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Article

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**ECONOMETRIC APPROACH OF THE SCENARIOS REGARDING
THE IMPACT OF THE CONSUMER'S EMPOWERMENT AND COMPANIES'
RESPONSIBILITY FOR ENVIRONMENT SUSTAINABILITY
ON THE ELECTRICITY MARKET PERFORMANCE**

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Abstract

Energy is a major component of the economy, both as a sector in itself and as an input factor to all other economic activities. This sector is facing major challenges regarding increasing oil prices, severity of climate change or extremely complex implications of the global financial crisis. Organized as an empirical study, based on econometric analysis supported by a rigorous literature review, the paper studies possible correlations between the performance of electricity market, renewable resource consumption, consumers' behaviour, the influence of economic environment and economic development. It also aims to encourage a new and wider research framework regarding the implications of economic policies' use on consumers' perception. The results of the study indicate that the early stage of renewable energy use and the prospect of influencing the consumer behaviour in a way to increase the market performance, through the development of strategies oriented towards sustainable energy consumption, can have a positive impact on companies' responsibility. It is concluded that consumers' empowerment stimulates competition, raises efficiency and rethinks companies' strategies for environment sustainability.

Keywords: consumers' empowerment, corporate responsibility, sustainable environment, market performance, renewable energy, econometric scenarios analysis.

JEL Classification: D12, M14, Q42, Q43, Q47, Q56

Introduction

In the current global crisis with such slowly recovering process, the international organizations have sought new strategies for economic growth and development. Traditional economic model, ignoring the behaviours studied by social psychology is unsustainable, involving risks that could impose human costs and constraints. It could result in increased natural resource scarcity, air and water pollution over bearable limits, severe and irreversible climate change and biodiversity loss (OECD, 2011). Discussions about the

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future of capitalism and the role of states in controlling markets (Shahrokhi, 2011) are conducted at the international level, raising questions about the sustainability of current development paths, consumer behaviours and policy decisions (Wicker and Becken, 2013).

These challenges demand fundamental changes to the role that consumption plays in society (Jackson, 2002). The limited progress on international agreements to combat climate change encouraged the up-to-now limited research on people's perceptions regarding the energy availability (Corner *et al.*, 2011). Some research explores attitudes towards different energy sources, identifying that traditional fuels are perceived as most harmful (Truelove, 2012), while renewable resources (solar and wind energy) are generally viewed positively (Corner *et al.*, 2011). Other researches have been undertaken on consumers' willingness to pay for renewable energy and related policies (Longo, Markandya and Petrucci, 2008).

The considerations in addressing the risks of climate change and resource depletion raise debates on the quality and the substance of the relationship between the consumer and the government, on the new role of human being as an altruistically behaving and politically engaged (Faber, Petersen and Schiller, 2002). The concept of citizen-consumers should be scaled in order to respond to complex problems such as energy availability and climate change (Barr, Gilg and Shaw, 2011).

Efficient consumer markets with favourable consumer conditions play an important part in meeting the strategic goals for inclusive economic development disclosed in Europe 2020 project, regarding employment, productivity and social cohesion. Consumers are one of the key stakeholders of companies in the marketing changing process (Folkes and Kamins, 1999). As Beckmann (2007) presents, the green consumer research evolved rapidly, at least for a short period of time, addressing subjects related to green products, green ads, and interest in energy conservation, waste management and recycling.

Researchers report that economic performance is the result of influences that institutions wield on government and economic policies, as measured by the *Economic Freedom Index*, or institutional quality indicators used in the study of international financial organizations (Marinescu, 2013).

The answers to all these issues arising from economic practice can be researched on the ground of econometric modelling, directed towards finding an appropriate model (Săvoiu, 2013) to simulate the dual impact of consumer empowerment and corporate responsibility on environmental sustainability.

