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Green Entrepreneurship & Green Economy as a Way-Out: Insights from the EU

INTRODUCTION

The entrance of US economy into recession in late 2007 interrupted the twenty year old period of stability and prosperity of "Great Moderation" [Castree, 2009; Dagum, 2010; Kurth, 2010]. The US credit crisis spread rapidly in many developed countries (butterfly effect) and the subsequent recession has become so deep and prolonged so as to be considered as a new major crisis following the Great Depression of 1930 [Castree, 2009; Kurth, 2010]. Indicative of the inability of current theoretical approaches to provide a suitable policy was the possibility of payments' suspension that the United States faced in July 2011 as well as the risk of a domino debt effect in many member states that €-zone still has to deal with. The problem becomes more complicated taking into consideration that it has been simultaneous with severe environmental and social problems [Castree, 2009].

In the following paragraphs we explore whether green economy (via a new green technological revolution) could be sufficient to overcome the downswing phase of the current Kondratieff wave and to put global economy on a growth trajectory. More specifically, could it help European economies that have been hardest hit?

The rest of the paper is structured as follows: next section provides a short theoretical and empirical literature review. Section 3 provides empirical investigation in micro-dimension through specific case studies of certain multinational companies. Section 4 implements a cross section test using a gravity model to provide a macro-dimension empirical investigation. Last but not least, section 5 concludes.

LITERATURE REVIEW

The present global economic crisis is systemic as well as multidimensional for a series of reasons that will be presented below.

There are opposing views in the academic community regarding the nature of current crisis that has led to declining profits, growth and employment in world-wide scale, burdening at the same time the socio-economic inequalities [Gills, 2010]. Heterodox tradition argues that the capitalist economy has inherent imbalance trends tending to no equilibrium. Thus crisis are generated by the system itself and economic fluctuations are structural and long-term (thus accepting the existence of long waves) unlike neoclassical view of normal recession incidents of the business cycle [Zarotiadis and Michalena, 2010; Gills, 2010]. According to Gills [2010] the causes of nowadays problems must be searched in the footsteps of neo-liberalism. Conscripted in 1970 temporally led the way out of the Great Inflation but apparently created a chain reaction within capitalism leading to present systemic crisis. Otherwise problems would be solved through existing policy tools, confirming that neoliberal capitalism has a relative smooth operation (which is not observed) demonstrating the failure of the orthodox school who believed that the recipe for the control of business cycles had been found [Kotz, 2009]. Moreover, the current crisis differs from previous ones due to its multidimensional nature. Not only do we have financial matters but also serious environmental and social ones that occurred since the beginning of 21st century.

The gradual rise of crude oil prices (that reached nearly $150 per barrel in July 2008) was due to the reduction of oil production during 2002–2003 (because of the war in Iraq), increasing demand for fossil fuels from emerging countries and the absence of reliable data regarding reserves' adequacy [Kesicki, 2010; Maugeri, 2009]. It is obvious that developed countries, which entirely depend on oil, were - and still will be- more sensitive to any energy crisis. There was a direct consequence on the prices of staple food by increased fertilizer prices, the cost of agricultural machinery and the transport cost [Chand, 2008]. Furthermore, we should include the conversion of arable production from 2007 to biofuels, the change of the dietary preferences of emerging countries and the climate change in areas that were the main producers of staple foods leading to the 2007 food crisis (prolonged drought in Russia and floods in Australia) [Biggs, et al., 2011; Chand, 2008; Hanjra and Qureshi, 2010]. At the same time there is a common consensus that global warming is a phenomenon that evolves with dramatic speed due to rapid increase of energy requirements and harmful emissions [Schumacher, 2007]. In addition, according to a WHO survey of 2004, 1.2 billion people had no access to cheap and clean water burdening their sanitation and hygiene as a result of water scarcity [Moe and Rheingans, 2006]. All the above burdened immediately the lower strata of global population and intensified the problem of famine.

Bearing in mind the relevant literature, each of the earlier long waves seems to have been launched by the adoption of a new technological revolution which according to Zarotiadis [2012, p. 41] "*… is the most fair and efficient solution to any crisis*" [Ayres, 2006; Eklund, 1980; Gore, 2010; Maddison, 2007]. Combined with the obvious need for an alternative form of development that will not be at the

expense of the environment, is not surprising that green economy has come to the fore. The question is whether we are on the threshold of a new, fifth Kondratieff wave that will be stimulated by the environmental technology and will be able to redeem the fragile global economy [Palmberg and Nikulainen, 2010].

