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### **Review**

**of the doctoral dissertation titled: "Market determinants of retail fuel price dispersion in Poland", Warsaw, 2017, 279 pages, written by mgr Marcin Nowakowski, under the supervision of prof. dr hab. Grzegorz Karasiewicz.**

The pricing issues constitute one of complex topics in economics with regard to both their formation and the consumers' reaction to their level. Conducting research in this area is complex in terms of both source information and research methods. The level and dispersion of prices depend on multiple diverse factors. Their nature is both external and internal. These issues are difficult to analyze on all markets, including fuel market. With respect to fuel prices it must be pointed out that this sector is of particular importance for a state. The reasons behind it are that fuel prices are burdened with taxes and the fuel market itself is strategic. The supply and demand in case of fuels are also related to road layout, seasonality, competition and even to the so called "fuel tourism". Consequently, it becomes necessary to perform a careful selection of market information, conduct one's own research and be familiar with methods of analyzing the way in which various factors influence the dispersion of fuel prices.

Bearing the above conditions in mind, the Author's decision involving the selection of the field of study calls for special recognition. The Author correctly formulated the research problem statement and reasonably supported the selection with existing factors. Based on critical assessment of the studied literature of the field (nearly 400 concise studies and articles quoted in the dissertation), own experience and fuel market observation, the Author has formulated the objective of his dissertation. He defined it in the following way: "The main objective of this dissertation and empirical study performed is to determine the impact of market factors on price level and its dispersion in the retail fuel market in Poland."

Proper understanding of the literature and the market enabled the Author to construct five research hypotheses:

- Hypothesis 1: Retail fuel market in Poland is characterized by prevalent and visible price dispersion.
- Hypothesis 2: Demographic and economic environment influences the shape of local competitive environment.
- Hypothesis 3: Shape of seller's resources and offer (amenities) is influenced by seller's localization and seller's brand and business model.
- Hypothesis 4: The level of seller's prices is influenced by: seller's localization, seller's brand and business model, seller's resources and offer (amenities), cost of product, local competitive environment, and demographic and economic environment.
- Hypothesis 5: Gasoline stations change their relative position in the price distribution over time. The frequency of the change is influenced by business model under which gasoline stations operated, seller's resources and offer (amenities).

In order to verify the proposed research hypotheses, the Author gathered secondary and primary market information. He used correct research methods to analyze them. He used methods of deductive reasoning, statistical measures, significance assessment methods to verify the research hypotheses.

The dissertation has been divided into four chapters concise in terms of both their logical and substantial content, preceded by an introduction and concluded with a summary. The structure of the discourse does not raise any concerns. The introduction was written comparatively correctly. It includes the definition of the research problem and its grounds, definition of the main objective, research hypotheses, the assessment of information sources, description of the applied research methods and concise explanation of the dissertation structure and the content of each of its four chapters. A more specific presentation of the dissertation scopes could have been included in the introduction, namely: the objective, subjective, spatial and time scope. Partially the information was provided in chapter three, dedicated to describing the research methods. Nevertheless, it does not contain exact information regarding the spatial and subjective scope of the research. In case of assessment of the research results, it is necessary to be familiar with the sources of information and research methods (what was the way of conducting

price observations, which gasoline stations were investigated, how were the weekly prices calculated). The description of the secondary sources of information is also rather brief. Comprehensively and relatively thoroughly written introduction facilitates understanding and assessment of the entire doctoral dissertation.

The first chapter includes critical view of the literature devoted to describing the factors that affect the level and dispersion of prices. The Author considered the factors that affect the price formation from a perspective of price formation process taking place in an enterprise. Further part of this chapter characterizes the correlation between the supply, demand, resources and the price level and dispersion. The deliberations refer to extensive literature on the subject matter. The Author showed very broad knowledge of price formation theory, models and concepts. It is particularly worth emphasizing that the price level and dispersion issues were enriched with a reference to the value. The deliberations included in chapter one deserve a highly positive assessment. The area of price formation was considered comprehensively. The correct language was used. The discourse was appealingly illustrated with adequate charts. In the opinion of the reviewer, the first chapter is too extensive. It constitutes one third of the dissertation's volume. The Doctoral Applicant could have provided a more concise description of factors affecting price level. These topics are widely described in the literature. The second comment is that there could have been more references to the fuel market and fuel prices in the content of the deliberations. The first chapter is focused on the description of factors and models, and therefore loosely relates to the subsequent sections of the dissertation. Should the dissertation be published, this could be modified.

The content of the second chapter concentrates on the fields of production, distribution and fuel market in Poland. This 50-pages-long part of the dissertation provides a description of fuel production, wholesale, retail and consumption spheres. Then retail market was presented, that is the entities functioning at the contact point with consumers (gasoline stations) were characterized. Additionally, elements comprising the fuel prices were described and diversity of products was characterized. The deliberations included in this part are based on secondary data, collected by the Doctoral Applicant and analyzed by means of properly selected methods. The collected information

was clearly presented in a graphic form. Perhaps the issues of fuel production could have been described in a shorter form and including a critical view of the parallel economy (shadow economy) present on this market would be interesting indeed. It could be also attractive to address the topic of road infrastructure. It is the factor that affects the scale of fuel purchase and consequently may influence the level and dispersion of prices, in particular in the regional cross-section. The seasonal approach to the turnover could also be worth analyzing. It is also a factor that may affect the level and dispersion of fuel prices.

