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Analysis of the Energy Market Operator Activity in Eight European Countries

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ABSTRACT: The article aims to analyze the connection between economic development, energy consumption, and prices of electricity and gas on one side and of the operation of the Energy Market Operator on the other. For this purpose we use a sample of eight EU countries with well-functioning energy markets but quite diverse characteristics. The results show that Market Operators in more developed countries in the sample have above average activity (according to revenue), and their primary goal is to achieve external economies. A higher level of Market Operator activity (greater revenue) is influenced by the decrease of transaction costs in energy markets and improves the prospect for greater use of energy. An active Market Operator is characteristically associated with international openness in the energy market as well as with the development of gas use in the given country. We find that a better equipped (greater assets used by the Market Operator) and more active (according to revenues) Market Operator is related with relatively higher levels of electricity and natural gas prices.

Keywords: energy; supply and demand; financial analysis; macroeconomics; international benchmark; comparison
JEL Classifications: E3; F0; G0; Q4

1. Introduction

The analysis presented in this article gives a new aspect of contemporary European energy market monitoring. Single and not most important institution on this market, "energy market operator", is taken under the research with open questions how are its activity, relative size and assets connected to energy market. Thus we estimate the connection between economic development, energy consumption and prices of electricity and gas on one side and the operation of the so-called *Market Operator*[1] on the other.

1 The *Market Operator* is one of the actors in the market with a monopolistic, market facilitating function. The Market Operator is a centralized institution, which operates an organized market for the (commercial) exchange of energy or other products on behalf of market participants. In addition to organising the electricity market, the market operator is also responsible for the following tasks performed within the framework of the public service of organising the market for electricity: a) to carry out the clearing process, i.e. the accounting for and settlement of liabilities incurred on the basis of the deals made at the exchange, including the assurance of compliance with regard to these liabilities; b) to provide for the balancing of the electricity market according to the instructions of, and under the direction of, the transmission system operator, c) to establish imbalances and balance the imbalances relating to the supply and consumption of electricity, d) to record all the concluded contracts or the supply of electricity, d) to register all market participants that are eligible and wish to participate in the market.

In our analysis we have included *Market Operators* in eight European countries: Slovenia – BORZEN, Austria – APCS, Italy – GME, United Kingdom – ELEXON, Spain – OMEL, Czech Republic – OTE, Croatia – HROTE, and Romania – OPCOM. The analysis refers to the year 2010 and assumes that we estimate the relationships which do not change quickly. First, we define the economic theory of energy market development and the *Market Operator's* role in a modern national economy. Then we describe the relative economic development, energy consumption and energy prices in the group of analysed countries. We proceed with a description of the methodology used in this econometric research where we set a link between the functioning of the *Market Operator* and the characteristics of a given national economy. At the end we elaborate on our conclusions and provide references.

2. About the Energy Raw Materials Market

Economic development is a dynamic process defined by two economic laws: the law of diminishing returns on labour and capital[2], as well as the Gossen's first law of diminishing marginal utility (Gossen, 1854). The first creates a tendency for capacity constraints despite the accumulation of capital and the growth of the population, while the second leads to a glut of market goods. Their combined impact causes occasional drastic shifts in economic conditions. The evolutionary school of economic thought names it the change of techno-economic paradigms (Nelson et. al, 1982). Contemporary economic growth depends on the development of information technologies and their direct (components of devices and products) or indirect (information basis for the production of goods or the provision of services) applications in almost all products and services (Romer, 1990, Perez, 1983). GDP per capita in economically developed countries has reached such a level that the demand for agricultural products does not increase, while the demand for industrial products increases slowly. Faster GDP increases just relate to demand for services. Due to a high degree of flexibility and the continuous expansion of production efficiency through new technologies and because of slow growth in the consumption of industrial products, economic growth has become less dependent on increased consumption of raw materials, including energy. In recent decades, particularly influenced by two "oil shocks" in the 1970s,) energy industry management has changed in fundamentals. Some producers of energy based on raw materials, in particular electricity, who were previously part of the infrastructure, had to fully transform to market-oriented activities. The essence of this transition has been the implementation of sovereignty of the electric power producers. The state has thus ended its regulation of quantities and prices in this field. Sovereign producers need an efficient market of energy raw materials. For the smooth operation of the market of energy raw materials in which there is no lack of individual goods nor large fluctuations in their prices, where prices are a sufficient signal for the entry of new providers or for increasing the capacity of existing providers, and where prices are just as good a signal to clients when deciding to purchase energy consuming devices, there are inevitable institutions which develop to regulate this market ("energy agencies") and institutions that promote the market and help secure the participants on this specific market (*Market Operators*). Both of these institutions are relatively new, also in developed market economies (more about Market Operators in Kema Int,, 2007 or Bučar, 2012). In this article we analyze the functioning of the *Market Operator*.