UNEP [2011, p. 16] appointed green economy as the economic system that aims at improving the welfare of individuals and social justice which is combined with the simultaneous reduction of both environmental risks and ecological inadequacies. Nevertheless, the concept does not enjoy wide acceptance by economists and environmentalists, probably due to the complexity of the term. It is frequently confused with sustainable development which is a broader term that includes the three pillars of (sustainable) development: economic, social and environmental [Fulai, 2011; Khor, 2011]. In practice, it is the economic strategy that will help to reach sustainable development [UNEP, 2011, p. 16–19]. However there will not be a simultaneous transition process towards green economy for all countries but will vary among them, taking into account the specificities of their natural environment and environmental problems, human resources and level of development [McLauchlan and Mehrubeoglu, 2010; OECD, 2010, p. 22].

Environmental issues attracted worldwide attention since the 1970s energy crisis and thereafter many countries adopted environmental practices concerning the characteristics of products and production processes [Esty and Geradin, 1998]. Despite research progress in both theoretical and empirical level since 1990, the empirical literature in micro- and macro-dimension is currently inconclusive whether 'it pays to be green' [Horváthová, 2010; López-Gamero, Molina-Azorín and Claver-Cortés, 2009].

The traditional view believes that environmental legislation (that has been promoted to deal with environmental problems and has become stricter over the years) is to correct the negative externalities caused by pollution [Testa, Iraldo and Frey, 2011]. However, businesses face additional costs that lead to reduced competitiveness and decreased market share [Costantini and Mazzanti, 2012; Esty and Geradin, 1998; Iraldo, Testa, Melis and Frey, 2011; Horváthová, 2010; Testa, Iraldo and Frey, 2011]. Palmer, Oates and Portney [1995] in their neoclassical model showed that stricter environmental legislation is an additional cost that deteriorates companies' financial operations [Eiadat, Kelly, Roche and Eyadat, 2008; Testa, Iraldo and Frey, 2011]. On the other hand it has been argued that improved environmental activity (through legislation) is able to promote competitive business advantage by more efficient processes, improved productivity and opportunities in new emerging markets [Iraldo, Testa, Melis and Frey, 2011; Testa, Iraldo and Frey, 2011]. According to Porter and van der Linde [1995] the more flexible but rigorous environmental legislation will increase the incentive to adopt innovations towards two directions: firstly, towards product innovation (as a finished

product or as an input) in order to differentiate it from others. Eco-labeling that appeared in late 1970 allows businesses to acquaint their environmentally friendly products with consumers [D'Souza, Taghian and Lamb, 2006]. Meanwhile process innovation regulates the manner in which goods are manufactured. Thus, businesses adopt environmental management systems and communicate them through international certification standards such as ISO 14001 and EMAS [Sinding, 2001]. Hitherto the empirical literature review is divided [Iraldo, Testa, Melis and Frey, 2011]. Half of the studies displays a positive relationship while the rest a negative or no relationship between environmental practices and business economic performance [Eiadat, Kelly, Roche and Eyadat, 2008].

At macro level an indicative measure of competitiveness is the size of exports, assuming that an open economy strengthens its competitiveness when its share of exports (imports) is increasing (decreasing) [Kemp and Horbach, 2008; Taner, Öncü and Çivi, 2000]. Among several econometric studies, gravity models are more often used to check the effect that stricter environmental legislation (as a new variable in the classical gravity model) may have on bilateral trade between countries. Xu [2000] could not confirm that stricter environmental legislation reduces total bilateral exports of environmental sensitive goods among 34 countries. Jug and Mirza [2005] unlike the majority of previous models, decided to express the stringent environmental variable through the new Eurostat indicator of current environmental protection expenditure. Through a gravity model among 12 importing and 19 exporting European countries for the period 1996–1999, they concluded that the environmental costs incurred negative trade flows. Cagatay and Mihci [2006] constructed an index that indicates the level of diversification of environmental stringency between 23 developed and 9 developing countries for 2000 and concluded that the environmental rigor discourages exports. Caporale, Rault, Sova and Sova [2010] also used current environmental expenditure data from Eurostat. Their gravity model for multilateral trade relations between Romania and 20 European trading partners suggested that in most cases the environmental stringency variable had a positive and statistically significant effect on trade. Finally Costantini and Mazzanti [2012] in a sample of 14 exporting and 145 importing countries, for the period 1996–2007, introduced each country's environmental policies (such as environmental taxation and Environmental Certification Standards) to find that they did not burden exports while in some cases promoted them.