In this article the focus is, instead, on market performance, as it is possible that the level of *Gross Domestic Product* or other economic indicators influence the experienced market performance. The assumption would be that the fluctuation in market performance evaluation is influenced by changes in the economic situation as perceived by consumers. In order to respond to the major problem of responsible policies making on the electricity services market, this study addresses to the relational component (relationship with companies and consumers) of resource-based competitive advantage theory. This is a dynamic growth theory in contrast with neoclassical growth theory based on a static equilibrium.

The article is structured as follows: in the first section is provided a literature review focused on the dependencies identified by the authors between market performance as seen

by consumers, and various features such as renewable energy, consumer behaviour, involvement of companies through the economic environment and economic development. Following the literature review, an econometric study is presented addressing the identification and discussion of dependencies between the elements set out above. A scenario analysis is performed in order to support the discussions and conclusions of this research. Results are debated and new approaches are proposed in order to facilitate modelling companies and governments' strategies to respond effectively to the requirements of European policies on sustainable consumption, while maintaining a high level of competitiveness and market performance. Corporate responsibility in the context of economic freedom refines the consumers' empowerment in a sustainable environment. The results show that both companies and consumers need to learn to be responsible on the environment, with a positive impact on the performance of the electricity market in the context of sustainable development.

1. Consumers' empowerment and companies' responsibility for a clean environment from EU strategies perspective

According to the OECD framework „green growth is about fostering economic growth and development while ensuring that the natural assets continue to provide the resources and environmental services on which our well-being relies” (OECD, 2011). One of the significant aspects of green growth refers to carbon emissions and energy productivity, and is reflected by the efficiency (environmental and economic) of using energy resources in production and consumption, and informs about the results of policies that promote low carbon technologies and cleaner energy.

A significant implication for energy system in European Union is given by the goal of cutting greenhouse gas emissions by 80-95 % by 2050 and has serious implications for the electricity market (European Commission (EC), 2011a). This means resizing the structure of energy consumption and investing in the renewable energy system which will impact the economic growth through creating jobs, new businesses and welfare. According to Member State plans (EC, 2011a), the growth rate of the sector will increase to 6.3% p.a. until 2020, reaching the target of 20% of total energy consumption in 2020, and with 1.2% p.a. between 2020 and 2050.

A market study on electricity (ECME Consortium, 2010) reveals major problems for electricity consumers being able to identify the most efficient tariff, switching providers and dealing with complaints. EU Consumer Policy Strategy 2007-2013 underlines the importance of consumers' empowerment, as a key driver of innovation, competition and productivity, emphasizing the importance of a better understanding of how consumers actually behave. It advocates for the need of having real choices, accurate information, market transparency and the confidence that comes from effective protection and solid rights. However, there is evidence that consumers often fail to make optimal choices and not only because of asymmetric information, but also because of different approaches for profit maximisation behaviour. The more consumers are able to make informed decisions, the greater the impact they can have on stimulating economic growth by demanding value, quality and service. The companies oriented towards responding those requirements are to be the best-sited for managing the pressures of the global market (EC, 2011b).

The interest and debate on the concept of consumer empowerment has been rapidly increasing during the last decades. The literature emphasizes the connections of knowledge, skills, competences, rights and abilities of the consumer to a more responsible choice

(Hunter, Harrison and Waite, 2006), assuming the need for an agreed framework for consumer empowerment. Consumers play an important role in protecting the environment based on the choices they make when buying products and services (Dinu, Schileru and Atanase, 2012).

While some research link consumer empowerment with a better choice, other research suggests that consumer empowerment also includes access to increased information, presumably to make more informed choices. The products bringing added value to health and environment, such as organic products, turn market competitive only if the average consumer will understand these products benefits (Dinu, 2012, p. 6). Other researchers suggest that in addition to increased quantity of information, this should include a component for finding the most relevant information in order to empower consumers. These ideas are pointed out by Hunter, Harrison and Waite (2006) suggesting that rising consumer empowerment foretells a new era in which marketing must shift from a primary role of persuading consumers to that of being an information provider and advisor to consumers, even to the point of recommending competitors' products. Authors argue that increasing consumer empowerment, while offering opportunities for marketers willing to change, will cause traditional marketing methods to lose effectiveness.

