

**WILL RUSSIAN NATURAL GAS LONG-TERM
CONTRACT PRICES REMAIN OIL PRICE
DETERMINED AFTER THE END OF OIL-
INDEXATION?**

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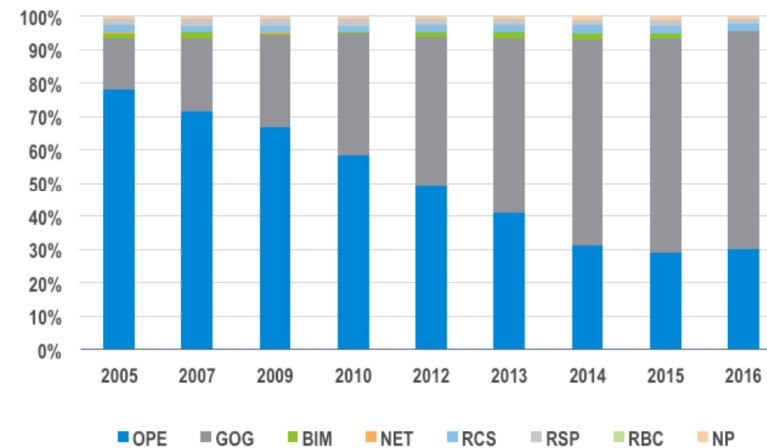
41st IAEE Conference

- Question relevance and nature of LTC pricing
- Data description
- Hypothesis 1: European wholesale gas markets work in a competitive manner
- Hypothesis 2: European wholesale gas markets are oligopolistic, pricing is market-power dependent
 - ▶ E-Index for market power quantification
 - ▶ Multivariate panel regression analysis
- Conclusion

Why is this issue important?

- Majority of European gas consumption is traded on an OTC basis
- Oil-indexation as a main pricing mechanism
- Oversupply, over-contracting by the late-2000s - decoupling
- Re-negotiation and gradual phasing out of oil indexation from LTCs, replaced by gas-on-gas competition
- What drives LTC prices?

