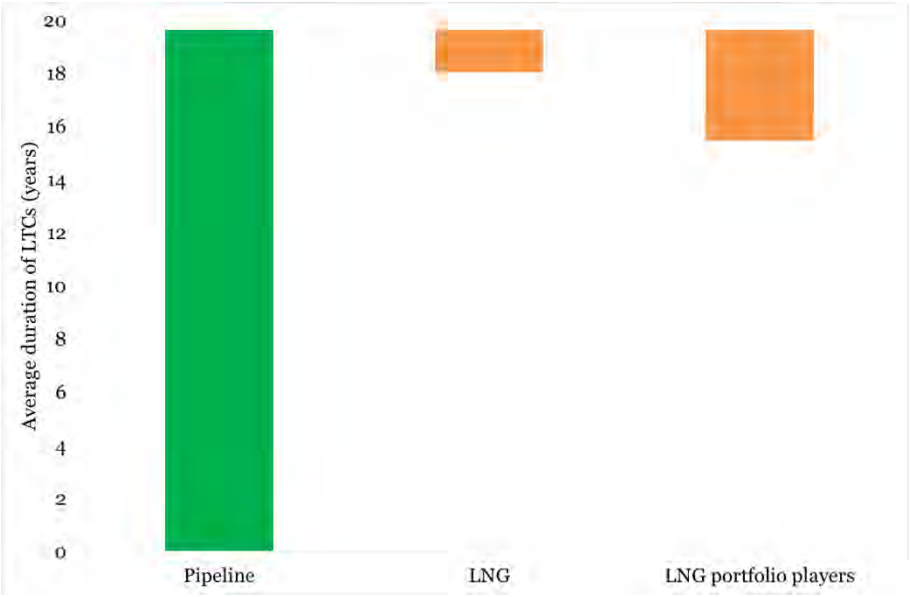

Note: these differences are statistically significant at least at 95% level

(ii) LNG trade is in general more flexible than pipeline gas trade:

- LNG contracts are on average shorter than pipeline gas contracts
- Recent LNG contracts not linked to particular production fields (supplied by portfolio players such as BG, Shell) are on average 2.5 years shorter than pipeline gas contracts
- They are also one year shorter than other LNG contracts with dedicated production assets.

The role of long-term contracts in gas trade

results from statistical analysis of more than 630 contracts

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Other factors influencing the changing nature of gas trade in Europe:

1. Capital intensiveness of gas infrastructure assets,
2. Macroeconomic conditions, energy regulation and policies in Europe affecting gas markets – climate policies and coal/gas competition, renewables policies, and energy efficiency improvements,
3. demand and supply shocks

European gas industry changed dramatically in response to regulatory, technological and industrial dynamics:

- Ten years ago oil-linked contracts dominated gas trade in Europe
- In 2012 – ca. half of gas is traded based oil-indexed contracts; spot (gas-on-gas competition) accounted for about one-third
- In 2014 – ca. one-third of gas trade is based on oil-indexed contracts while two-thirds is based on spot-indexation

(Source: IGU Wholesale gas price review, 2005-2014)

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1. European gas industry: from contracts to traded markets

2. Sales strategies in the new European gas order

3. Economic implications of Gazprom's sales strategies

Sales strategies in the new European gas order

There are two sales strategies that complement traditional sales through LTCs: (i) ***'pure production'*** or 'border sales' strategy, and (ii) integrated production, supply, trading and marketing – ***ISTM sales strategy***

'Pure production' strategy	**ISTM Strategy**
"Specialization" drives stock price, and	Reduce earnings volatility
future value, measured through reserves-replacement ratio	Improve margin
	Hedging, portfolio optimization along entire value chain
	Robust and competitive advantage vis-à-vis traditional trading houses (Vitol, Trafigura, Noble, etc.)

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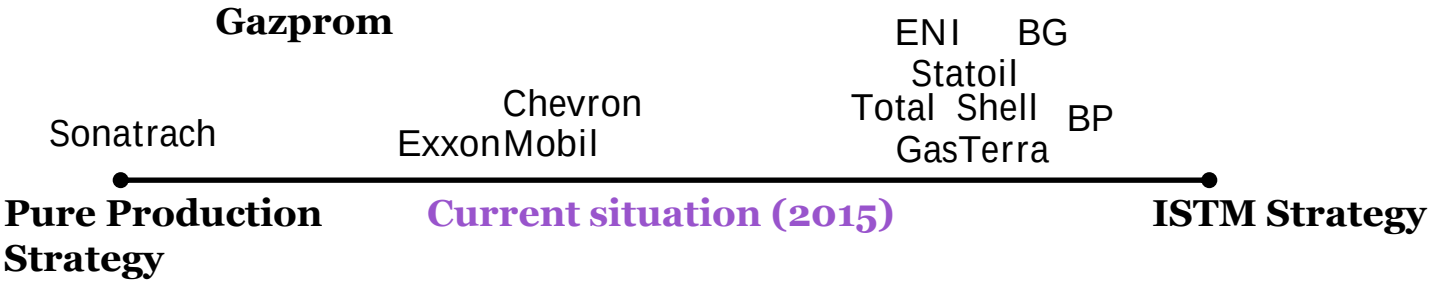