The concept of consumer empowerment derives from different sources, including consumer education, valuable information, corporate marketing strategies and institutional regulations. Encouraging consumers' empowerment produces changes in consumers, who become less passive consumers in accepting whatever is offered by suppliers with benefits in the short and long term and improved business results (Wright, Newman and Dennis, 2006). The management efforts to enhance market environments are considered by the authors as results of consumer empowerment, in contrast to the more traditional visions of companies exploiting and manipulating consumers. Three attributes of consumers define their empowerment: decision's awareness when buying (terms and conditions, comparing prices, products' labels), ability on getting information on their rights, and access to advocacy. These three elements are those surveyed by Eurobarometer and captured in the Consumer Empowerment Index (Nardo *et al.*, 2011).

The new EU Corporate Social Responsibility (CSR) Strategy, adopted with the *Social Business Initiative* sets forward a modern understanding of the concept of corporate responsibility and aims to maximize the positive impact of companies on society and promote long-term consumer trust (EC, 2012). In line with this premise, many authors have investigated the implications of responsibility in organizations, concluding that contribution to social and environmental causes may induce consumer concern towards the company, whereas irresponsible companies would be negatively affected (Brown and Dacin, 1997; Handelman and Arnold, 1999; Maignan, 2001).

Numerous studies refer to a positive deterministic relation between companies' assumed responsibility for the environment and consumers' responses reflected in the market performance, including attractiveness for the company (Lii and Lee 2012; Marin *et al.*, 2009; Sen and Bhattacharya, 2001), corporate attitudes (Becker-Olsen *et al.*, 2006; Brown and Dacin, 1997), loyalty and commitment (Lacey and Kennett-Hensel, 2010) positive evaluation of products (Creyer and Ross, 1997; Folkes and Kamins, 1999), reactions to price (Creyer and Ross, 1997), and purchase intentions (Becker-Olsen *et al.*, 2006; Maignan, 2001).

Vazquez et al. (2012) assert that economic aspects such as price, innovation, guarantees and other information about the product directly affect buying decisions, whereas ethical and social concerns are of secondary importance for most consumers. Companies must consider that the freedom of business input, as well as freedom of business output, known as economic freedom (Vukotic, 2008), impact the choices of individuals and help companies to decide what and how to produce.

2. Research methodology

2.1 Research hypotheses

Combining the aspects identified in the literature review: the performance of electricity market, renewable resources consumption, consumers' behaviour, the influence of economic environment and economic development, the study aims to encourage a new and wider framework for research regarding the implications of economic policies' use on consumers' perception. The research proposition relates to the increase in the entities' empowerment, whether they are companies, consumers or governments, with a greater impact on market performance. The field of research chosen is the electricity sector because it is a dynamic domain in which the European strategy has an important involvement and which will be affected by the significant changes in the structure of energy consumption in the future.

Based on the current knowledge presented in the literature review, there are stated four research hypotheses tested through a series of scenarios, discussed on the base of an econometric analysis. The hypotheses are:

H1. The renewable resources consumption does not currently have a significant influence on the performance of electricity market;

H2. The increase in consumers' empowerment determines an increase of electricity market's performance;

H3. The quality of the environment in which companies operate has a direct and positive impact on the performance of electricity market;

H4. The performance of electricity market is positively correlated with economic development indicators.

The purpose is to test these hypotheses and discuss the results obtained from an integrated model, together with a detailed impact analysis of various qualities of consumers, such as skills, awareness of law and engagement, on the growth of electricity market's performance.