3. Some Characteristic of Economic Development and Energy Market in the Analysed Countries

The connection between *Market Operator* activities and different macroeconomic, development or energy-related variables of the national economies is estimated for the group of eight countries using data for 2010. Seven of these countries were already EU Member States, and Croatia was in the process of EU accession in that year. We can say that all of them operate in the same EU institutional framework, but there are still significant historical differences between them. Some of the states involved in our analysis have long and important traditions as market economies. The modern monetary economy in the Western hemisphere started in Italy. The United Kingdom initiated the world's energy-fuelled industrial revolution. Austria has a tradition of modernization development policies and has been a recognized school of economic thought from the times of its empire. Spain

2 The concept of limited natural resources that decreases the efficiency of an additional unit of labor and/or capital was described by different economists at the end of the eighteenth and beginning of the nineteenth centuries. The most persistent about this subject was, without doubt, Thomas Malthus (1798).

passed into the developed market economy from feudalism. Slovenia and Croatia recently emerged from socialism of the so-called "Illyrian type"[3], while the Czech Republic and Romania transformed into contemporary market economies from the centrally-planned socialistic states[4]. In spite great historical differences, the electricity market is for all these analysed economies relatively new.

Table 1. The size, economic development and R&D intensity (data for 2010)

	Population	GDP	GDP per capita	Investment in R&D per capita	The share of R&D investment in GDP
	Thousand	Million €	Thousand €	Thousand €	%
Slovenia	2,049	35,798	17	364	2.1
Austria	8,880	281,179	34	942	2.8
Italy	60,483	1,547,117	26	324	1.3
United Kingdom	62,262	1,571,205	25	485	1.8
Spain	46,073	1,047,103	23	317	1.4
Czech Republic	10,517	145,324	14	222	1.6
Croatia	4,290	45,122	10	76	0.7
Romania	21,431	116,247	5	27	0.5

In Table 1 we can see from our sample of countries there are three big national economies (in principle, around 50 million inhabitants or more) with a gross domestic product exceeding a trillion €. These are the United Kingdom, Italy and Spain. Among the medium-sized economies are Romania, the Czech Republic and Austria, while Croatia and Slovenia are small economies. Between the economically most developed and least developed, Austria and Romania, the difference in GDP per capita is nearly 7:1. There are also major differences in the development positions of the analyzed countries.

Austria has the highest economic development and is the most R&D investment intensive (judging by the GDP per capita and volume of investments in R&D per capita, as well as the share of investments in R&D in GDP) in our sample; it has a 2.8% share of R&D in GDP and under this criterion is close to the structure of the Scandinavian countries in such a way as to resolve the dilemma between competitiveness and costs needed for the creation and maintenance of human capital. If we look only at GDP per capita, the older market oriented economies (Austria, Italy, the United Kingdom and Spain) are far above the former socialist countries. With regard to development effort, measured by investment in R&D, the United Kingdom and Slovenia follow Austria. The results in the last two columns of Table 1 show the relative effort of the Czech Republic in active development policy. The share of their R&D spending in GDP is larger than in Italy or Spain, while the volume of this investment per capita is in Czech Republic still smaller than in Italy or Spain. In our sample the least R&D investment intensive are Croatia and Romania. The proportion of investment in R&D, both in Croatia and Romania does not reach even one percent of GDP.