MICRO-INVESTIGATIONS

The following empirical investigation will be carried out by the method of case studies. Environmental policy reporting is quite a recent aspect of corporate

strategy, thus there is difficulty in finding available data from businesses[1]. Meanwhile, there is controversy in the hitherto literature review due to a long list of practices that have been used and variables that have been examined, which leads to different results [Horváthová, 2010]. In order to avoid these problems we will adopt this method examining four multinationals: Fujitsu, IBM, Sharp and Toyota. Our primary goal is to notify the reasons that initially motivated them to adopt environmental friendly practices in process and/ or products. Moreover, since they apply environmental accounting we can have a comparative evaluation between environmental costs and benefits in order to examine which view of the existing literature prevails.

Fujitsu, Sharp and Toyota are Japanese companies whereas IBM is an American multinational. They were all founded in the beginning of the 20th century and are successful in their respective fields of operation. Through their environmental reports it has been observed that in general their interest in environmental protection started in the decade of 1990. As stated, their common objective was the fulfillment of their 'corporate social responsibility'. At the same time, they admit their desire to strengthen their competitive advantage, enhance their market share and promote their economic prosperity. According to them, all the above can be achieved through their preoccupation with environmental practices.

Thus, they have restructured their production processes as a means to use resources efficiently (since nowadays there is constant increase of the prices of raw materials) and to alleviate as much as they can their impact on the environment. Otherwise they would be dealing with more fines because of stricter environmental legislation, which seems to confirm the 'Porter Hypothesis'. Thus, all multinationals have adopted the global ISO 14001 environmental management system to harmonize with various environmental laws of foreign markets and gain easier access to them. At the same time, they are interested in environmental friendly products and their certification (e.g. ENERGY STAR) in order to inform consumers as well as to sell them in any market where certification is needed.

Concerning the environmental accountings of the multinationals in question, they appear to have relatively uniform positive effects. Environmental costs are quite similarly assessed while there is diversity in the calculation of benefits, mostly in the indirect ones (whose importance has been realized). As far as the economic impact of the specific multinationals is concerned, we can deduce that the environmental costs do not seem to significantly burden them as an additional cost unlike traditional view argues. Accordingly, the resulting benefits (direct and indirect) are difficult to be estimated and do not appear to particularly contribute because in times

[1] Data were collected from multinationals' sustainable and environmental reports respectively from the following websites: http://www.fujitsu.com/global/about/environment/communication/report/ (as of 23.11.2011); http://www.ibm.com/ibm/environment/annual/ (as of 12.11.2011); http://sharp-world.com/corporate/eco/csr_report/backnumber.html (as of 19.11.2011); http://www.toyota- global.com/sustainability/report/archive/ (as of 14.11.2011).

of crisis businesses were unable to maintain their momentum. Instead they produced more environmental sensitive products, probably as a way to boost their profile and gain the 'first mover advantage'. This is clearly demonstrated in the case of Toyota (by the production of hybrid Prius) and of Sharp (by the production of photovoltaic panels). Their involvement with innovative green products provided them with the required expertise that made them leaders in the new arising markets.

Nevertheless, the orientation of business green innovation both in products and production processes is relatively recent, thus medium and long term results have not yet occurred. Therefore, we cannot draw definitive conclusions because of the limited amount of information since data are mostly ten years old. A future, further research through an appropriate econometric investigation would be required, taking into account a wider range of data.

MACRO-EMPIRICAL ANALYSIS

In the following part, we will try to examine whether the transition to a green economy can have positive effects on nations' competitiveness through an inductive reasoning. Thus, we focused on the European Union that has been the leader -up to a degree- in the design and adoption of stringent environmental policies [Costantini and Mazzanti, 2012]. Since the southern member-states were mostly hit by the current debt crisis, we thought it would be of greatest interest to focus on them. The issue of 'environment and international trade' is relatively recent thus specializing in the core of the European Union, Eurozone, is even rarer. For this reason, we will use the current environmental expenditure and investment data both for public and private sector from Eurostat that do not seem to have been widely used before.