2.2 Selected sample and data collection

Hypotheses testing are conducted for the year 2011 and data are collected for the 27 countries of the European Union at the time. Croatia was not taken into consideration since it became a member in 2013 and not all the data used in the study were available. Conducting the study on the countries of the European Union has been chosen in order to pursue the coherence between the EU's current policies regarding the changes of energy consumption structure and future growth of energy consumption from renewable resources, on the one hand and the behaviour of companies, consumers and governments, quantified and analyzed by extensive and validated studies in the European Union, on the other.

Data series needed for the econometric analysis are collected for the year 2011 and refer to: *market performance index for electricity - MPI_EL*; *electricity generated from renewable*

sources - EL_RE; Share of renewable energy in gross final energy consumption - SH_RE; gross inland consumption from renewables per inhabitant - GIEC_RE_INH; consumer empowerment index (CEI), calculated as a score and compound of consumer skills (CO_SK), awareness of consumer legislation (CO_AW) and consumer engagement (CO_EN); economic freedom index (EF), expressed as a score with theoretical values between 0 and 100, and its component, business freedom index (BF); and Gross domestic product per inhabitant (GDP_INH).

The data were exported in tables and processed using MS Office Excel and then imported in Eviews 4.1 for statistical and econometric analysis.

2.3 The research method

Besides the fundamental research based on the literature review, an empirical study is conducted using the two-stage regression method: estimation models and hypotheses testing.

The relationship between the electricity market performance (MPI_EL) in EU member states (as an endogenous variable) and a number of features, exogenous variables, considered explanatory, such as the impact of renewable resources consumption (REG), consumer empowerment (CONS), the quality of the environment in which companies operate (COMP) and economic development (GDP) are examined using the regression analysis. There are tested the four research hypotheses by developing scenarios projected on the econometric model based on the following equation:

$$MPI_EL = \alpha_0 + \alpha_1REG + \alpha_2CONS + \alpha_3COMP + \alpha_4GDP + \varepsilon, \tag{1}$$

where α_i represents the correlation coefficients and ε represents the residuals.

The regression models are defined through different scenarios and the functions implemented in Eviews 4.1 are used in order to perform validation tests: F statistics test for model validation, Durbin Watson statistics for testing the autocorrelation of errors, White statistics for heteroscedasticity testing and Jarque Bera for testing the normality of residual series.

3. The results of the econometric study

The description of data series distributions under general trend, values diversity and form is shown in Table no. 1.

It is noticed that for all data series, the mean and median have similar values. Also, the standard deviation (Std. Dev.) of data series has small values and therefore one can consider that the series are relatively homogeneous. The variables reflecting renewable energy consumption reveal higher values for standard deviations, which can be explained by the wide range of values for these series due to cultural diversity of the economies included in the model.

The variables GIEC_RE_INH and GDP_INH are not characterized by a normal distribution. The high values recorded for Jarque Bera test, having associated probabilities equal to zero indicate that the two variables have high volatility. This can be explained by the influences of external factors such as consumers' behaviour, their education level or heterogeneity caused by national differences in the European Union.

Table no. 1: Descriptive Statistics

	MPI_EL	EL_RE	SH_RE	GIEC_RE_INH	BF	EF	CEI	CO_AW	CO_EN	CO_SK	GDP_INH
Mean	99.80	20.24	15.52	0.43	80.89	69.56	14.97	13.25	13.45	18.30	24877.78
Median	101.30	12.99	11.60	0.28	80.10	70.20	14.98	13.21	13.69	19.14	23700.00
Maximum	109.00	58.72	46.80	1.68	99.70	78.70	17.50	17.12	15.52	22.68	68100.00
Minimum	83.70	0.00	0.40	0.00	61.40	60.30	11.05	8.39	10.79	12.16	11600.00
Std. Dev.	6.12	15.83	11.22	0.42	9.43	5.23	1.67	2.04	1.20	2.70	10907.91
Skewness	-0.99	0.98	0.94	2.03	0.27	-0.03	-0.35	-0.51	-0.38	-0.47	2.25
Kurtosis	3.88	3.08	3.42	6.37	2.40	2.02	2.54	3.50	2.54	2.45	10.16
Jarque-Bera	5.29	4.34	4.20	31.26	0.75	1.07	0.78	1.43	0.89	1.31	80.41
Probability	0.0711	0.1141	0.1224	0.0000	0.6878	0.5843	0.6762	0.4885	0.6398	0.5188	0.0000
Sum	2694.60	546.45	419.00	11.74	2184.00	1878.00	404.31	357.67	363.04	494.18	671700
SumSq.Dev.	974.72	6518.79	3272.14	4.59	2310.15	710.77	72.10	108.09	37.47	189.97	3.09E+09
Observations	27	27	27	27	27	27	27	27	27	27	27