Energy consumption in the analyzed group of countries. Table 2 shows the effectiveness of the total consumption of energy and the efficiency of the consumption of electricity and gas in the analysed countries (more about energy market can be found in Bask et al, 2009, Hellström et al., 2012, Meeus et. al, 2005). Efficiency is measured as energy consumption per unit of GDP. The lower this consumption figure, the more energy efficient is the economy (also Saatci et al., 2013). Additionally, Table 2 shows the share of the imports or exports of electricity in its total final consumption. This quotient indicates the importance of cross-border trade for the functioning of the market.

3 "Illyrian socialism" did not have a centrally-planned economy, but independent companies. They operated on the domestic and international market of goods and were structured accordingly. Problems arose from the market of production factors and their inefficient use, resulting in inflation.

4 Socialist planning had deep consequences in the energy sector. Extensive investments in energy manufacturing capacity were based on the miscalculation that economic development is the consequence of capital accumulation and investment. However, the investments in energy-related facilities were more efficient (not so misguided) than the rest of the investment in industrial capacity. In the transition, most inefficient industrial producers (the so-called "mastodons") collapsed, yet the energy capacities, remained. Their abundance has led to the low level of energy raw materials prices, in particular prices of electricity (Križanič, 2001).

The most energy efficient among the analysed countries (second column of Table 2) is: Italy, Austria, Spain and the United Kingdom. The two former Yugoslav republics, Croatia and Slovenia, are to some extent less energy efficient. Due to the more favourable climatic conditions and complete deindustrialization, Croatia needs slightly less energy per GDP unit than Slovenia. Both of the former centrally plan economies, the Czech Republic and Romania, are distinctly the least energy efficient in our sample. The electricity consumption per unit of GDP is shown in the third column of Table 2. Here too, are in our model the most effectively developed market economies of Western Europe. Most effective is again Italy, closely followed by the United Kingdom, then Austria and Spain. Slovenia is at the fifth place but not significantly ahead of Croatia and Romania. The greatest electricity consumption per unit of GDP is in Czech Republic. The sixth column of Table 2 shows gas consumption per unit of GDP. Here, the factors of supply (natural resources and pipelines) are more important than factors of demand. In the case of gas consumption we cannot describe it in terms of energy efficiency but according to the level of gas supply in a given economy. From this perspective Spain has the smallest consumption of gas per unit of GDP in our group of analysed countries; it is followed by Slovenia and Austria. Gas consumption per unit of GDP is then slightly higher, but still below the average, in Italy and above average in Croatia and in the UK. It is the highest in the Czech Republic and Romania. In the fourth and fifth columns of Table 2 we can finally see the importance of cross-border trade of electricity in the analysed group of countries. The most integrated in the international market on this field is Slovenia. Austria is similar but to a much lesser degree. Exports of electricity are important in the Czech Republic, while imports of electricity are significant (based on the total consumption of these goods) in Italy and Croatia. The United Kingdom (understandable), Romania and Spain have virtually completely closed electricity markets.

Table 2. The efficiency of energy consumption (data for 2010)

	The energy consumption to GDP	Electricity consumption to GDP	Share of imports in total electricity consumption	Share of exports in total electricity consumption	Gas consumption to GDP
	TOE */mill €	GWh/mill €	%	%	TJ/mill €
Slovenia	0.2029	0.3343	67	85	0.7255
Austria	0.1231	0.2181	32	29	0.7428
Italy	0.1134	0.1935	15	1	1.0419
United Kingdom	0.1353	0.2090	2	1	1.2502
Spain	0.1244	0.2489	2	5	0.5826
Czech Republic	0.3081	0.3937	12	38	1.9269
Croatia	0.1900	0.3515	42	12	1.1947
Romania	0.3072	0.3554	2	7	2.2290

* TOE is thousands of tons of oil equivalent

The prices of electricity and natural gas in the analyzed group of countries. Prices of electricity and natural gas are specifically formed in several classes and are divided depending on the extent and/or purpose of consumption (sale of energy retail or wholesale – for use in households and the services sector or in industry). Electricity prices, divided according to classes, decrease with the consumption growth (see also Berndt, 1991 or Girish et. al, 2014). This manner of price formation is likely to be affected by expensive (gas) or nearly impossible (electricity) storage of these two goods. Sometimes the state influenced these prices by price regulation (mandatory approval, etc.); after transition, however, state influence on this sector is possible only through taxation.

