

# ***THE INTEGRATION OF THE EUROPEAN NATURAL GAS MARKET***

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## **Overview**

The European natural gas market is currently undergoing fundamental changes in order to create a more sustainable and secure energy sector. However, according to recent EU reports, a truly integrated natural gas market is far from complete. Although the existing literature gives much attention to theoretical analysis of the market, there have not been many empirical studies performed in that regard.

This paper hopes to contribute to the existing literature by investigating a number of issues that collectively provide a better picture of the European integration process of the natural gas market. It combines both theoretical and empirical approaches which together complement each other and allow for drawing conclusive remarks regarding the current state of market as well as its future directions. Above all, the integration process is analysed through the effects of the liberalisation measures undertaken by the EU as well as through the behaviour of natural gas prices. Considering specific price formations, the main determinants of gas prices are thoroughly discussed. The empirical section studies the cointegration of natural gas prices, separately for households and industry, between multiple economically different countries. This paper additionally conducts an empirical study of countries' responsiveness towards the EU's gas directives which allows us to measure the extent to which member states implemented them.

In particular, the analysis focuses on the historically established trading mechanisms, recent infrastructural developments (gas trading hubs, LNG terminals) as well as the overall global evolution of the market (new sources of unconventional gas) and the European efforts of enhancing the overall level of market security (EU gas directives, Third Energy Package). Given the changing landscape of the industry, we observe an increasing activity of the short-term trading mechanisms, which therefore needs to be closely analysed with respect to the long-term natural gas commodity contracts between gas producers and incumbent wholesale suppliers. This research investigates crucial factors that strongly determine the contractual relationships between suppliers and consumers of natural gas, which affect not only gas prices but more importantly the European natural gas security and the overall level of market's integration. The analysis also tackles the impact of the governmental and institutional bodies as well as commercial entities on the market settings, which strongly determines the nature of natural gas contracts. Given current economic climate and recent long-term projects that aim at fostering the European energy security, the long term contracts and short-term trading are additionally analysed with respect to crucial external factors that affect the market security (GDP levels and severity of winter periods).

This paper consists of five main sections. The following section provides a brief review of existing literature and corresponding research findings. Section 3 describes the specific structure of the natural gas market. It examines EU's directives responsible for enhancing market integration, tackling the issue of antitrust among member states and describes an overall direction which the gas market has been following so far. Section 4 conducts an empirical research including the cointegration of prices and the impact of EU's directives on fostering market integration. After considering the results in light of economic theory, this paper concludes the research and presents further ideas of creating a more efficient European market for natural gas. Theoretical analysis of market's integration and an empirical study of prices' behaviour and countries' responsiveness towards EU's gas directives provide us with a thorough analysis of the extent to which the European natural gas market is currently integrated (Section 5 and Section 6).

## **Methods**

This study employs two sets of time series data of quarterly observations (1992 to 2012) of end use natural gas prices in 9 European countries. The analysis of prices is conducted separately for industry and households. Data was originally collected by the International Energy Agency (IEA) and was obtained from the Economic and Social Data Service (ESDS) database. The prices are calculated in dollars (USD/toe) using the country specific calorific value (heat content). The choice of countries for this analysis is based on data availability and the extent to which member

states have adopted the EU directives. Certain members lack necessary data or choose to make it confidential therefore they need to be excluded from our research.

Time series analysis of macroeconomic data might suggest a presence of stochastic trends, even though our variables might not be related to each other. This paper employs the Augmented Dickey-Fuller test (ADF) in order to determine whether the variables of our model are integrated of the same order. Cointegration feature of our price series is the most appropriate analysis for investigating market integration (Asche et al., 2000). We use the Johansen test (Johansen and Juselius 1990) which is based on a Vector Error Correction Model (VECM). It combines the Vector Autoregressive system (VAR) and the error correction term.

This subsection empirically investigates countries' responsiveness towards the EU gas directives in the long-run as well as how prices are being affected by shocks and inflation. For the purpose of this analysis we employ the VAR approach.

## Results

For both sectors, industry and households, the results of the empirical analysis confirm the existence of a cointegrated relationship among prices of the select European countries. However, the findings suggest that the relationship between the markets vary across the EU. In most cases the long-run equilibrium conditions do not influence short-run fluctuations in natural gas prices among European markets. This is in conformity with the economic theory which argues that the European market of natural gas remains not fully integrated.

This study also measures the responsiveness of member states to the EU's liberalisation efforts. The findings suggest that most member states did not respond well to the gas directives imposed by the EU which could be caused by the strong impact of various constraints that slowed down the integration process. Therefore, we analyse the liberalisation measures with respect to the Energy Antitrust Enforcement. By studying the antitrust (through identifying the power of the market) and economic sides of the market (through identifying the market prices) (Church and Ware, 2000), further liberalisation actions are being suggested in order to obtain a fully integrated and efficient gas market.

## Conclusions

This research project draws conclusive remarks regarding the current state of the natural gas market and future directions of contractual agreements as well as suggestions for new policies that will foster the energy security both on the international and local level. The study closely examines the advantages and disadvantages of the long-term natural gas contracts and short term trading as well as suggests future market settings that will enable both types of contractual agreements to co-exist.

It should be concluded that despite multiple physical, economic, commercial and legal barriers, the integration of the European natural gas market is progressing, although at a much slower rate than anticipated. Given the ambiguous results of the European regulations and rather weak interactions among gas prices, one could suggest that the principal settings of the market are naturally evolving regardless of the legislative drive for changes. This paper attempts to provide an empirical investigation of the interactions between natural gas prices among member states, however similar studies should be undertaken for many other aspects including the technical, legislative and political sides of the market.

## References

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