Source: Authors' calculation using Eviews 4.1 software

In order to validate the research hypotheses and reach a conclusion that can be supported both from econometric and economic points of view, different values on the exogenous variables are assigned for the model described by the equation (1). Thus, the consumption of renewables sources (REG) is replaced one by one with the values of the following indicators: *electricity generated from renewable sources* (EL_RE), *share of renewable energy in gross final energy consumption* (SH_RE); and *gross inland consumption from renewables per inhabitant* (GIEC_RE_INH).

The variable evidencing the quality of the economic environment in which the companies operate takes the values of *business freedom* (BF) and *economic freedom* (EF) indicators and to the variable projecting the impact of consumer was assigned the value of *aggregated consumer empowerment index* (CEI).

The further comparative analysis is based on estimates of scenarios resulting from the combination of independent variables. The results of the simulations conducted using Eviews 4.1 software are presented in brief and discussed subsequently and lead to the choice of four relevant scenarios for explaining the relationships between variables and their influence on the electricity market performance.

The debates regarding the model estimation and hypotheses testing are explained in detail for the first scenario and then used for the other three scenarios considered in the comparative analysis and debates. For the first scenario, the regression model captured from Eviews is:

$$\text{MPI_EL} = C(1)*\text{BF} + C(2)*\text{CEI} + C(3)*\text{EL_RE} + C(4)*\text{GDP_INH} + C(5),$$

where C(1) – C(4) are the regression coefficients of the exogenous variables and C(5) is the intercept.

The regression generated from the above data series is:

$$\text{MPI_EL} = 0.00417*\text{BF} + 1.65494*\text{CEI} - 0.0587*\text{EL_RE} + 8.8404\text{e-}05*\text{GDP_INH} + 73.6691$$

The regression model shows that an increase of 1 point in the *consumer empowerment index* will determine an increase by 1.65 points of the *electricity market performance*, while the other variables remain unchanged.

Scenario 1

Dependent Variable: MPI_EL Date: 08/30/13 Time: 10:41 Sample: 1 27
 Method: Least Squares
 Included observations: 27

Variable	Coefficient	Std. Error	t-Statistic	Prob.
BF	0.00417	0.138842	0.030086	0.9763
CEI	1.65494	0.807475	2.049527	0.0525
EL_RE	-0.0587	0.071915	-0.816333	0.4231
GDP_INH	8.84E-05	0.000113	0.779396	0.4441
C	73.6691	11.61970	6.340020	0.0000
R-squared	0.292142	Mean dependent var		99.80000
Adjusted R-squared	0.163441	Akaike info criterion		6.449048
S.E. of regression	5.600174	Schwarz criterion		6.689018
Sum squared resid	689.9629	F-statistic		2.269925
Durbin-Watson stat	1.289718	Prob(F-statistic)		0.094201

Similarly, an increase of 1 point in the *economic freedom index* will trigger an increase by 0.0041 points of the *electricity market performance* and an increase by 1000 EUR per capita in *gross domestic product* will also generate an increase by 0.088 points of the *electricity market performance*. In contrast, *renewable electricity consumption* has a negative impact on the market. An increase of 1% of electricity generated from renewable sources results in a decrease of 0.058 points of *market performance*, seen from a consumer perspective.