We will adopt the method of gravity models because they are eminently applicable in the empirical investigation of international trade and are thought to be the most successful econometric tools without losing the geographic dimension [Cagatay and Mihci, 2006; Caporale, Rault, Sova and Sova, 2010; Costantini and Mazzanti, 2012]. Applied initially by Tinbergen, Pöyhönen and Linneman, who pioneered the idea to analyze international trade flows by adopting the concept of Newton's law of gravity (science of physics), were further developed by Bergstrand as well Helpman and Krugman [Cagatay and Mihci, 2006; Caporale, Rault, Sova and Sova, 2010; Eita, 2008; Xu, 2000]. Gravity models are also used to test the relationship between environmental regulation and trade flows and the equation has the following form:

$$T_{ijt} = \beta_0 + \beta_1 GDP_{it} + \beta_2 GDP_{jt} + \beta_3 N_{it} + \beta_4 N_{jt} + \beta_5 d_{ij} + \beta_6 S_{ijt} + \beta_7 X' + u_{ijt}$$

where T_{ijt} is the dependent variable that represents trade flows between counties i and j in time t (they can be bilateral, exports or imports), while the explanatory variables are GDP_{it} and GDP_{jt} (GDP for countries i and j respectively at time t), respective populations N_{it} and N_{jt} for countries i and j at time t, d_{ij} is distance between countries i and j and is independent of time, X´ is a vector that represents other control variables which may differ between countries and influence trade flows, β_0 is the constant variable, u_{ijt} is the error term and β_1, β_2, β_3, β_4, β_5, β_6, β_7 are the coefficients of the model [Caporale, Rault, Sova and Sova, 2010; Jug and Mizra, 2005].

MODELS AND THE DATASET

Our main goal is to examine the consequences of environmental policies on trade flows, by analyzing bilateral trade relations among five northern (Germany, France, Netherlands, Finland, Belgium) – henceforth N – and six southern (Greece, Italy, Spain, Portugal) and eastern (Bulgaria, Romania) European countries – henceforth S – for the period 1997 to 2007. Their selection was based on data availability and their economies' size depending on European GDP ranking.

Before proceeding, it must be noted that there will be two different dependent variables: net exports (henceforth NX) between N and S and exports (henceforth X) between N and S. Considering that NX, in general show the country's position in bilateral trade flows while X reveal the openness of domestic firms, it is likely that trade balance remains unchanged although firms become more competitive.

The two econometric regression equations are:

$$\bullet \left(\frac{NX_{S,N}}{GDP_S}\right)_t = a_0 + a_1 (y_S - y_N)_t + a_2 \left(\frac{\frac{ECE_S^{Pu}}{GDP_S}}{\frac{ECE_N^{Pu}}{GDP_N}}\right)_t + a_3 \left(\frac{\frac{ECE_S^{Pr}}{GDP_S}}{\frac{ECE_N^{Pr}}{GDP_N}}\right)_t + a_4 \left(\frac{\frac{EI_S^{Pu}}{GDP_S}}{\frac{EI_N^{Pu}}{GDP_N}}\right)_t + a_5 (ISO_S - ISO_N)_t + u_{SNt} \quad (1)$$

$$\bullet \left(\frac{X_{S,N}}{GDP_S}\right)_t = a_0 + a_1 (y_S - y_N)_t + a_2 DIST_{SN} + a_3 \left(\frac{\frac{EI_S^{Pu}}{GDP_S}}{\frac{EI_N^{Pu}}{GDP_N}}\right)_t + a_4 \left(\frac{\frac{EI_S^{Pu}}{GDP_S}}{\frac{EI_N^{Pu}}{GDP_N}}\right)_{t-1} + a_5 \left(\frac{\frac{ECE_S^{Pu}}{GDP_S}}{\frac{ECE_N^{Pu}}{GDP_N}}\right)_{t-1} + a_6 \left(\frac{\frac{ECE_S^{Pr}}{GDP_S}}{\frac{ECE_N^{Pr}}{GDP_N}}\right)_{t-1} + a_7 (ISO_S - ISO_N)_t + a_8 (ISO_S - ISO_N)_{t-1} + a_9 D_{IT} + a_{10} D_{SP} + a_{11} D_P + a_{12} D_{BU} + a_{13} D_{RO} + a_{14} D_{FR} + a_{15} D_{NL} + a_{16} D_{FI} + a_{17} D_{AU} + u_{SNt} \quad (2)$$

where $\left(\frac{NX_{S,N}}{GDP_S}\right)_t$ denotes net exports from country S towards country N in year t, expressed as a percentage of GDP while $\left(\frac{X_{S,N}}{GDP_S}\right)_t$ shows exports from S towards