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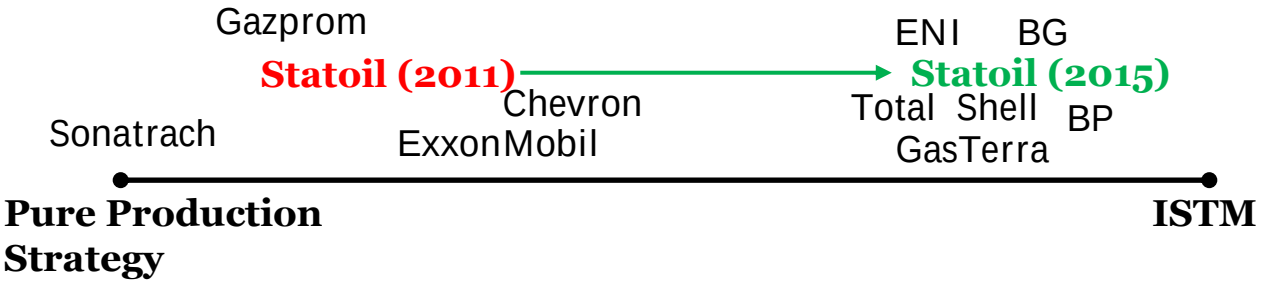
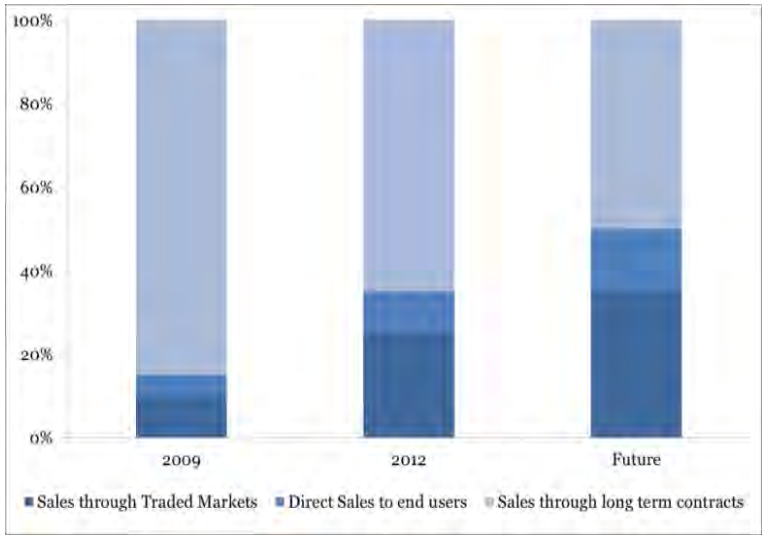
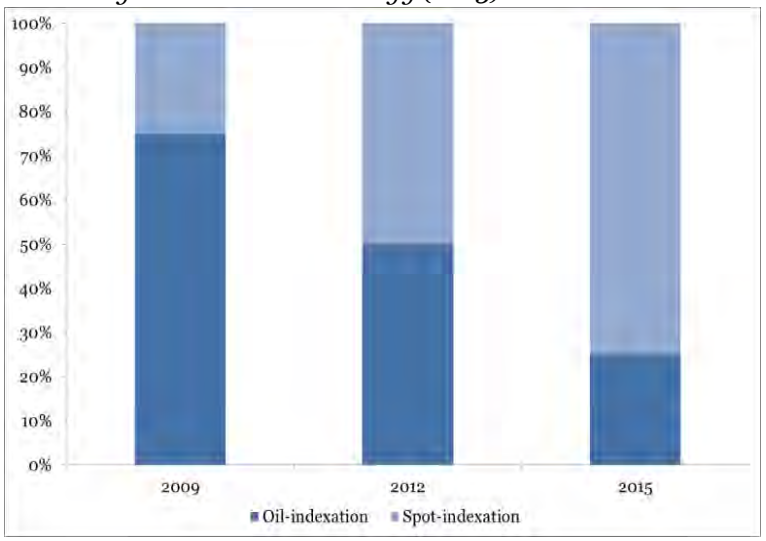


Sales strategies in the new European gas order

Statoil *- an example of an ISTM gas player 'in the making'*



Source: Presentation by Eldar Sætre, EVP, Marketing, Processing and Renewable Energy (2013)



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- Diversified sales channels to include:
  1. Sales directly to traded markets, and
  2. Direct sales to industrial users
- arbitrage opportunities by engaging directly with spot prices
- Capturing additional value further downstream, bypassing traditional importers
- Diversified pricing mechanisms to include more spot-indexation
- Statoil took back the flexibility that was embedded in the long-term contracts and 'pro-actively' prices those flexibilities
- Introduced varieties of products around gas commodity - -> became supplier of integrated solutions, not just pure gas producer

Sales strategies in the new European gas order

Statoil *- an example of an ISTM gas player 'in the making'*

- An econometric analysis of Statoil's swing production capacity – Troll and Oseberg

$$Q_i = Constant + \beta_1 NBP + \beta_2 Season + \beta_3 SpotIndex + \beta_4 ActiveTrading + \beta_5 RU\_Undersupply14 + \beta_6 DummyUK1 + \beta_7 DummyUK2, \quad (2)$$

- where *NPB* is the day-ahead spot price (monthly averages),
- *Season* is a dummy variable taking the value 1 between October and March and 0 otherwise,
- *SpotIndex* is a dummy variable taking the value 1 for 2012, when the positive effect of increased spot indexation allowed Statoil to take market shares from other suppliers, and 0 otherwise,
- *ActiveTrading* is a dummy variable taking the value 1 for 2011–2015, the period when structural shifts in the market affected Statoil's contracts, pricing and sales strategy, and 0 otherwise,
- *RU_Undersupply_14* is a dummy variable taking the value 1 for the winter of 2014/2015, when Russian supplies to Europe were minimised due to a number of factors, including reducing oversupply and stopping Ukrainian imports from Europe, and 0 otherwise,
- *DummyUK1* is a dummy variable taking the value 1 for the period between October 2006 and July 2007, representing the effects of a temporary gas glut in the UK due to increased importation from the Langeled and BBL pipelines and failure of the IUK to export the surplus to Continental Europe, and 0 otherwise, and
- *DummyUK2* is a dummy variable taking the value 1 for the winter of 2005/2006, to account for tight supply condition in the UK, and 0 otherwise.

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Regressors	Troll output	Oseberg output	Troll and Oseberg output
Constant	1.422	0.064	1.486
	(0.108)	(0.034)	(0.118)
β_1	0.064***	0.015***	0.080***
	(0.017)	(0.005)	(0.019)
β_2	0.978***	0.164***	1.142***
	(0.084)	(0.026)	(0.092)
β_3	0.591***	0.186***	0.776***
	(0.175)	(0.055)	(0.192)
β_4	-0.242**	-0.097**	-0.339**
	(0.123)	(0.039)	(0.135)
β_5	0.659***	0.188**	0.847***
	(0.237)	(0.074)	(0.260)
β_6	0.565***	-0.064	0.502***
	(0.165)	(0.052)	(0.181)
β_7	-0.432	0.030	-0.402
	(0.267)	(0.083)	(0.292)
R-squared	0.581	0.357	0.617
Adjusted R-squared	0.563	0.330	0.600
No. observations	171	171	171

Standard errors are reported in parentheses; *** indicates significance at the 99% level; ** indicates significance at the 95% level.