Figure 5.4 Europe Price Formation 2005 to 2016

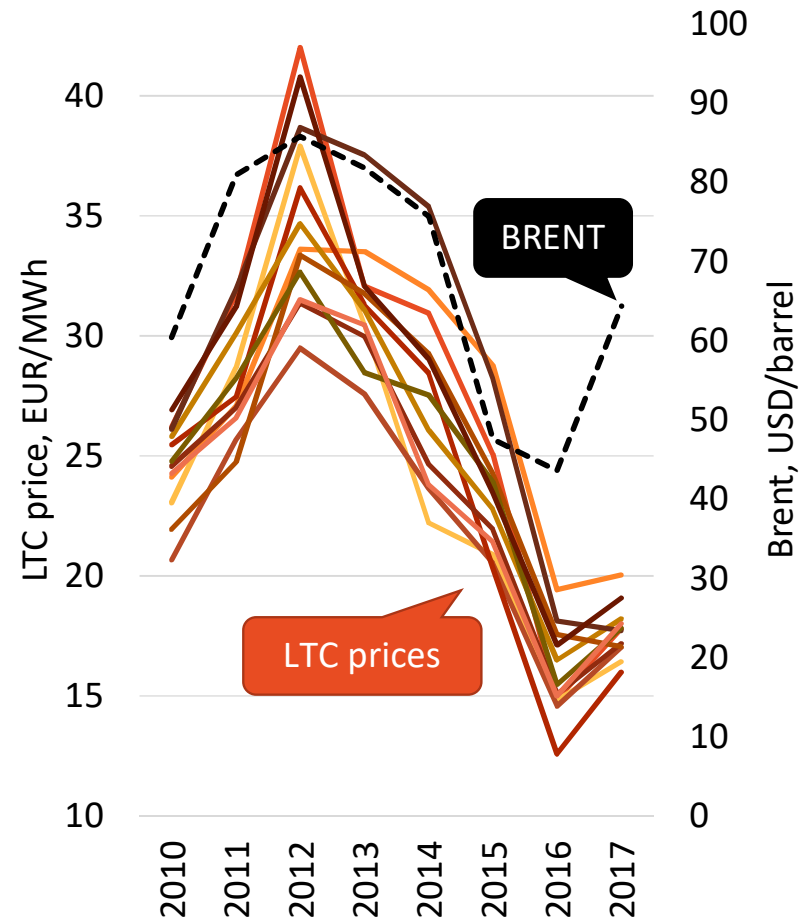


Source: IGU wholesale gas price survey 2017

Data description

- Eurostat, BAFA data 2010-2017
- 4-13 €/MWh price difference between countries
- LTC prices follow a trajectory of Brent crude
- LTC price convergence after 2014
- Different country profiles
 - ▶ Highest LTC prices: BG, EE, LT, SI
 - ▶ Lowest LTC prices: DE, CZ, GR
- Note: no information for DE, NL, DK, FR, UK in Eurostat

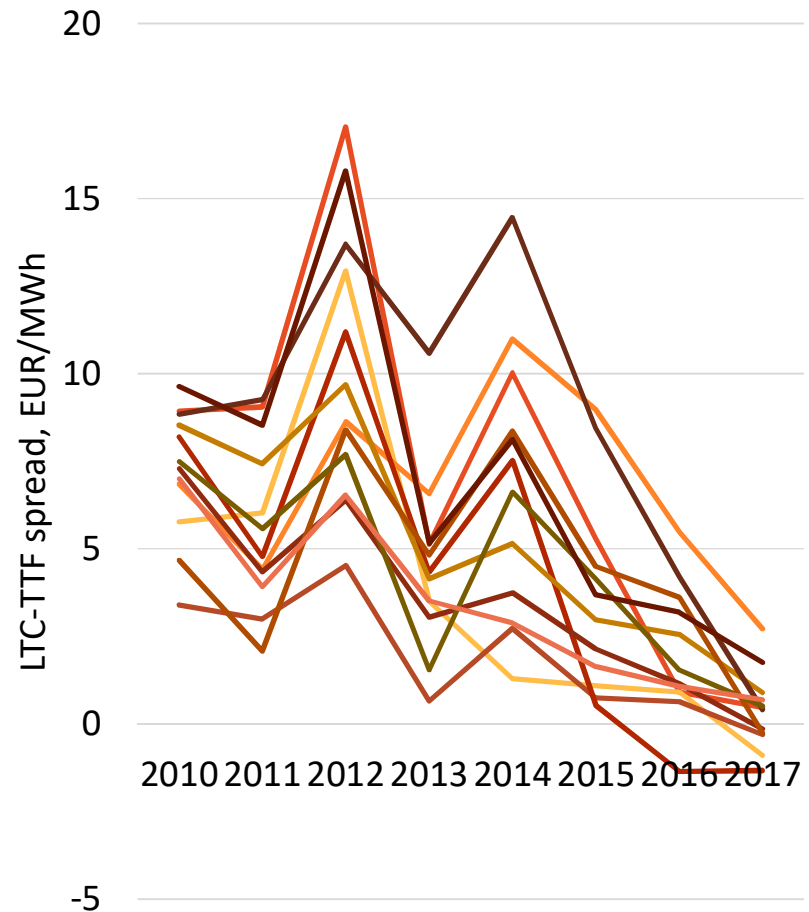
Countries analysed: Bulgaria, Czech Republic, Germany, Estonia, Greece, Hungary, Italy, Lithuania, Latvia, Romania, Slovenia, Slovakia



Source: author's calculations based on Eurostat, EIA

LTC –TTF spread

- Main tendencies are similar to raw LTC prices
- Decrease in LTC-TTF spread since 2012
 - ▶ Average spread in 2012: 9.72 EUR/MWh
 - ▶ Average spread in 2017: 0.15 EUR/MWh
- Despite the fact the LTC prices increased from 2016 to 2017, LTC-TTF spread continued to decrease in the same time period