N in year t, expressed as a percentage of GDP (database: COMTRADE[2]; World Bank[3]). Since GDP per capita is a more objective indicator that takes into account the country's population, we used $(y_s - y_N)_t$ which is the difference of GDP per capita between S and N in year t through (database: Eurostat[4]). Because there are no available data for private environmental investment, we tried to include them indirectly through the variable $(ISO_S - ISO_N)_t$, which shows the difference in change ratios of international environmental management systems among S and N in year t. (database: ISO surveys[5]). We also included it lagged by one year, assuming that their impact takes time to occur. Next independent variable DI shows the geographical distance in kilometers between the capitals of N and S (database: Google Maps). To denote environmental stringency we used $\left(\frac{\frac{ECE_S^{Pu}}{GDP_S}}{\frac{ECE_N^{Pu}}{GDP_N}}\right)_t$, $\left(\frac{\frac{ECE_S^{Pr}}{GDP_S}}{\frac{ECE_N^{Pr}}{GDP_N}}\right)_t$ which are the ratios of current environmental expenditures of public and private sector respectively (as a percentage of GDP) in S to N in year t (database: Eurostat[6]). Moreover, $\left(\frac{\frac{EI_S^{Pu}}{GDP_S}}{\frac{EI_N^{Pu}}{GDP_N}}\right)_t$ is the ratio of environmental investment as a percentage of GDP of public sector in S to N in year t (database: Eurostat[7]). For the same reason (as mentioned above), environmental variables entered our model lagged by one year. Finally, in order to take into account countries' general characteristics, we included D_{IT}, D_{SP}, D_{BU}, D_{RO}, D_{FR}, D_{NL}, D_{FI}, D_{AU} which are dummies for each country respectively and not every combination of countries.

[2] http://comtrade.un.org/db/mr/daYearsResults.aspx?y=all (as of 12.12.2011).

[3] http://data.worldbank.org/indicator/NY.GDP.MKTP.CD?page=3 (as of 13.12.2011); http://data.worldbank.org/indicator/NY.GDP.MKTP.CD?page=2 (as of 13.12.2011); http://data.worldbank.org/indicator/NY.GDP.MKTP.CD?page=1(as of 13.12.2011); http://data.worldbank.org/indicator/NY.GDP.MKTP.CD (as of 13.12.2011).

[4] http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/search_database (as of 14.12.2011).

[5] ISO survey, 2000, http://www.tc207.org/PDF/News_Articles/2000/2000_7.pdf (as of 28.12.2011); ISO survey, 2004, http://www.iso.org/iso/survey2004.pdf (as of 28.12.2011); ISO survey, 2006, http://www.environment.gov.au/soe/2006/publications/drs/pubs/590/set/hs59iso-survey 12thcycle.pdf (as of 28.12.2011); ISO survey, 2008, http://www.accredia.it/UploadDocs/488_survey2008.pdf (as of 28.12.2011).

[6] Current expenditure for environmental protection includes both internal current expenditure and fees/purchases. Internal (in-house) current expenditure includes the use of energy, material, maintenance and own personnel for measures made by a sector to protect the environment.

http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/search_database (as of 14.12.2011).

[7] Investment expenditure includes all outlays in a given year (purchases and own-account production) for machinery, equipment and land used for environmental protection purposes. http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/search_database (as of 14.12.2011).

EMPIRICAL RESULTS

In order to estimate the gravity model (1), we implemented the fixed effects (according to the Hausman test). On the other hand, we could not use this technique in its typical form to estimate equation (2) because we included the distance variable that remains unchanged for each pair of countries. Thus, we chose to use dummies. We estimated both regression models with weighted Generalized Least Squares method in order to deal with the problem of heteroskedasticity. Figure 1 summarizes the results for two different regressions and includes the estimated coefficients and their calculated t-statistics (in parentheses).