In Table 3 we present the prices (including all taxes) of electricity and natural gas for the analysed group of countries. Those presented are standard prices for the given (somewhere near average) class of electricity and natural gas consumption, separately for households and industry. In our sample the electricity and gas prices are more or less (the exception is prices of natural gas used in

manufacturing) the highest in Italy. They are slightly lower, but still above the average, in Austria and Spain. In the United Kingdom prices of these goods are lower than average. The same can be said for the Czech Republic and Slovenian electricity prices, while natural gas prices are (especially for industrial use) above average in these two countries. Slovenia has the highest natural gas prices in our sample. In Croatia and particularly in Romania electric power and natural gas prices are significantly lower than in the other analysed countries. For these two deindustrialized countries the price of electricity is not significantly lower, while price of natural gas is even higher for use in industry than in households. Electricity and natural gas prices vary widely among the analysed countries. Between the highest and lowest prices across countries, the difference is largest in natural gas prices for households (153%) and smallest in electricity prices for industry (61%). It is obvious that there are strong obstacles to cross-border trade of these two goods. Above, we have seen that the importance of gas consumption per unit of GDP in Spain is small and in Italy great. It is interesting to note that each has a similar effect on the price level of natural gas. In Spain, the demand for natural gas is likely to be sufficiently elastic to prevent greater rises of prices. In Italy industrial clients obviously achieve volume discounts. The United Kingdom has favourable natural conditions in obtaining natural gas, and so also the lowest price for it in industrial use. This price is even slightly lower than in Romania.

Table 3. Energy market – the prices of electricity and natural gas (annual average 2010)

	Electric energy		Natural gas	
	Households	Industry	Households	Industry
	2500-5000 kWh annual consumption	500-2000 MWh annual consumption	20-200 GJ annual consumption	10^4 - 10^5 GJ annual consumption
	€/KWh	€/KWh	€/KWh	€/KWh
Slovenia	0.1414	0.1199	0.0628	0.0510
Austria	0.1949	0.1276	0.0612	-
Italy	0.1943	0.1630	0.0702	0.0330
United Kingdom	0.1418	0.1163	0.0414	0.0267
Spain	0.1790	0.1322	0.0537	0.0333
Czech Republic	0.1369	0.1268	0.0493	0.0403
Croatia	0.1152	0.1134	0.0382	0.0452
Romania	0.1042	0.1013	0.0277	0.0269

4. Econometric Analysis of the *Energy Market Operators* in Eight EU Countries

This section outlines a short econometric analysis to find out how the *Energy Market Operator* behaves and functions and what the particular dependent features are with regard to different economic, market, and country specific variables, which we described in the previous chapter (economic development, R&D intensity, energy consumption, electricity and gas prices, etc.). The sample of eight European countries is diverse enough to comprise all the differences in economic development, energy consumption and the effectiveness of this spending, as well as with different levels in the prices of electricity and natural gas in order to give a comprehensive view of the subject. The relation between the variables that show economic environment, energy consumption and energy prices with the variables that show the *Energy Market Operator*'s business performance are estimated by cross-sectional regression analysis, according to equation:

$$(INCO / INHA) = (ENE / GDP) + u \quad (1)$$

INCO – *Energy Market Operator*'s business income (million €) across countries;
INHA – the number of inhabitants (in 1,000) across countries;
ENE – total final energy consumption across countries (in TOE);
GDP – gross domestic product (million €) across countries;
and u – unexplained residual to account for the inevitable fact that in our regression analysis we did not use perfect data, we did not form perfect equations, and because of incidental and unknown effects. Our analysis includes national economies of very different sizes and structures. The impact of these differences (heteroscedasticity) we eliminated with the use of cross-sectional weights. This is a special method for disposing of heteroscedasticity in panel econometric analysis.