After analyzing the correlation matrix, it can be observed a negative, but very weak correlation (-0.0775) between the *market performance* and the *renewable electricity consumption*. This latter relationship can be explained by the fact that from the point of view of consumers, the companies providing electricity are not significantly involved in the development of renewable energy sector.

The coefficient R² identifies a determination of 29.21%, which may seem a small amount, but it is a normal value for a model involving economic variables related to a specific area (Gujarati, 2003), in this case the electricity market. This shows the percentage of the endogenous variable evolution MPI_EL which can be explained by the changes in exogenous variables considered in the model. Because this value is relatively small, one can say that an important part of the MPI_EL's variation is due to other significant factors not included in the model. Standard error of the regression is quite high, which indicates that the forecasting error variance is quite large, and the model, although valid, explains the dependence between the *electricity market performance* and the exogenous variables taken into consideration, but it is not recommended to be used in the forecasting processes.

In order to validate the model the results of the Fisher - Snedecor, Durbin Watson and White statistic tests are interpreted and for the analysis regarding the normality of residuals, Jarque Bera test is used. F statistic test has a value of 2.2699, higher than the table value of 2.21, and the probability of 0.0942 is relatively small for a completely new research such as that undertaken in this article. The value of Jarque Bera test JB = 1.95 shows the residuals are part of a normal distribution. All the tests performed confirm that the assumption of homogeneity of the residual variable is met, but Durbin Watson test does not validate the model.

4. Comparative analysis of scenarios and debates

The other three alternative scenarios chosen for comparative analysis and related results are shown below.

Scenario 2

Dependent Variable: MPI_EL		Date: 08/30/13	Time: 10:44	Sample: 1 27
Method: Least Squares		Included observations: 27		
Variable	Coefficient	Std. Error	t-Statistic	Prob.
GIEC_RE_INH	-2.845057	2.999334	-0.948563	0.3531
BF	0.016802	0.140336	0.119725	0.9058
CEI	1.843185	0.841302	2.190873	0.0393
GDP_INH	8.76E-05	0.000113	0.776521	0.4457
C	69.89917	12.60780	5.544120	0.0000
R-squared	0.299356	Mean dependent var		99.80000
Adjusted R-squared	0.171966	Akaike info criterion		6.438805
S.E. of regression	5.571565	Schwarz criterion		6.678775
Sum squared resid	682.9315	F-statistic		2.349924
Durbin-Watson stat	1.328078	Prob(F-statistic)		0.085748

Scenario 3

Dependent Variable: MPI_EL		Date: 08/30/13	Time: 10:45	Sample: 1 27
Method: Least Squares		Included observations: 27		
Variable	Coefficient	Std. Error	t-Statistic	Prob.
EL_RE	-0.057844	0.070620	-0.819087	0.4215
CEI	1.626548	0.806045	2.017936	0.0560
EF	0.032651	0.270937	0.120512	0.9052
GDP_INH	8.30E-05	0.000122	0.679548	0.5039
C	72.27739	16.45285	4.393002	0.0002
R-squared	0.292580	Mean dependent var		99.80000
Adjusted R-squared	0.163959	Akaike info criterion		6.448430
S.E. of regression	5.598442	Schwarz criterion		6.688399
Sum squared resid	689.5361	F-statistic		2.274735
Durbin-Watson stat	1.282376	Prob(F-statistic)		0.093669

Scenario 4

Dependent Variable: MPI_EL		Date: 08/30/13	Time: 10:47	Sample: 1 27
Method: Least Squares		Included observations: 27		
Variable	Coefficient	Std. Error	t-Statistic	Prob.
GIEC_RE_INH	-2.780039	2.897360	-0.959508	0.3477
EF	0.056295	0.269389	0.208974	0.8364
CEI	1.813339	0.851427	2.129766	0.0446
GDP_INH	7.95E-05	0.000122	0.652906	0.5206
C	67.96274	16.89986	4.021498	0.0006
R-squared	0.300289	Mean dependent var		99.80000
Adjusted R-squared	0.173068	Akaike info criterion		6.437473
S.E. of regression	5.567857	Schwarz criterion		6.677443
Sum squared resid	682.0226	F-statistic		2.360384
Durbin-Watson stat	1.317067	Prob(F-statistic)		0.084703

From the comparative analysis and the interpretation indicated for the first scenario, one can observe that the above models have similarities in terms of results obtained from model validation tests and residuals tests.