Sales strategies in the new European gas order

Statoil *- an example of an ISTM gas player 'in the making'*

- An econometric analysis of Statoil's swing production capacity – Troll and Oseberg – highlights some of these points:
  - Troll and Oseberg output closely follows market dynamics in terms of prices and volumes placed on the markets
  - After contract renegotiations (2011), **average monthly production from Troll and Oseberg was on average 10% and 40% lower than monthly production in preceding years**. This insight is **statistically significant** even accounting for various effects (maintenance work at Troll, spot prices, EOR, seasonality and other market dynamics)
  - **This is against the trend of increased production and supplies from Norway to Europe in the same period (2011-2014)**

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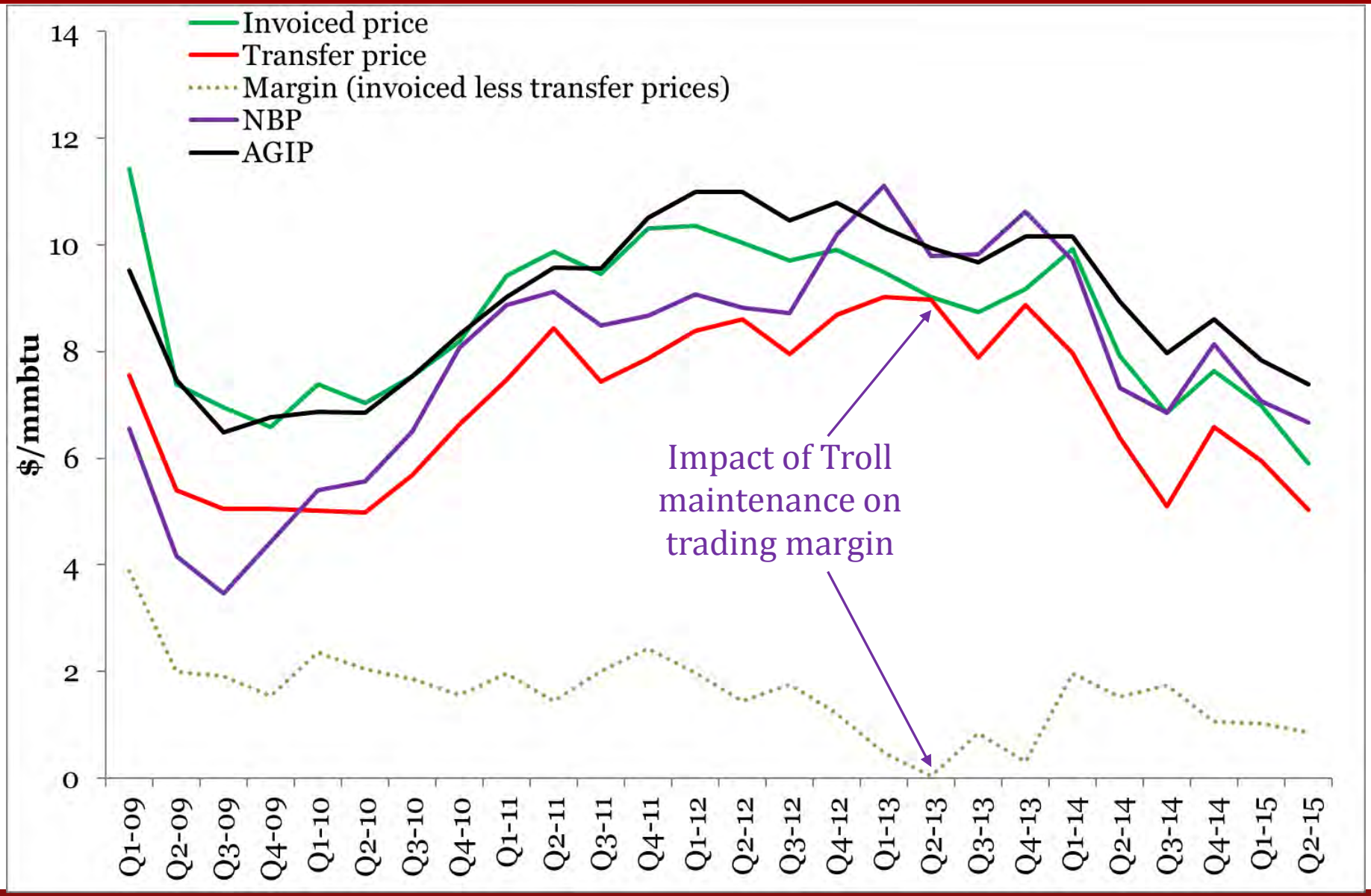

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  - This is against the trend of increased production and supplies from Norway to Europe in the same period (2011-2014)
- The results highlight that having the ability to shift production from flexible fields to future periods to add upward pressure on current spot prices creates value for producers.
- But such a strategic response is only possible when a producer is actively participating in liquid trading markets, while export volume is 'wired' through single trade and marketing division (like Statoil's MMP)