Figure 1. Estimation results

Variables	Regression (1)	Regression (2)
1	*2*	*3*
a_0	-0.003082 (-2.933548) ***	0.037032 (48.34934) ***
$(y_S - y_N)_t$	2.23E-07 (3.353034) ***	2.51E-07 (9.354016) ***
$DIST_{SN}$		-4.56E-06 (-24.74868) ***
$\left(\frac{\frac{ECE_S^{Pu}}{GDP_S}}{\frac{ECE_N^{Pu}}{GDP_N}}\right)_t$	-0.000259 (-1.509549)	
$\left(\frac{\frac{ECE_S^{Pu}}{GDP_S}}{\frac{ECE_N^{Pu}}{GDP_N}}\right)_{t-1}$		-0.000427 (-2.368970) **
$\left(\frac{\frac{ECE_S^{Pr}}{GDP_S}}{\frac{ECE_N^{Pr}}{GDP_N}}\right)_t$	-7.72E-07 (-0.005008)	
$\left(\frac{\frac{ECE_S^{Pr}}{GDP_S}}{\frac{ECE_N^{Pr}}{GDP_N}}\right)_{t-1}$		-0.000363 (-2.285744) **
$\left(\frac{\frac{EI_S^{Pu}}{GDP_S}}{\frac{EI_N^{Pu}}{GDP_N}}\right)_t$	3.61E-05 (2.237814) **	-2.65E-05 (-2.778902)

1	2	3
$\left(\frac{\frac{EI_S^{Pu}}{GDP_S}}{\frac{EI_N^{Pu}}{GDP_N}}\right)_{t-1}$		-1.14E-05 (-1.628592) ***
$(ISO_S - ISO_N)_t$	0.000168 (4.233916) ***	0.000345 (2.877118) ***
$(ISO_S - ISO_N)_{t-1}$		0.000205 (7.977332) ***
R-squared	0.940658	0.957916
Notes: * significant at 10%, ** significant at 5%, *** significant at 1%		

In both equations, the difference of GDP per capita has a positive and statistical significant effect, confirming similar findings in modern empirical theory (contrary to the neoclassical theory of trade). That supports that the intensity of trade flows is sometimes larger among countries which have a similar level of prosperity. Moreover, distance has the expected (by the gravity model theory) negative and statistical significant effect on exports.

Next, we focus on environmental variables. On equation (1), current environmental expenditures both in private and public sector are not statistically significant. On the contrary, in equation (2) the same variables lagged by one year, have a negative and statistically significant effect on X. This may be justified, because high environmental costs are incurred to recover damages that result from lack of appropriate environmental policy. As a result there is need for additional environmental costs that obviously further burden state budget and firms. This should not intimidate us. Conversely, one might say that it demonstrates the need for a proper environmental policy that will lead to reduction in expenditure.

Likewise, we do not have distinct results as far as environmental investments of the public sector are concerned. In spite of having positive and statistical significant impact on NX, the same is not confirmed for X. There is a rather negative impact when one year-time lag of the variable is included. Since the shift to environmental issues (with strict policies and more investments) is relatively recent, there may be short-term results that cannot be easily conceived within our models. For example, it would be useful perhaps to use more time lags, which is difficult because of the limited time horizon of our data.

Finally, the results from the implementation of environmental management systems (ISO) and the lagged ISO seem to vindicate us since they have a statistically significant effect both in NX and X.

CONCLUSIONS

The aim of this paper was to empirically contribute to the discussion whether the transformation to a green economy will have a positive impact in order to promote firms' profitability and countries' competitiveness in the current era of the new capitalist system imbalance.

Firstly, the investigation of four multinationals through the method of case studies, has not reached clear conclusions. It is not confirmed that the adoption of green products (both in production process and products) neither promotes and boosts multinationals' profitability in time of crises nor burdens them as an additional cost (as claimed by neoclassical theory). Of course, enterprises' occupation with environmental issues is relatively recent, thus medium- and long-term results do not exist yet. However, multinationals seem to increasingly declare their interest in becoming "green". Because of their new environmental profile they will gain larger market share and "the first mover advantage" that will give them the leading position in newly created markets as well. Therefore, we could say that the four multinationals care for indirect benefits, though they cannot fully calculate them.

The empirical testing of the two econometric models that followed, gave a number of interesting observations which certainly deserve further investigation and confirmation. However, there are indications that the adoption of environmental practices can contribute to the openness of a country's economy, contrary to the traditional view.

In future research, a microeconomic econometric investigation would be quite useful. At the same time, it would be beneficial to broaden the sample both of countries and control variables.