In all four scenarios, the F statistic test has values between 2.2699 and 2.3603, with associated probabilities between 0.09 and 0.08, considering them valid for explaining the dependency between the *electricity market performance* variable and exogenous variables. For the four scenarios, the R² coefficients are noticeably equal, but, comparing the coefficients, one can notice that the intensity dependence is higher in scenarios in which the variable used as *renewable sources consumption* is GIEC_INH, both when the component related to the economic environment introduced into the equation is *business freedom* or *economic freedom*.

If the variable REG (*renewable energy consumption*) is changed, one can observe that the lowest values are obtained when using EL_RE variable (*electricity generated from renewable resources*), higher values of the coefficient of determination being obtained when GIEC_INH variable (*renewable energy consumption per capita*) was used. If the replacing of the variable that reflects the quality of the economic environment in which companies operate is being analyzed, the obtained values determine the hold in the model of the *economic freedom index* detrimental to *business freedom index*.

From the comparative analysis of the results it can be asserted that the model which outperforms is the one expressed in *Scenario no. 4*. In this scenario, one can observe that the *electricity market performance* variation can be explained in proportion of 30% by the cumulative changes in *renewable energy consumption per capita*, *economic freedom index*, *consumer empowerment index* and *GDP per capita*, comprised in the equation:

$$MPI_EL = -2.7800 * GIEC_RE_INH + 0.0562 * EF + 1.8133 * CEI + 7.9458e-05 * GDP_INH + 67.9627.$$

An interesting observation resulting from all four scenarios is that renewable energy consumption adversely affects the *electricity market performance*, regardless the measurement variables: *electricity generated from renewable sources* or *renewable energy consumption per capita*. Specifically, in the case of chosen scenario, it can be said that given the other variables remain unchanged, an increase in *renewable energy consumption per capita* of 1,000 tons of oil equivalent per capita will cause a decrease by 2.78 points of the *electricity market performance*. In contrast, *consumer empowerment index*, *economic freedom* and *GDP per capita* have a positive influence on *electricity market performance*. For example, one unit increase of CEI implies an increase of 1.8133 units in MPI_EL, while one unit increase of EF determines an increase of 0.0562 units in MPI_EL.

This analysis should be also discussed in the context of probabilities obtained for the correlation coefficients of the exogenous variables. Both in the chosen scenario and the other scenarios, the impact of corporate policies, either expressed by *business freedom* or *economic freedom* is individually insignificant, with a high probability (>0.83).

If the variable related to *economic freedom* is eliminated, one can notice an improvement of values (Scenario 4.1), meaning that the probability associated to variables decreases, which indicates an increase in the significance of these variables for the model. F statistic test also has a higher value (F = 3.2685), with a lower associated probability (0.0395).

Scenario 4.1

Dependent Variable: MPI_EL		Date: 08/31/13	Time: 03:38	Sample: 1 27
Method: Least Squares		Included observations: 27		
Variable	Coefficient	Std. Error	t-Statistic	Prob.
GIEC_RE_INH	-2.751656	2.833366	-0.971161	0.3416
CEI	1.874017	0.783571	2.391637	0.0253
GDP_INH	8.99E-05	0.000109	0.827375	0.4165
C	70.69782	10.46675	6.754513	0.0000
R-squared	0.298900	Mean dependent var		99.80000
Adjusted R-squared	0.207452	Akaike info criterion		6.365382
S.E. of regression	5.450873	Schwarz criterion		6.557358
Sum squared resid	683.3764	F-statistic		3.268526
Durbin-Watson stat	1.329149	Prob(F-statistic)		0.039545