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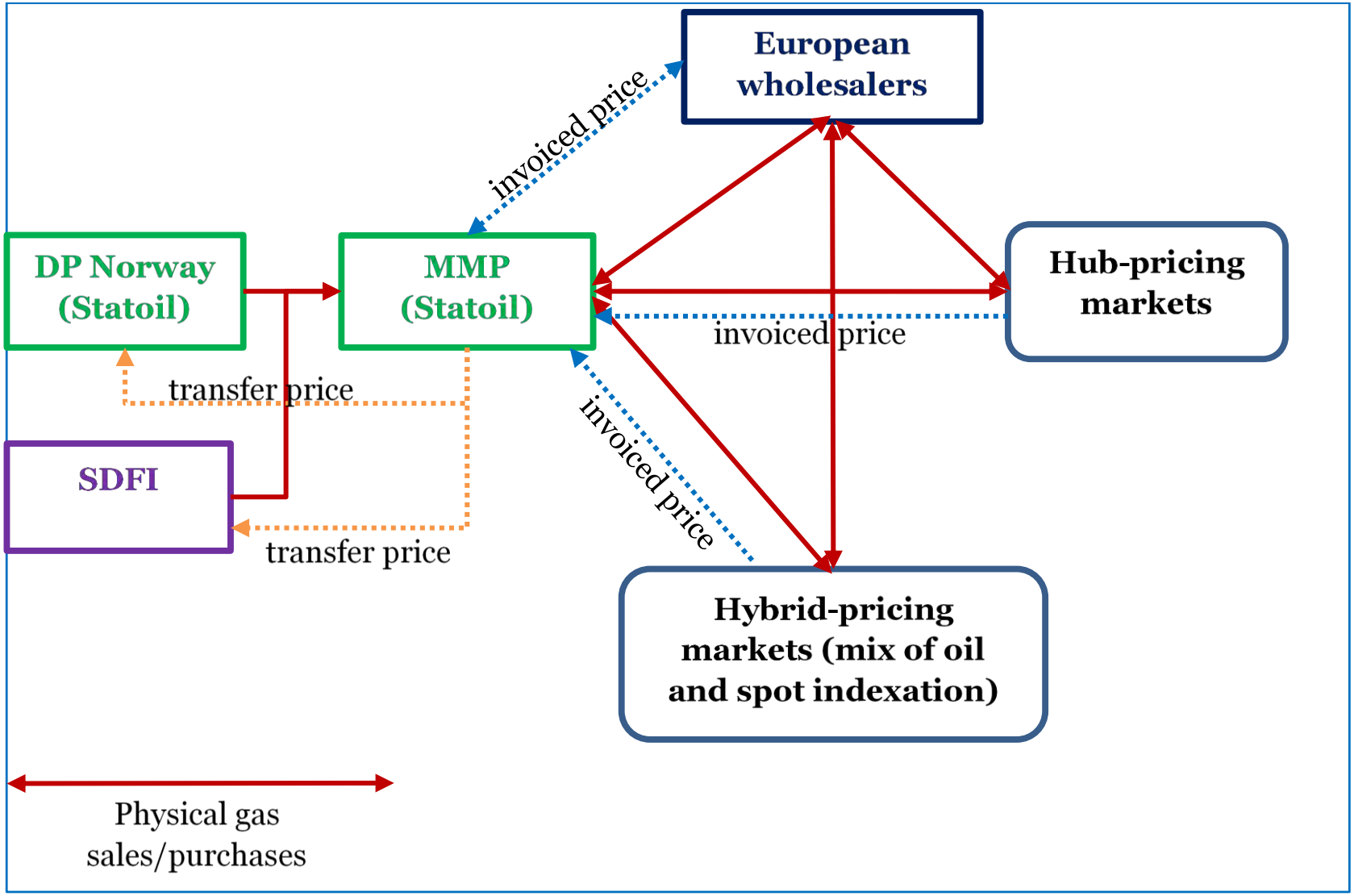

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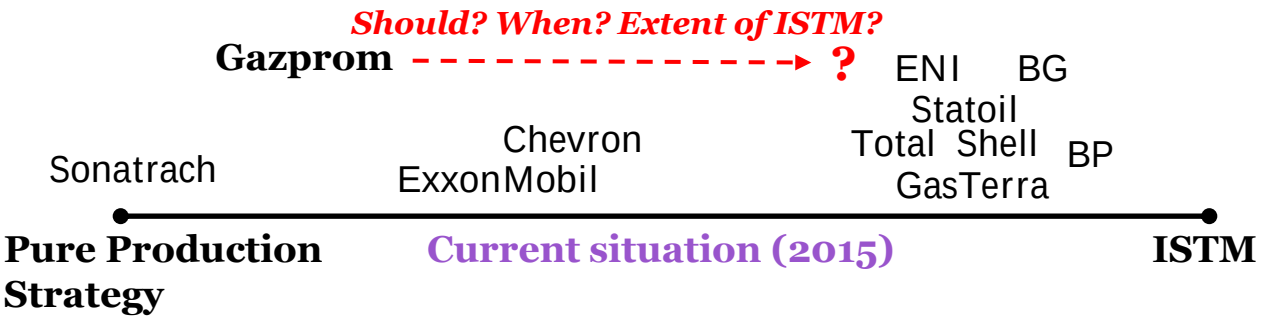
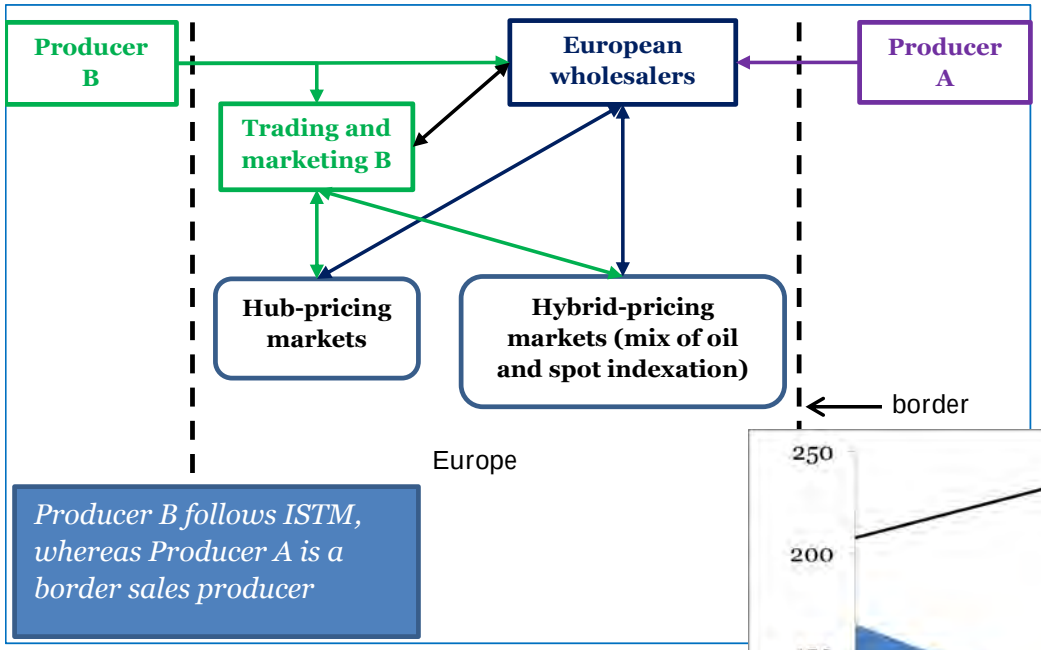
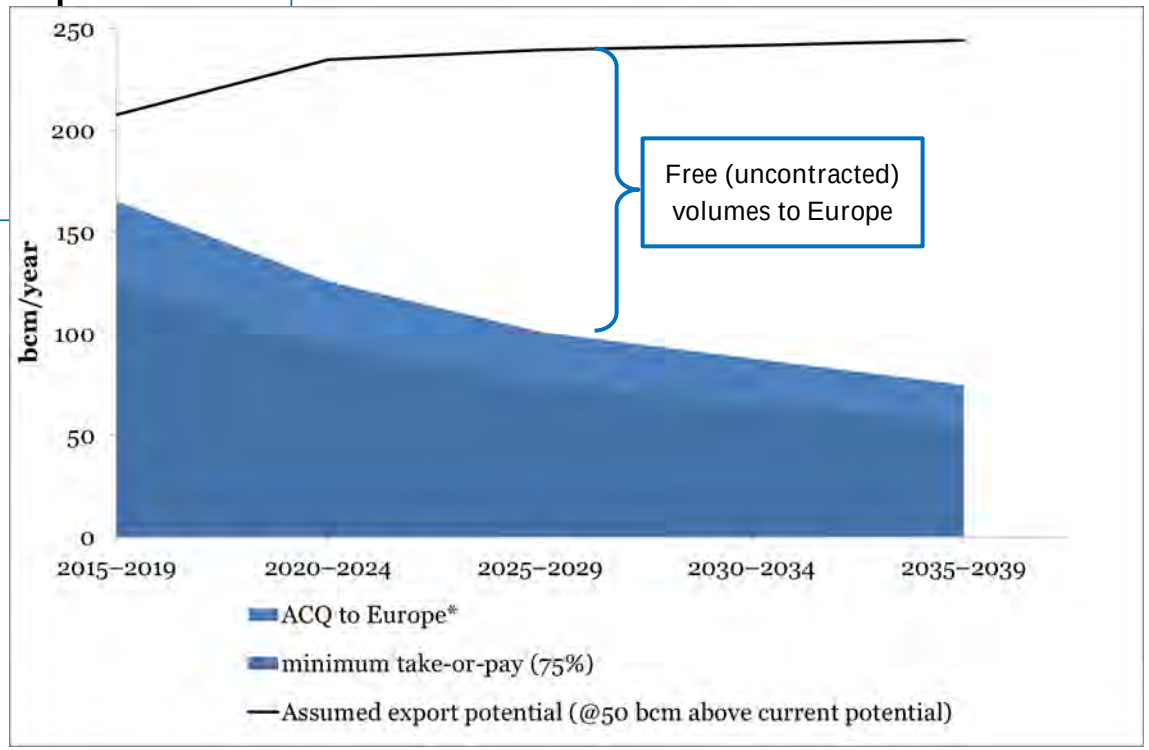