In conclusion, a comprehensive evaluation of the results is evident of having positive consequences from the shift to green economies which is not fully confirmed. Building a green economy will require strong political commitment and proper policy coordination. In any case, it is obvious that the era of neoliberal capitalism seems to be coming to an end and there should be a new development model, more environmentally friendly.

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APPENDIX

nx c y ecep ecepr eip iso

Correlated Random Effects – Hausman Test
Equation: Untitled
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	12.396861	5	0.0297

Conclusion: estimate with fixed effects (cross-section weights & white cross-section)

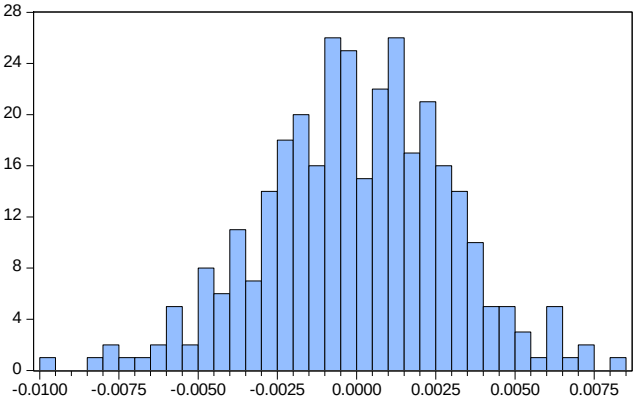
Dependent Variable: NX
Method: Panel EGLS (Cross-section weights)
Date: 04/26/12 Time: 14:19
Sample: 1997 2007
Periods included: 11
Cross-sections included: 30
Total panel (balanced) observations: 330
Linear estimation after one-step weighting matrix
White cross-section standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.003082	0.001051	-2.933548	0.0036
Y	2.23E-07	6.66E-08	3.353034	0.0009
ECEP	-0.000259	0.000172	-1.509549	0.1322
ECEPR	-7.72E-07	0.000154	-0.005008	0.9960
EIP	3.61E-05	1.62E-05	2.237814	0.0260
ISO	0.000168	3.96E-05	4.233916	0.0000

Effects Specification
Cross-section fixed (dummy variables)

Weighted Statistics			
R-squared	0.940658	Mean dependent var	-0.010371
Adjusted R-squared	0.933819	S.D. dependent var	0.013519
S.E. of regression	0.003116	Sum squared resid	0.002864
F-statistic	137.5354	Durbin-Watson stat	0.732056
Prob(F-statistic)	0.000000		

Unweighted Statistics			
R-squared	0.853399	Mean dependent var	-0.006353
Sum squared resid	0.003163	Durbin-Watson stat	0.474613



Series: Standardized Residuals
Sample 1997 2007
Observations 330

Mean	0.000000
Median	-4.36e-05
Maximum	0.008489
Minimum	-0.009740
Std. Dev.	0.002950
Skewness	-0.158481
Kurtosis	3.194130
Jarque-Bera	1.899590
Probability	0.386820

p-value>0.05: Normality

x c y dist eip iso ecep1 ecepr1 eip1 iso1 it sp p bu ro fr nl fi au

Dependent Variable: X
Method: Panel EGLS (Cross-section weights)
Date: 04/26/12 Time: 15:44
Sample (adjusted): 1998 2007
Periods included: 10
Cross-sections included: 30
Total panel (balanced) observations: 300
Linear estimation after one-step weighting matrix
White cross-section standard errors & covariance (d.f. corrected)
WARNING: estimated coefficient covariance matrix is of reduced rank