From the analysis of the models presented above one can observe that the *consumer empowerment index* (CEI) has the highest dependence on MPI_EL. In this regard, it is proposed the elimination of other exogenous variables in the model and the conversion in a simple linear regression model with one exogenous variable, CEI. Consequently, one can observe an improvement in the results, F-statistic increases to 8.15, and the probability associated with the correlation coefficient of the exogenous variable, CEI is much smaller (0.0085) compared with 0.0253 in *scenario 4.1.*, the model proposed in *Scenario 5* being validated and thus becoming practically the most competitive.

Scenario 5

Dependent Variable: MPI_EL		Date: 08/30/13	Time: 10:57	Sample: 1 27
Method: Least Squares		Included observations: 27		
Variable	Coefficient	Std. Error	t-Statistic	Prob.
CEI	1.823441	0.638583	2.855451	0.0085
C	72.49499	9.619186	7.536499	0.0000
R-squared	0.245934	Mean dependent var		99.80000
Adjusted R-squared	0.215771	Akaike info criterion		6.290063
S.E. of regression	5.422188	Schwarz criterion		6.386051
Sum squared resid	735.0032	F-statistic		8.153598
Durbin-Watson stat	1.431023	Prob(F-statistic)		0.008521

Finally, it is proposed a developed econometric analysis of the *Scenario 5*, using a linear regression model with one exogenous variable (*consumer influence* - CONS), which takes one by one the values of *consumer empowerment index* components: *consumer awareness* (CO_AW), *consumer engagement* (CO_EN) and *consumer skills* (CO_SK). The regression equations estimated with EViews for the three sub-scenarios that can generate also useful elasticity coefficients are:

$$\text{MPI_EL} = 1.1238 \cdot \text{CO_AW} + 84.91205$$

$$\text{MPI_EL} = 1.3331 \cdot \text{CO_EN} + 81.87437$$

$$\text{MPI_EL} = 1.1976 \cdot \text{CO_SK} + 77.87989$$

Comparing the results of the last three sub-scenarios, it can be said that currently, the *electricity market performance* variation can be explained in a proportion of 27.9% by the change in *consumer skills* indicator, the dependence relationship being much more relevant than when explained by the *consumer awareness* or *consumer engagement*.

Conclusions

The structure of a country's energy supply and the intensity of its energy use, along with changes over time are key determinants of the environmental performance and the sustainability of economic development, and hence of green growth.

The results of the study indicate that the entities which place their business strategies by manipulating financial skills, but also the one needed in interpretation of the logos and information displayed on the labels, will have superior results in terms of market performance. The main limitation of the research is the use of cross-sectional data, limit aimed to be eliminated in our future research by combining cross-sectional data with time series in order to ensure an increased robustness of the results.

The results obtained support the idea that governments and businesses should take into consideration the implications that consumer behaviour have on market performance and develop policies adapted to consumers. For example, although both previous studies and the present study show an insignificant impact of present and past consumption of renewable electricity market performance, future projections could be reshaped by influencing consumer behaviour. Given that renewable energy use is in an early stage and that it can influence the consumer behaviour in a way to increase the market performance, development of new strategies orientated to sustainable energy consumption can have a positive impact if properly explained in terms of consumer demand.

A thorough knowledge of actual capacities, access to information and reactions of consumers is crucial for being able to design and develop policies that effectively enhance consumer protection.

It is recommended for companies to pay attention to the current capacity of consumers as well as their access to various information and their reactions, in designing and developing the policies to effectively increase consumer protection. Therefore, the social responsible acting of a company should be incorporated in the overall corporate strategy and economic policies, influencing the market performance from the consumers' point of view.

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