Cost-benefit analyses of Gazprom's possible sales strategies



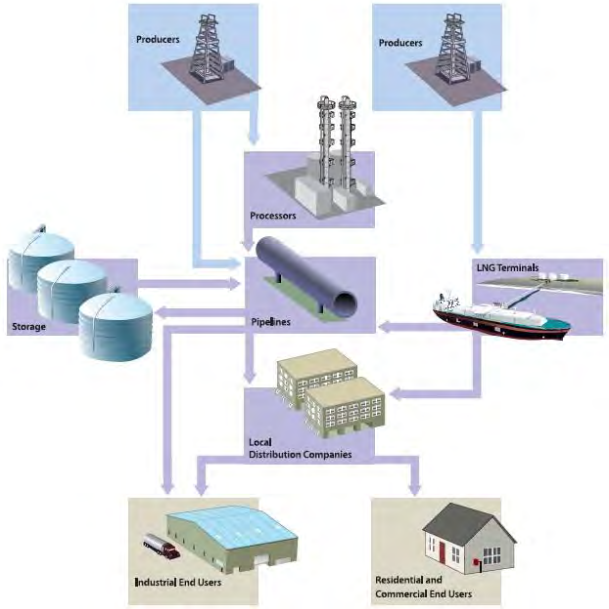
Billion-dollar Question:

Should Gazprom become Producer **A** or Producer **B for uncontracted volume going forward?**



Analytical Approach to value ISTM strategy

- Global gas market was used to simulate 216 different market scenarios, representing combinations of
  - possible oil prices,
  - market structure & competition, and
  - structure of LTCs: minimum take-or-pay and share of spot-indexation
- Basic model structure and what is in the model:



1. Gas producers: can be modelled as behaving imperfectly (exercising market power) or perfectly competitive (marginal cost pricing)
2. Gas traders: can be modelled as behaving imperfectly (exercising market power) or perfectly competitive (marginal cost pricing)
3. Pipeline transmission operator: price pipeline transport services efficiently i.e. with no market power
4. LNG terminal operator: price liquefaction and regasification services efficiently i.e. with no market power
5. LNG shipping: marginal cost based pricing
6. Gas storage operator: price storage operations efficiently i.e. with no market power
7. Clearing wholesale prices are represented by demand curves which tells us that the clearance prices depend on total supplies to that market

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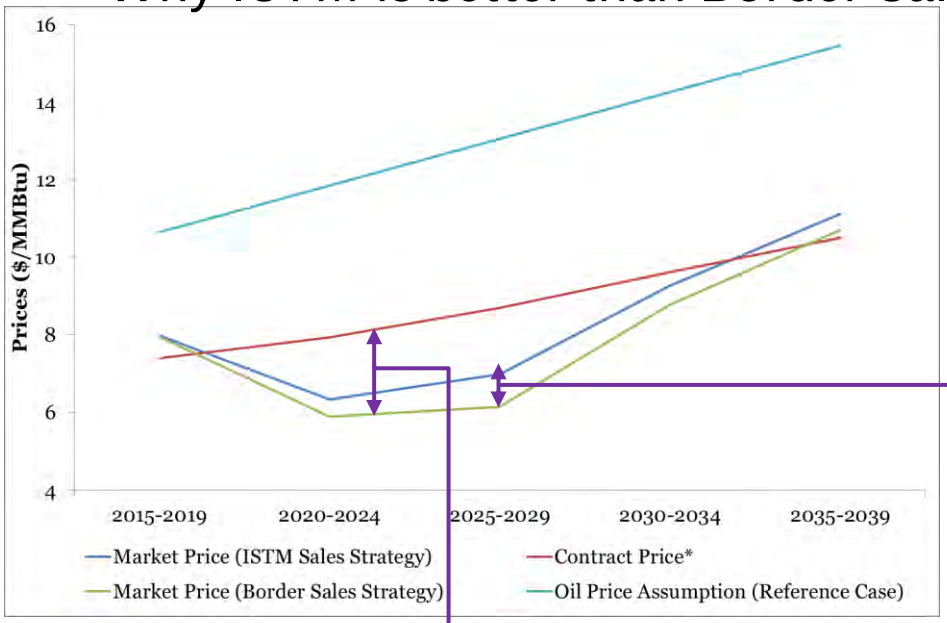
- Basic model structure and what is in the model:

Disclaimer

The purpose of examining multiple market and non-market scenarios is to conduct **'stress tests'** for the two possible gas sales strategies. **The scenarios examined are not predictions.** Whenever possible, we devised these scenarios to be as close as possible to the industry's expected possible paths of future gas market developments. However, these scenarios are not intended to replicate possible market developments; some may be hypothetical and do not necessarily conform to the current established view of the future of the gas markets. For example, one scenario is Qatar's removal of the exploration moratorium and the further expansion of its production capacity; this may not be realistic given the current environment of low oil and gas prices. Nevertheless, this scenario has a positive probability of occurring, making it a form of 'high-impact, low-probability event'. **Our intention is to test the robustness of hydrocarbon producers' sales strategies in an uncertain world and not to provide 'price forecast'-type analysis.**

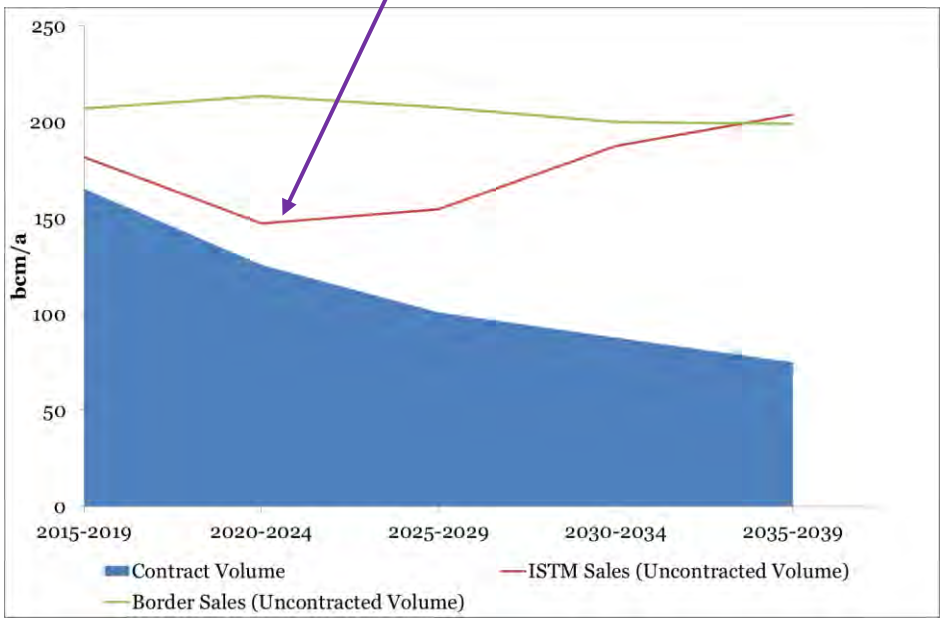
Results: Economics of Gazprom's possible sales strategies

- Why ISTM is better than Border Sales Strategy?



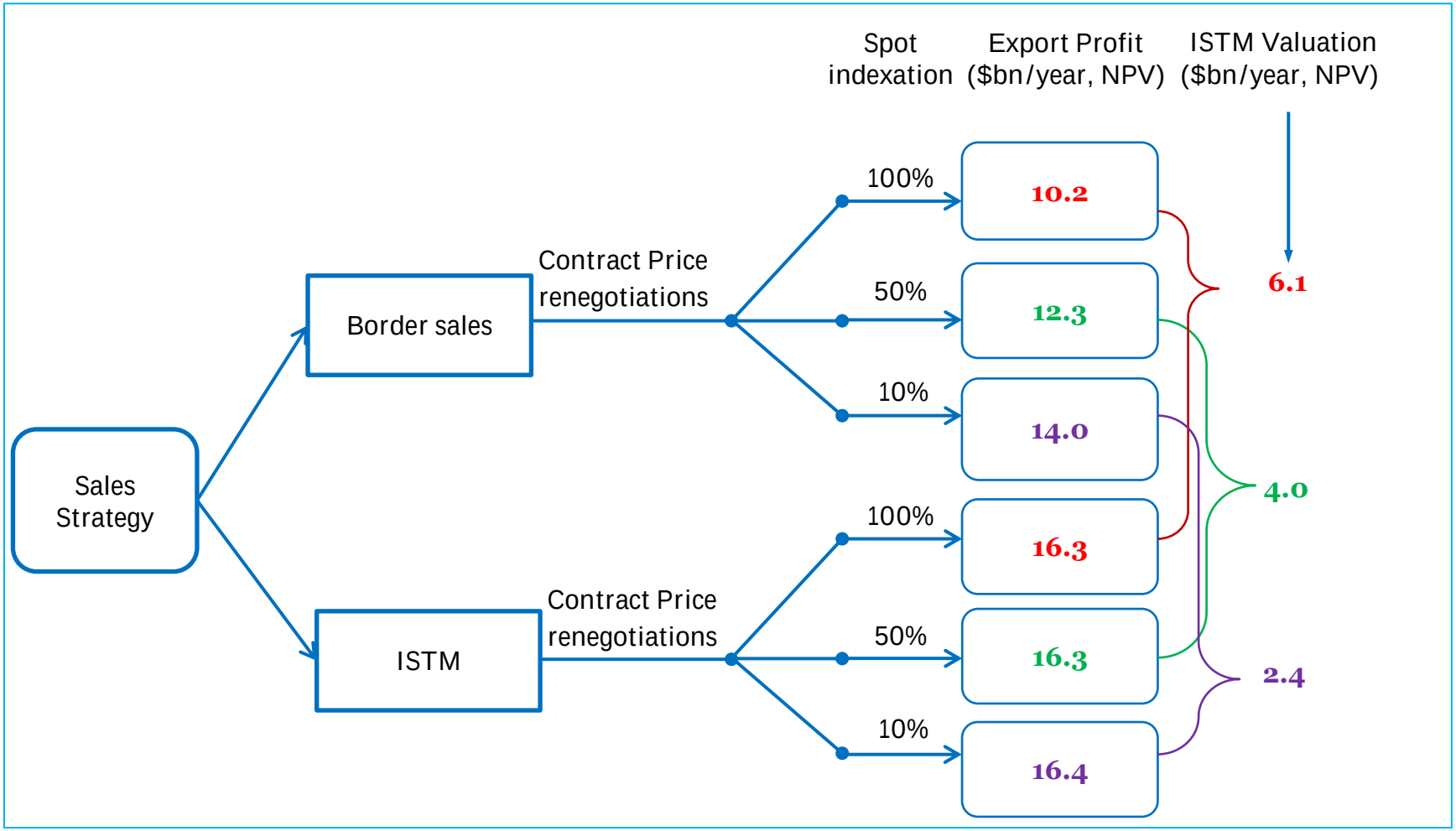
ISTM's ability to correctly 'manage' potential supply glut raises market prices above what could be achieved under border sales strategy

