

# ***SECURITY OF GAS SUPPLY IN POLAND – NEW PERSPECTIVE***

Honorata Nyga-Lukaszewska, Warsaw School of Economics, Phone: +48 22 564 93 61, e-mail: hlukas@sgh.waw.pl

## **Overview**

Security of gas supply gains more and more importance with every gas crisis. Fuel deficit brings again the question of its supply reliability. For countries of the Central – Eastern Europe the security of gas supply is inherently connected with geopolitics. Therefore, majority of the scientific research in this area roots in politics, while economics', especially international economics' perspective is still missing. Additionally, rising role of natural gas in Poland, with its volatile import prices induces increased investments in the natural gas sector.

Thus, presented research offers a closer look at the natural gas supply security from the international economics perspective with the use of the international trade theories and empirical measures. That allows for an innovative extension of an existing international economics theory into security of gas supply. Analysis includes the deterministic, scenario-based case-study for Poland.

The paper is organised as follows: After the introduction, the second section gives a brief overview about the theory and empirical method from the international economics field, that I applied to describe the security of gas supply. The third section addresses the investments in the supply reliability in Poland. In section four, I present the conducted research and the results. In the final section policy implications are derived.

## **Methodology**

In the theoretical layer study uses critical literature review. I employ logical synthesis and analysis in order to thoroughly investigate and compare interdisciplinary notions so as to arrive with the complex approach to the security of supply idea.

In the empirical layer, analysis relies on the case study research method with an embedded qualitative and quantitative study. Qualitative research is an introduction into a quantitative study. Qualitative research consists of in-depth interviews. Quantitative analysis includes international trade structure measures. Study constitutes a dynamic and deterministic analysis of the Polish gas supply security.

## **Results**

First, international economics theory is applied to the phenomenon of the gas supply security and further on extended with own contribution. Popular in the 70's of the XXth century concept of trade dependence is employed in the theoretical layer. Its modern development breaking the notion into horizontal and vertical dimension allows for a comparative analysis with the security of gas supply phenomenon. This approach relies on the division of the trade dependence into: dependence sources; state of asymmetry and its benefits/costs.

Second, international trade structure measures are presented as tools used for the empirical measure of the security of supply. Among many different ways to capture security of supply in the quantitative dimension, existing literature distinguishes two types of measures. The core idea behind both of them is a diversity/concentration approach. Though, there are methods focused on one hand on the use of A. Stirling diversity indicators, and on the other on Herfindahl-Hirschmann concentration indicators. Study employs the latter ones.

Third, the result of empirical study suggests that security of gas supply to Poland increases over time in every of the analysed scenarios. In order to analyse security of supply in a multidimensional manner, I employ J. Stern concept that distinguishes four different types of threats referring to energy imports: source, facility and transit dependence. This idea constituted basis for definition of the security of energy supply while establishing European Union's "Security of Supply (SoS) directive" in 2010. Additionally, the above given Stern's notion is broken into several

categories, including different import volumes and number of suppliers. This deterministic approach allows to identify break-even point, which once crossed, influences negatively security of supply.

Fourth, I found the differences between different investments aimed at security of gas supply improvement (e.g. LNG facility and interconnectors capacity extension; within LNG regasification capacity – differences in increased and decreased gas imports). Thorough quantitative analysis proved that security of supply gains can differ in terms of their magnitude. The greatest potential brings introducing LNG supplies into the import portfolio. That influences, first of all, facility dependence. This effect does not accompany interconnectors' capacity extension, which affects all of the dependence types.

## **Conclusions**

Security of gas supply is a phenomenon which can be explained by the theoretical and empirical framework stemming from the international economics. Following the Occam's rule, it seems that there is no need to develop additional definitions of the supply security. Existing literature offers explanation that can be applied to this phenomenon as well.

Poland is gradually improving its gas supply security with the use of various investments. Each of them has different potential. The greatest possibility occurs with the LNG terminal commence. However, when LNG supplies exceed a break-even point security of supply decreases significantly. Therefore, any optimal energy policy needs to reflect on the break-even point as a in/security of supply frontier.

## **References**

- Bohi D. and M. Thoman (1996), "The economics of energy security", Kluwer Academic Publishers, Massachusetts.
- Coq Ch. and E. Paltseva (2009), "Measuring the Security of External Energy Supply in the European Union", SITE Working Paper, No. 2.
- Cohen G. and F. Joutz, P. Lougnani (2011), "Measuring Energy Security: Trends in the Diversification of Oil and Natural Gas Supplies", IMF Working Paper, No. 11/39.
- Hirschman A.O. (1980), "National Power and the Structure of Foreign Trade", University of California Press, Los Angeles.
- Stern J. (2002), "Security of European gas supplies. The impact of import dependence and liberalization", Royal Institute of International Affairs, London.
- Stirling A. (1999), "On the Economics and Analysis of Diversity", SPRU Electronic Working Paper Series, No. 28.
- Stirling A. (2010), "Multicriteria diversity analysis. A novel heuristic approach for appraising energy portfolios", Energy Policy, Vol. 38, Issue 4.
- Wysokinska Z. (1995), "Dynamiczne współzależności wymiany handlowej krajów Europy Środkowej i Wschodniej w świetle teorii integracji i wymiany międzynarodowej", Wydawnictwo UŁ, Łódź.