Chapter three includes deliberations on the wider grounds for the research problem, description of the used secondary and primary information sources and more detailed description of research methods. The Doctoral Applicant phrased three research questions, namely:

- How do the sellers determine the level of retail fuel prices?
- Which market factors affect the level of retail fuel prices?
- How do seller's brand and business model, resources and offer (amenities), as well as local competitive environment influence the level of retail fuel prices?

This part of the dissertation presents detailed breakdown of the research hypotheses. It applies to hypotheses from 3 to 5, for which detailed hypotheses were formulated:

- Shape of seller's resources and offer (amenities) is influenced by (H3A) seller's localization and (H3B) seller's brand and business model.
- The level of seller's prices is influenced by: (H4A) seller's localization, (H4B) seller's brand and business model, (H4C) seller's resources and offer (amenities), (H4D) cost of product, (H4E) local competitive environment, and (H4F) demographic and economic environment.
- Gasoline stations change their relative position in the price distribution over time (H5A). The frequency of the change is influenced by business model under which gasoline stations operated, seller's resources and offer (amenities) (H5B).

This breakdown is significant, since also detailed hypotheses (within a given main hypothesis) were subjected to verification. It should be emphasized in particular that the Doctoral Applicant prepared and presented a clear graphic depiction of the research model (p.139). The Author applied proper research

methods, including statistical measures to analyze the gathered information in various cross-sections (brand of station, type of fuel, region of the country). The reliability of performed analyses may be positively evaluated.

Chapter four includes deliberations relating to the five formed research hypotheses. The layout of this chapter is based on the formulated hypotheses. The information indicating the verification extent of partial hypotheses are presented one by one from hypothesis one to five. The complete summary of hypotheses with the information on the extent to which they were verified can be found on pages 229-230. Eleven of the twelve formed hypotheses were verified positively and one (H4C) did not achieve a positive verification. It is worth emphasizing that the Doctoral Applicant had a very meticulous approach to verifying the hypotheses. With respect to each of them proper empirical data were presented and correctly described by means of approved research methods. The above constitutes the Doctoral Applicant's original contribution in solving the constructed research problem.

The conclusion of the dissertation also deserves a positive evaluation, since it concisely describes the achieved research results, indicates their significance for theory and practice and points out the directions of further studies. The achieved research results are original and interesting. They show the fuel market functioning in a relatively comparable period. They may become a reference point for the future studies. In 2018 the conditions of retail trade functioning will change. Limitations in the operation of sales outlets open on Sundays will systematically be introduced. Undoubtedly it will affect the level and dispersion of fuel prices, since gasoline stations will be open on Sundays. In these conditions the structure of gasoline stations turnover, in particular on Sundays, will change. This in turn will translate into the change of price formation policy at gasoline stations. Another issue relates to limiting the traffic of diesel engine vehicles. It will also constitute a factor affecting the level, structure and dispersion of fuel prices in Poland. The number of vehicles driven by electric energy and other energy sources will also increase each year. As a consequence, the fuel market will change and so will the level and dispersion of prices.

The formal aspect of the dissertation may also be evaluated as very positive. The language and style of the dissertation are correct. The deliberations are illustrated with interesting diagrams and charts. Should the

dissertation be published in whole or partially, comments under diagrams and tables would be worth adding (occasionally a new clause is started after a diagram or a table).

The conclusion of this review will point out the elements that constitute grounds for recommending its acceptance and admission of its public defense by the Author. These include the following issues:

- ability to formulate a research problem independently
- providing grounds for the problem in the form of objectively occurring factors
- formulating the aim of the research
- posing the research hypotheses
- selecting wide and proper literature on the research area, its critical description and proper use in the prepared dissertation
- gathering appropriate source information, their critical assessment and processing by means of adequately selected methods
- ability to draw conclusions and to justify them objectively
- verification of the constructed research hypotheses
- indication of the directions for further studies
- correct language and style of the dissertation
- correct text editing in the dissertation
- ability to use scientific methods.

According to the spatial scope of the research adopted by the Author, the research was conducted in the area of Poland. This ensured the coherence of the entire dissertation. The twenty first century is however the age when all entities operate on a global scale. In view of the above it would be interesting if the Doctoral Applicant has mentioned – at least within a limited extent – the fuel price dispersion in other countries. Poland does not constitute an exception in this scope. Fuel prices are characterized by dispersion also in other countries. It would enable a wider perspective in the perception of the problems studied in Poland.

The comments presented above enable me to formulate an unambiguously positive opinion that the reviewed dissertation meets the requirements imposed on doctoral dissertations. Therefore, I recommend accepting the dissertation titled “Market determinants of retail fuel price

dispersion in Poland" written by Marcin Nowakowski and to admit it to a public defense.

Puszczykowo, January 18, 2018



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