Risks of contract renegotiations is always higher under border sales



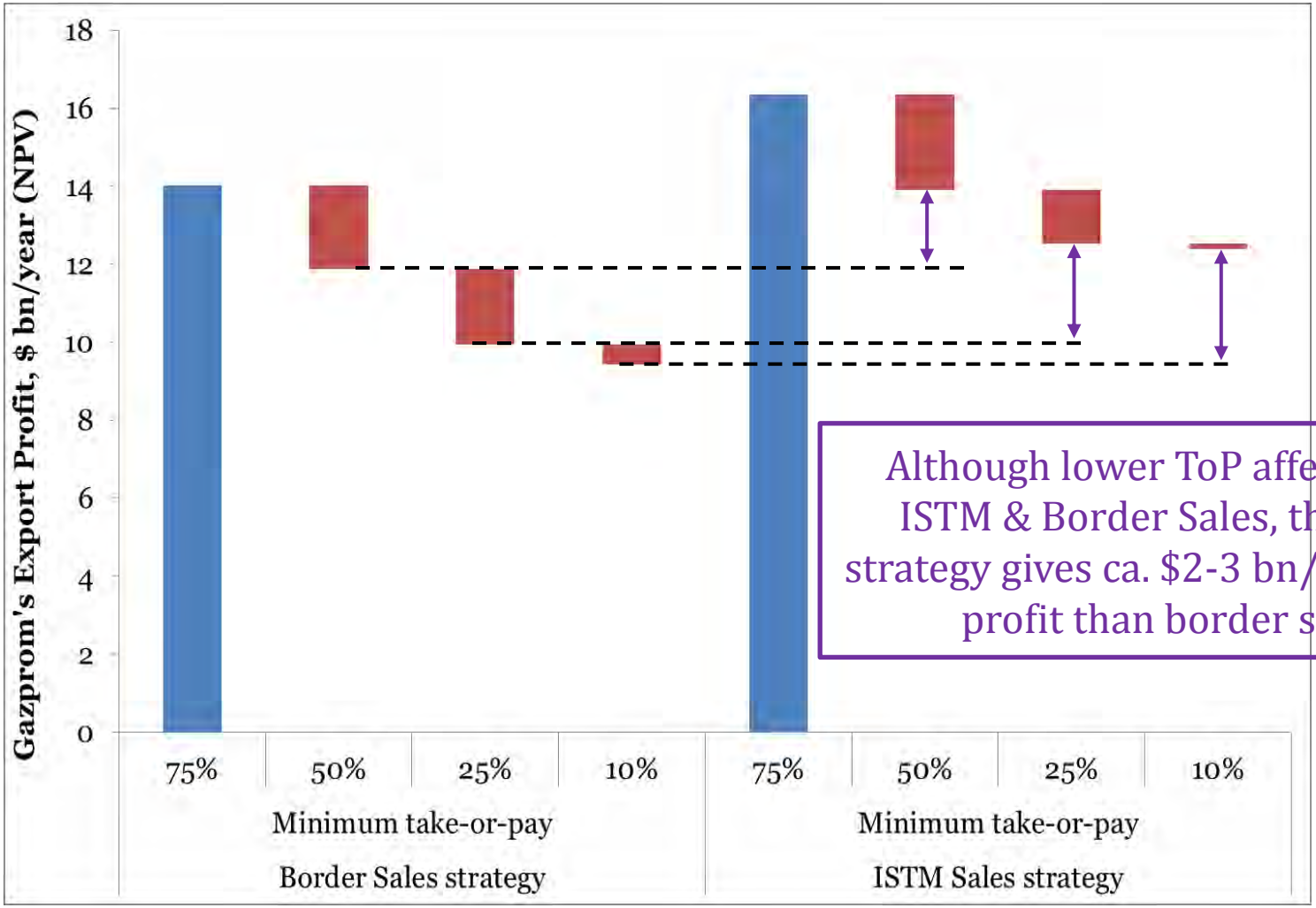
Results: Economics of Gazprom's possible sales strategies

- Even if pricing in contracts are renegotiated (more spot indexation), ISTM generates higher profits