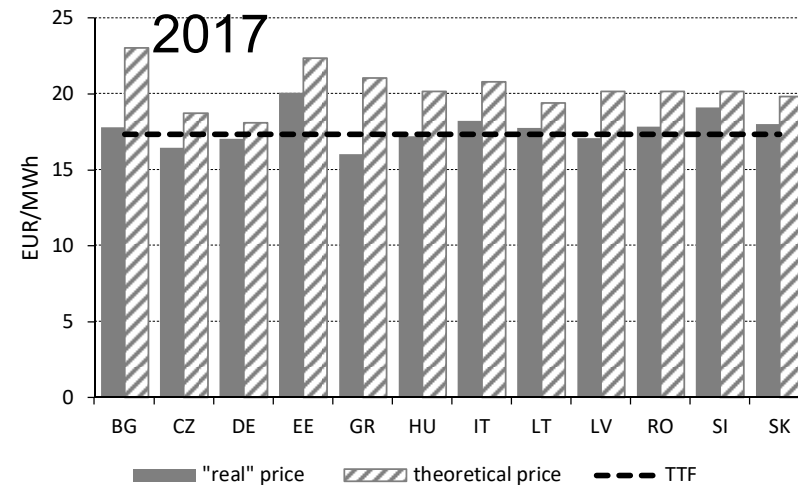
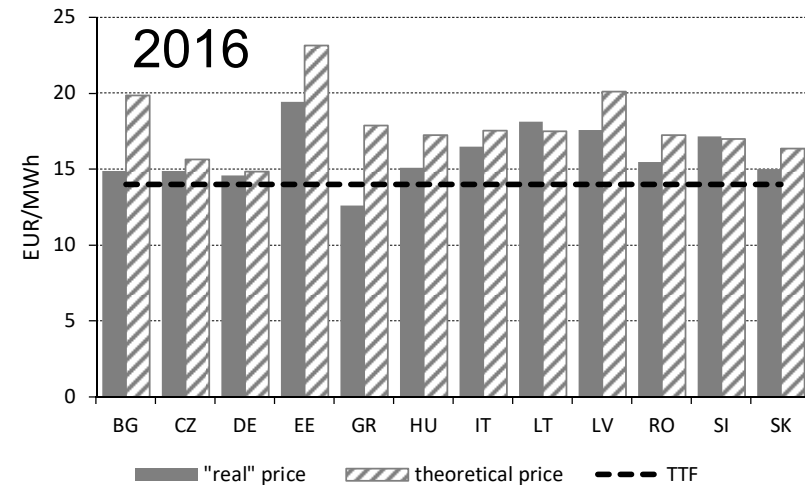


Source: author's calculations based on Eurostat

- Competitive market:
 - ▶ Goal of Russia is profit maximisation by keeping market share and sustaining market foreclosure
 - ▶ LTC prices should reflect the price of the closest competitive alternative
- Market power issues
 - ▶ Russia has the option to exert market power in the national markets
 - ▶ Market power is estimated with the E-index
 - ▶ LTC prices should reflect the market power of Russia

Competitive market

- Theoretical price:
 - ▶ TTF+transportation cost for CZ, DE, HU, IT, SI, SK
 - ▶ Klaipeda LNG for EE, LT, LV
 - ▶ Greek price + transportation cost for BG
 - ▶ HU price + transportation cost for RO
- Accidental for 2016, not valid for 2017



Source: author's calculations based on ENTSOG and REKK data collection on tariffs

- Exposure-index (E-index) to measure Russian market power

$$E_{i,t} = \frac{C_{i,t} - P_{i,t} - I_{max_{i,t}}}{C_{i,t}}$$

where i represent the different countries while t the different years. C stands for the annual consumption level, P is the annual production, while I_{max} is the maximum import capacity per year from non-Russian source