Coefficients in Tables 4 to 6 presented in the column under "Connection", show the change in the dependent variable (for example, millions of Euros "energy market organizer's" business income per capita) where the independent variable is changed by one unit (for example, final energy consumption to GDP expressed in thousands of tons of oil equivalent per million € of GDP) in the analyzed group of countries. The results in this column are largely dependent on the units. Statistically, the significance of the explanation of a given independent variable's relation to *Energy Market Operator* operation, equipment and business performance shows T statistics, while the total cover of the variance (changing the independent variable by changing the dependent variable) shows the determination coefficient R^2. It is given as a percentage from 0 (no connection) to 100 (tautology). The results of our analysis are limited in time (2010) and space (eight European countries). In the study they can be described as a possible link.

The characteristics of the *Energy Market Operator* depending on the size, economic development and R&D intensity of its national economy. Here we first analyze the *Energy Market Operator's* features that depend on the size of the country (GDP), economic development (GDP per capita), and its development orientation (R&D investment per capita or share of R&D investment in GDP). In doing so, we observe the characteristics of *Energy Market Operator* in relation to its business income, assets and the economic result (EBIT), all standardized per capita. The relationship is then estimated in cross-sectional regression analysis[5] on the data for 2010. The results in Table 4 show that the *Energy Market Operator*'s greater business income per capita and more engaged resources per capita are positively related with the size of GDP[6]. Business income and EBIT (both per capita) under *Energy Market Operator* are positively and strongly related with economic development, as is shown by GDP per capita. In rows (Table 4) after "R&D intensity of the economy" we can finally see that the *Energy Market Operator*'s business income per capita, assets per capita and EBIT per capita are also positively linked with the development dynamics (investment in R&D) of the given economy.

Table 4. The connection between the characteristics of the *Energy Market Operator* and the size, economic development, or R&D intensity of the national economy

***Energy Market Operator*'s business income** (per capita)				
		Connection	T-statistics	R^2
The Size of the economy	GDP	0.0000004	11.1	32%
Economic development	GDP per capita	0.0285	7.5	38%
R&D intensity of	R&D per capita	0.0012	9.8	24%
the economy	% of R&D in GDP	0.4377	181.9	97%
***Energy Market Operator*'s assets** (per capita)				
		Connection	T-statistics	R^2
The Size of the economy	GDP	0.000008	1.9	15%
Economic development	GDP per capita	0.6134	782.0	38%
R&D intensity of	R&D per capita	0.0144	2.2	29%
the economy	% of R&D in GDP	5.1697	3.7	35%
***Energy Market Operator*'s EBIT** (per capita)				
		Connection	T-statistics	R^2
Economic development	GDP per capita	0.0055	3.0	31%
R&D intensity of the economy	% of R&D in GDP	0.0867	2.8	25%

5 The regression coefficient (presented in the column under "Connection") shows how it is given an *Energy Market Operator*'s characteristic (business income, assets or EBIT) associated with certain macroeconomic variables (GDP, etc.); T statistics show how strong this link is; R^2 (determination coefficient) indicates how much of the variance in the data on *Energy Market Operator*'s characteristics is explained by the variance of a given macroeconomic variable.

6 The size of economy (its GDP) is not connected with EBIT per capita in *Energy Market Operator* (the relation statistically isn't significant).

In short, the *Energy Market Operator* is more active and better equipped in larger, more economically developed and more R&D intensive national economies. Because the *Energy Market Operator* works basically as a part of market infrastructure (even if it has the status of a limited liability company), its profitability is of minor importance. There is no relation between the return of *Energy Market Operator* and the size of the national economy. The relation between the *Energy Market Operator*'s EBIT and the economic development of the analyzed countries is, however, smaller than the relation between the same macroeconomic variables and *Energy Market Operator*'s activity or assets.

The *Energy Market Operator*'s characteristics depending on energy consumption. After introducing the *Energy Market Operator*'s connection with general macroeconomic performance and R&D intensity of a modern national economy, let us look at its connection to the functioning of the energy market. In doing so, the activity of the *Market Operator* is again shown by its income, its equipment by its assets, and its economic performance by its EBIT (all three per capita). These *Market Operator* characteristics are analyzed according to total energy consumption per unit of GDP, the consumption of electricity (total and exclusive to industry) per unit of GDP, and the consumption of natural gas per unit of GDP in a given national economy. Finally we estimated the relation between *Market Operator* characteristics and the importance of cross-border electricity trade in the analyzed group of countries. The results of cross-sectional regression analyses are shown in Table 5.