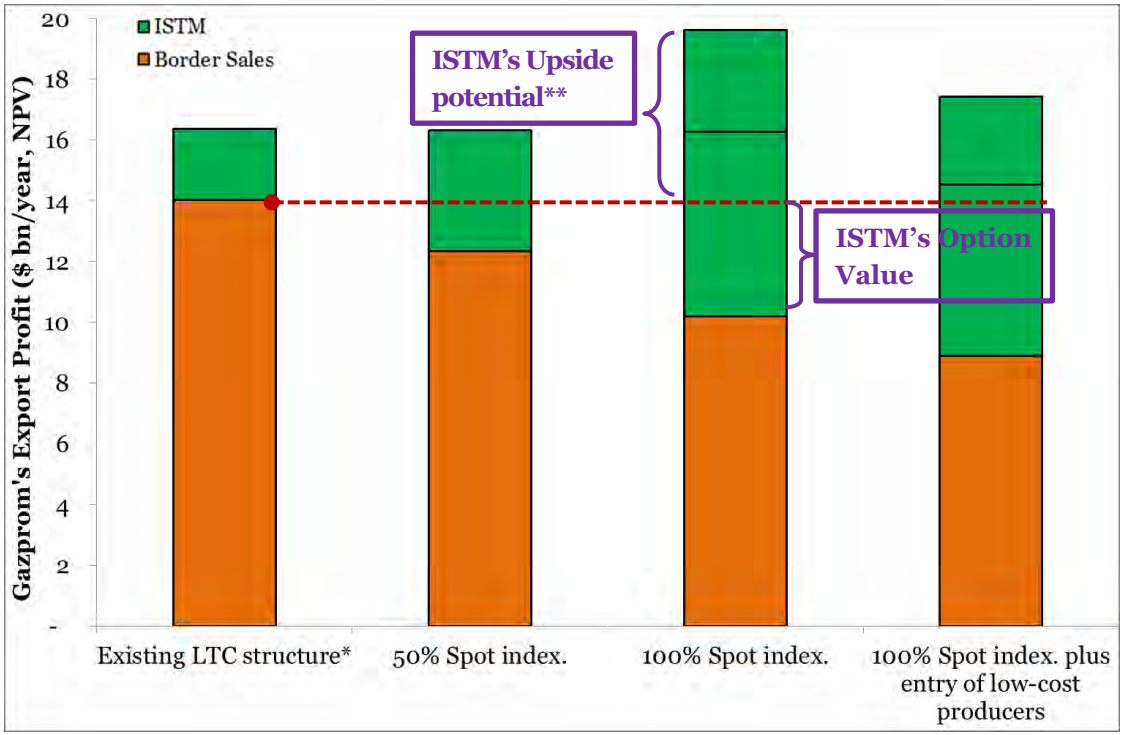
Results: Economics of Gazprom's possible sales strategies

- Even if pricing structure is retained while volumes in contracts are renegotiated (less ToP level), ISTM still generates higher profits



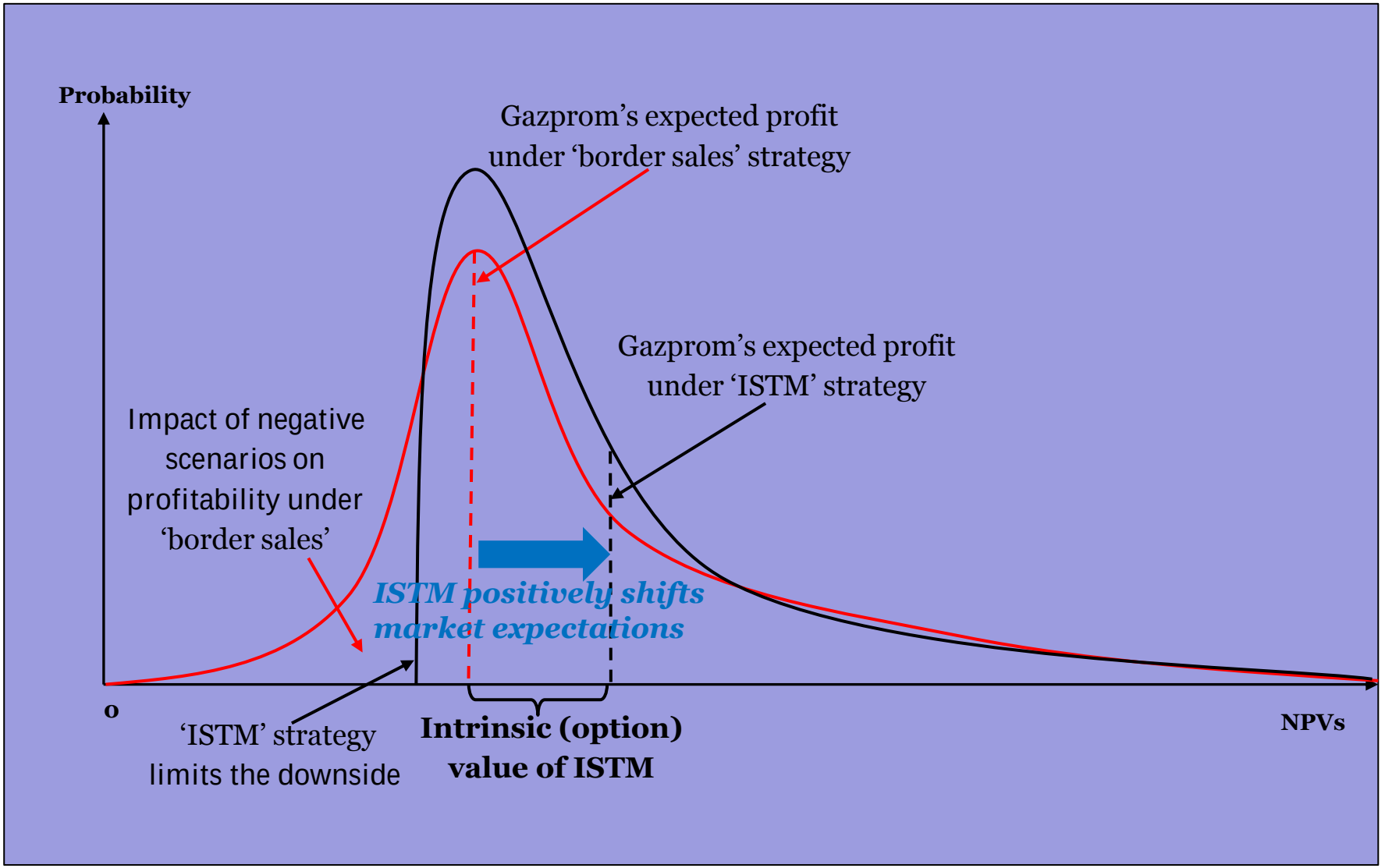
Summarizing: Economics of Gazprom's possible sales strategies

- Ability to 'correctly' price the produced gas creates additional profit for Gazprom
- ISTM has intrinsic – option and strategic – value to Gazprom
- ISTM can also better capture the upside potential under favourable market conditions



Note: we assume 75% minimum take-or-pay level and 90/10 oil vs. spot indexation for existing LTC structure; ** for example, due to increased downstream market competition*

Integrated Supply, Trading & Marketing Strategy **positively** shifts market expectations regarding Gazprom's performance



Thank you for your attention

Questions?

Contact:
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