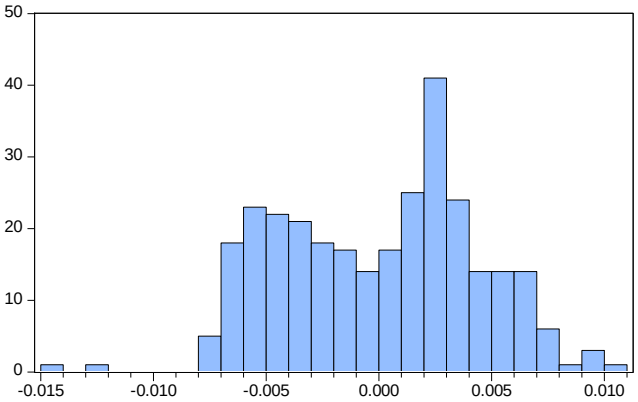
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.037032	0.000766	48.34934	0.0000
Y	2.51E-07	2.68E-08	9.354016	0.0000
DIST	-4.56E-06	1.84E-07	-24.74868	0.0000
EIP	-2.65E-05	9.55E-06	-2.778902	0.0058
ISO	0.000345	0.000120	2.877118	0.0043
ECEP1	-0.000427	0.000180	-2.368970	0.0185
ECEPR1	-0.000363	0.000159	-2.285744	0.0230
EIP1	-1.14E-05	6.98E-06	-1.628592	0.1045
ISO1	0.000205	2.57E-05	7.977332	0.0000
IT	0.002161	0.000340	6.361808	0.0000
SP	0.004508	0.000263	17.17061	0.0000
P	0.008535	0.000170	50.28784	0.0000
BU	0.007841	0.000488	16.06451	0.0000
RO	0.009625	0.000757	12.71715	0.0000
FR	-0.007870	0.000698	-11.27664	0.0000
NL	-0.022920	0.000434	-52.80243	0.0000
FI	-0.021914	0.000702	-31.21733	0.0000
AU	-0.026261	0.000691	-38.00634	0.0000

Weighted Statistics

R-squared	0.957916	Mean dependent var	0.017856
Adjusted R-squared	0.955379	S.D. dependent var	0.016797
S.E. of regression	0.004489	Sum squared resid	0.005683
F-statistic	377.5831	Durbin-Watson stat	0.335122
Prob(F-statistic)	0.000000		

Unweighted Statistics

R-squared	0.839735	Mean dependent var	0.012148
Sum squared resid	0.008065	Durbin-Watson stat	0.083840



Series: Standardized Residuals
Sample 1998 2007
Observations 300

Mean	-1.04e-05
Median	0.000541
Maximum	0.010018
Minimum	-0.014105
Std. Dev.	0.004360
Skewness	-0.103322
Kurtosis	2.387012
Jarque-Bera	5.230696
Probability	0.073142

Summary

Global economic crisis, along with domestic structural inefficiencies, weakens growth perspectives for the less developed and/or the financially weaker economies of Europe. On the other hand, relevant literature claims that technological innovations, especially with respect to the ecological aspects of products and processes, could be an effective way-out, both for the countries as well as for businesses. The present paper contributes to this discussion in two ways: first, we provide specific case studies, showing how environmental investments strengthen the competitiveness and the profitability of certain multinationals. Second, we proceed with a panel data analysis of recent intra-EU data, estimating the effect of public, environmental expenditures and investments on exporting activity, in the frame of an econometric model that includes also "gravity"- explanatory variables. We conclude that "green" investments seem to have a positive effect, both, on micro- as well as macrodimension, while expenditures could affect extroversion and competitiveness adversely. Our conclusions support the need for efficient and accurately oriented state interventions.

Zielona przedsiębiorczość i zielona gospodarka jako sposób wyjścia z kryzysu: obserwacje UE

Streszczenie

Globalny kryzys gospodarczy, wraz z nieefektywnością krajowych struktur, osłabia perspektywy wzrostu słabiej rozwiniętych i/lub finansowo słabszych gospodarek europejskich Z drugiej strony w literaturze przedmiotu wskazuje się, że innowacje technologiczne, szczególnie odnoszące się do wymiaru ekologicznego produktów i procesów, mogą stanowić efektywny sposób funkcjonowania zarówno dla państw, jak i przedsiębiorstw. Opracowanie włącza się w nurt tej dyskusji w dwóch obszarach: po pierwsze, autorzy przedstawiają szczególne przypadki, które ukazują w jaki sposób inwestycje środowiskowe wzmacniają konkurencyjność i zyskowność badanych korporacji wielonarodowych. Po drugie, analizie panelowej poddano bieżące dane o handlu wewnątrzunijnym, oszacowując wpływ publicznych, środowiskowych wydatków i inwestycji na działalność eksportową, wykorzystując ramy modelu ekonometrycznego, który zawiera m.in. zmienne wyjaśniające efekt „grawitacji". Wnioski z prowadzonych analiz wskazują, że „zielone" inwestycje wydają się mieć pozytywny wpływ, zarówno na poziomie mikro-, jak i makroekonomicznym, podczas gdy wydatki oddziałują w sposób odwrotny na konkurencyjność. Przedstawione wyniki wskazują na potrzebę efektywnej i ściśle ukierunkowanej interwencji państwowej.