Table 5. The connection between *Market Operator's* characteristics and energy consumption

	Energy Market Operator's* business income			
		Connection	T-statistics	R^2
Energy consumption	Total energy consumption**	3.9489	10.9	32%
Electricity consumption	Final consumption of electricity**	2.4770	4.3	18%
	Consumption of electricity in industry**	6.2962	4.5	23%
Cross-border trade of electricity	Share of imports in the final consumption of electricity	2.2668	13.9	88%
	Share of exports in the final consumption of electricity	2.1263	8.3	71%
Gas consumption	Final consumption of gas**	0.4892	20.7	84%
	Energy Market Operator's* assets			
		Connection	T-statistics	R^2
Energy consumption	Total energy consumption**	43.6131	3.6	22%
Electricity consumption	Final consumption of electricity**	38.2178	22.3	42%
	Consumption of electricity in industry**	72.2323	2.7	11%
Cross-border trade of electricity	Share of imports in the final consumption of electricity	42.6766	24.8	99%
	Share of exports in the final consumption of electricity	32.3982	12.3	94%
Gas consumption	Final consumption of gas**	5.6677	3.0	22%
	Energy Market Operator's* EBIT			
		Connection	T-statistics	R^2
Energy consumption	Total energy consumption**	0.6682	3.2	26%
Electricity consumption	Final consumption of electricity**	0.4297	2.4	13%
	Consumption of electricity in industry**	1.4807	12.6	27%
Cross-border trade of electricity	Share of imports in the final consumption of electricity	0.6455	9.2	90%
	Share of exports in the final consumption of electricity	0.5069	8.5	91%
Gas consumption	Final consumption of gas**	0.0952	5.1	34%

* Per capita ** Per unit of GDP

In Table 5 we see that the *Market Operator's* business income, assets, and EBIT (all three per capita) are greater the higher the energy consumption per GDP. This relationship is thus positive. Greater *Market Operator* activity leads to decreased transaction costs in this market. The result suggests a possibility of increased energy consumption. In Table 5 we also see that the *Market Operator's* business income, assets and EBIT (all per capita) are larger the higher the final electricity consumption to GDP. Total electricity consumption (to GDP) is related mainly with the *Market Operator's* assets (per capita), while electricity consumption in the industry (to GDP) is more related with *Market Operator's* business income and EBIT (both per capita). The results in Table 5 also show that the more active the *Market Operator* is the stronger the involvement of the given economy in the international electric energy trade. This is true for the *Energy Market Operator's* business revenues, assets, and EBIT (all per capita). The link between total final natural gas consumption (per unit of GDP) and the activity of the *Market Operator*, indicated by its business income per capita, is positive and even very high (Table 5). This relation is similar to total energy consumption, electricity consumption, and participation in the international electricity market. In Table 5 we also see that the connection between total final natural gas consumption (per unit of GDP) and *Market Operator's* assets and EBIT (per capita) is not as strong as it is in the case of *Market Operator*'s business income. When we focus ourselves on the level of natural gas supply per unit of GDP, obviously, the main indicator of the *Market Operator's* activity is its business income. The impact of the assets is likely to be smaller due to the opposite effect of their better utilization in national economies with a higher level of gasification, thus, the impact of EBIT is lower due to the *Market Operator's* infrastructural nature.

The *Energy Market Operator's* characteristics depending on energy prices. The connection of the operation of the *Market Operator* with electricity and natural gas prices is presented in Table 6[7]. Due to the specific nature of the pricing of electricity and natural gas, depending on the purpose (industrial, non-industrial) and scope (classes of prices depending on the amount of the consumption[8]), Table 6 shows the connections between different *Market Operator's* characteristics and the level of a given energy resource price only in exemplary classes. The same as in Table 3. The results in Table 6 show that higher electric power and natural gas prices relate to greater *Market Operator* business income, assets, and EBIT (all per capita). This connection is not significant in the relation between the *Market Operator's* business income per capita and electricity prices for the industrial use nor between *Market Operator's* assets per capita and industrial use of natural gas (in this case the relation is not significant for all classes of natural gas use in industry, not just for the one presented in Table 6).