- 0 (totally independent) and 1 (totally dependent)
- Index may be negative

Evaluation of E-index

	BG	CZ	DE	EE	GR	HU	IT	LT	LV	RO	SI	SK
2010	0.97	-0.50	-0.17	1.00	-0.55	0.53	-0.34	0.75	1.00	0.05	-1.30	-0.83
2011	0.91	-0.70	-0.39	1.00	-0.25	0.50	-0.43	0.77	1.00	0.08	-2.88	-0.64
2012	0.98	-3.10	-0.15	1.00	-0.29	0.47	-0.52	0.43	1.00	0.06	-3.77	-1.34
2013	0.90	-4.84	-0.17	1.00	-0.72	0.45	-0.69	0.29	1.00	-0.02	-3.99	-2.82
2014	0.94	-5.80	-0.49	1.00	-1.37	0.40	-0.90	0.16	1.00	-0.12	-4.50	-7.29
2015	0.86	-5.88	-0.42	-3.18	-1.07	-0.02	-0.71	-1.53	-0.48	-0.15	-4.60	-5.84
2016	0.86	-5.67	-0.32	-2.96	-0.80	-0.01	-0.71	-1.74	-0.38	-0.14	-4.50	-6.87
2017	0.87	-4.13	-0.24	-3.02	-0.32	0.02	-0.71	-1.71	-0.58	-0.01	-3.96	-5.73

Source: author's calculations based on ENTSOG and Eurostat

Independent even in 2010: CZ, DE, GR, IT, RO, SI, SK

Dependence reduced: HU, EE, LT, LV

Constant high dependence: BG

Positive correlation of LTC prices and E-index

Positive correlation of LTC TTF spread and E-index

(higher than raw case)

- We estimated two main fixed-effect panel regression
 - ▶ Dependent variable: LTC price or LTC-TTF spread
 - ▶ Variable of main interest: E-index
 - ▶ Control variables: Brent oil price, linear time trend
- $ltc_{i,t} = \alpha + \beta_1 * eindex_{i,t} + \beta_2 * brent_{i,t} + v_i + \rho t + u_{i,t}$
- $ltc_{i,t} - ttf_t = \alpha + \beta_1 * eindex_{i,t} + \beta_2 * brent_{i,t} + v_i + \rho t + u_{i,t}$
- In both cases we included different sets of controls in the different regressions
- Standard errors were clustered on country level

Exposure has an effect on LTC prices

VAR	(A) LTC	(B) LTC	(C) LTC	(D) LTC-TTF	(E) LTC-TTF	(F) LTC-TTF
Eindex	1.949*** (0.373)	0.386* (0.178)	-0.438 (0.258)	1.030*** (0.241)	0.574** (0.200)	-0.161 (0.215)
Brent	-	0.327*** (0.023)	0.278*** (0.016)		0.0953*** (0.022)	0.0516*** (0.016)
Time trend	-	-	YES	-	-	YES
Obs.	96	96	96	96	96	96
R ²	0.141	0.652	0.722	0.136	0.285	0.477

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

- Is the market competitive or is there place for market power exertion?
- Hypothesis for competitive market is rejected
- E-index affects
 - ▶ LTC price
 - ▶ LTC-TTF spread
- Brent remained an important determinant of LTC prices
- Enhancing market competition affects LTC prices > countries should work on bringing alternative sources to compete incumbent

Thank you for your attention!

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Oil price escalation in LTCs – the Groningen formula

- Price linked to substitutes
(typically HFO and LFO)

$$P_t = P_0 + \alpha(HFO_{t-m} - HFO_0) + (1 - \alpha)(LFO_{t-m} - LFO_0)$$

P_t	Price of LTC gas in month t
P_0	Price of LTC gas in month 0
HFO/LFO	Price of substitutes
α	Share of substitute
m	Lag of substitutes (3-9 months)