We can conclude that an active, well equipped and directly (depending on its EBIT) economically efficient *Market Operator* is not associated with the relatively low prices of electricity and natural gas in a given national economy. Obviously the reduction of transaction costs in the energy market (one of the *Market Operator*'s roles) does not promote only a new supply, but encourages also greater demand. The latter case is even more so. This was clearly manifested in 2010, when the energy consumption due to the intensified recessionary trends in the EU stagnated (it fell in 2009 and then again in 2011). Here another aspect is also possible. The EU is finalizing the transition of the energy sector in which the termination of price regulation has led to decreasing and then increasing prices until the market will not establish a new balance (see also Zachmann, 2008). In a given case, this means that electricity and natural gas prices in 2010 were still (albeit temporarily) at a higher level in countries where the energy market worked better and had a more active *Market Operator*.

7 Eurostat publishes energy prices on a half-yearly basis. For the purposes of our analysis we have converted them to an annual level using the simple arithmetic mean of the prices of electricity and natural gas in the first and second halves of the year.

8 The Austrian data on electricity prices for industrial use in 2010 are not available. We have estimated them according to their level in 2008 (last data) and the dynamics of the prices of electricity in this country for the highest class of these prices in retail trade (over 15,000 kWh annual consumption).

Table 6. The connection between *Market Operator's* characteristics and energy prices

	The characteristics of the *Market Operator*	Connection	T-statistics	R^2
Price of electricity in the retail trade (2500 to 5000 kWh) **	Business income*	3.7782	12.9	22%
	Assets*	91.0918	2.3	8%
	EBIT*	1.0283	28.6	24%
Price of electricity for the industry (500 to 2000 MWh) **	Business income*	-	-	-
	Assets*	116.5429	2.5	15%
	EBIT*	1.2580	5.1	32%
Gas prices for households (20 to 200 GJ) **	Business income*	13.7131	60.5	29%
	Assets*	298.0165	2.9	24%
	EBIT*	3.3913	9.4	65%
Gas prices for industry (10^4 to 10^5 GJ) **	Business income*	0.0345	10.1	29%
	Assets*	-	-	-
	EBIT*	0.1140	207.7	98%

* Per capita ** Annual consumption

5. Conclusions

Our research aim was to analyze the connection and dependence between economic development, energy consumption, and prices of electricity and gas with the operation and business performance of an *Energy Market Operator*, one of the actors in the market with a monopolistic, market facilitating function. For this purpose we used a sample of eight EU countries with well-functioning energy markets but quite diverse characteristics. Due to these structural differences we performed a short cross-sectional regression econometric analysis and revealed some interesting results. We determined that the activity and equipment of the *Energy Market Operator* grows with the size of a country. On the other hand in large states the *Energy Market Operator* acts as infrastructure, as the size of a national economy is not associated with an *Energy Market Operator*'s better cost management (higher EBIT). Along with that we established the connection of countries with higher GDP per capita and more active development policy (high level of R&D investments) with above-average activity of the *Energy Market Operator*. In continuation, we realized that increased *Energy Market Operator* activity lowers the transaction costs on the market and increases the possibility of energy consumption. This applies to total energy consumption as well as for electricity consumption (per unit of GDP) and that involvement in the international trade of electric energy is associated with a more active *Energy Market Operator*. This is true for its resources, business revenues, and EBIT (all per capita).

Finally, we found that the relationship between total final consumption of natural gas (per unit of GDP) and the activity of the *Energy Market Operator,* indicated by its business income, is both positive and high; gasification is associated with an active *Energy Market Operator,* and that greater business income, more assets, and a higher EBIT (all per capita) of an *Energy Market Operator* is specific to a national economy with a higher level of prices for electricity and natural gas in the retail and industry. Regarding economic policy use of our results, we can derive conclusions that energy policy leaders in EU should finally recognize that "*energy market operators*" provide efficient support to the development of this specific market. The main contribution of "energy market operator" is in promoting of energy trade and also consumption. These effects are not limited just on electric power but also on natural gas. European "energy market operator" is efficient in allocation and not in reduction of energy consumption.

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