

Innovation – The Key Factor in Global Trade Flow

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ABSTRACT

This paper presents in its first part several theoretical approaches on the impact that the innovative factor has globally on the trade circuit. The last part of the paper reveals a quantitative approach of this matter, using an econometric study, which emphasizes the gross expenditures allocated for R & D in European Union and also the exports level towards areas outside EU, during 2002-2009.

KEYWORDS: *innovation, research-development, trade.*

JEL CLASSIFICATION: O31, O32, O52

INTRODUCTION

There have been identified four fundamental forces (*forces profundes*) as the main pillars of the Globalisation, and they are: trade, production, finance and technology (Malița, 2001). The elements listed before represent the most dynamic activities which determine the global economic world to go round. The figures related to them have been continuously shown an increasing tendency between 1950 and 2007 (the beginning of the economic and financial crisis). In the current paper two of this forces will be analysed, i.e. the *trade and technology*. By technology we do not mean the technological fix asset, but we rather mean the innovative factor which contributes to an increase of the efficiency and to the reduction of certain transaction costs. In an economic system which tends to bring its dependencies in a horizontal plan due to Globalisation, we considered as being landmarks these two factors; in our vision, they are crucial in the context of trans-nationality, in order to bring a better understanding of the existent commercial flows and of the way in which the innovation process stimulates the expansion of these routes, both from the space-dimensional perspective and from the perspective of the debts associated to these flows.

The problem of the *international* trade has been brought in the economic thinking even since Adam Smith's time: to secure freedom of the trade, in general and freedom of the international trade, in particular - this was a real moral duty of the liberal state (Rogojanu, 2009). The way opened by Smith to the free trade (both at the domestic and external level) has been continued by authors like Thomas Malthus and David Ricardo; during the second half of the 19th century, this problem has been raised by the English philosopher and economist John Stuart Mill. Malthus (1992) who was a proponent of free trade thought that one country's protectionism and isolation practices do not bring benefits: "A country in

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which in this way the agriculture, industry and trade, as well as the various parts of its territory have a mutual influence, could obviously growth in wealth and power.(...). Such a country would naturally profit the most from its external trade, whatever would be its real situation.” In Ricardo’s vision, finding new markets would bring in exchange a double quantity of foreign goods, for a certain quantity of own goods (Ricardo, 1993). J.S. Mill goes over the excessive abstraction of the Ricardo’s model, introducing in analysis the measurement of the imported product through the quantity of the exported product, which should be given in exchange (Rogojanu, 2009); thus the analysis become tangential with the law of supply and demand.

After a short introduction of several relevant ideas for the history of the economic thinking concerning the international trade, this scientific approach will be continued with the review of the main concepts related to innovation. In the academia, the foundation of the *innovation* study has been set during the ‘60s. Since then the attractiveness of this subject has grown for an important part of the scientific community in the economic field. Innovation is an interactive process which involves more people and often involves an exchange of ideas between people from different sectors of activity. Therefore, innovation is a common activity, which is not dedicated only to those from the “creative class”, to the “symbols’ analysts” or to those from the research and development laboratories (R&D) (Fuglsang, 2008). Innovation means to have and to put into practice one idea, and sometimes to put into practice other persons’ ideas, in totally new and unusual ways (Sarkar, 2008). In the next section we will see how we can bring to a common point the idea of international trade (in a global context) and the innovation process.

1. INNOVATION EXPRESSED THROUGH THE GLOBAL COMMERCIAL FLOWS

We can say that technology is the main vehicle which enables access to information. Besides this very well defined role, the technological progress has also economical implications: through the access to information, certain transaction costs are cut, but also the degree of competitiveness of one entity is highly determined by the innovations made. In this moment the economic entities (both macro and micro) go through a considerable changes period, determined by the high rhythm of innovation. This, together with a high degree of competition, determines reconsideration of the objectives, and also of the action ways.

Innovation is an important measurement indicator of competitiveness among nations at a macro level, or among companies, at a micro level. The innovation and the transfer of technology influence the foreign trade of one country. The innovation improves the trade terms of one developed country, while the technology transfer enables countries less developed to realise goods with a higher innovative content (Cassiman & Martinez-Ros, 2004). The direct consequence of this flow - this time the information flow – is that the more developed countries are continuously competing for innovation, in order to get access to some competitive advantages on the external markets, in front of the less developed countries, which – due to the technology transfer – come in competition with the products from those countries who developed that technology. A discovery in the medical field or the announcement of a certain merger in R & D sector may trigger the upward movement of stock quotes. In which way are these upward movements translated? They are translated through the competitive advantages obtained by a company as a result of the innovation

process. These advantages give them a certain growth potential, which eventually is expressed by exports. In turn, the companies penetrating external markets get access to new information which may be further used in the R & D process.

During the last years the accent was more and more on the entities with trans-national characteristics (e.g. NAFTA, UE), while the market dropped almost entirely from her local attribute. The barriers standing in front of the goods exchange between countries have been considerable reduced or even disappeared. Under the circumstances, in order to easier understand how the global trade is positively affected by innovation, we will stick to the example of the European Union and the way in which the budgets allocated to R & D processes influence exports from EU to the rest of the world (Extra-EU). To illustrate this situation, an econometric study will be used.

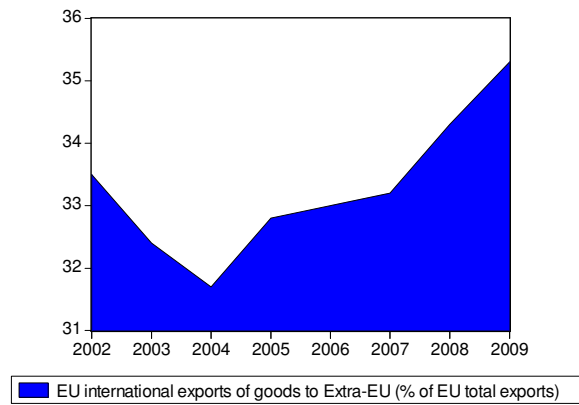
2. THE CORRELATION BETWEEN GERD (GROSS EXPENDITURE ON R&D) AND THE INTERNATIONAL EXPORTS OF THE EUROPEAN UNION TOWARDS EXTRA-EU

As the world becomes more integrated, there is an increasing demand for quantitative analyses of policy issues on a global basis (Hertel, 1997). The idea of this study came after consulting the writings of two Spanish authors, Cassiman and Martinez-Ros (2004), who studied the correlation between exports and innovation in Spain. The mentioned research has continued through several years. In our study two chronological series have been used, provided by Eurostat. These chronological series represent values for the following indicators from inside European Union:

- *The gross expenditure with R&D processes as weight of GDP*, hereunder called **GERD**;
- *The European Union exports of goods towards Extra-EU areas – percentage of the total exports of EU*, series called hereinafter **X_EU**.

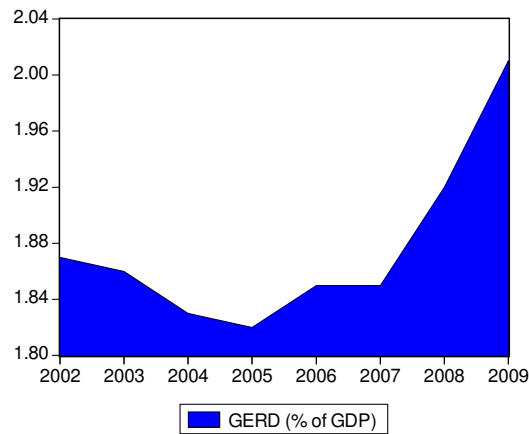
The series include a number of 8 (eight) observations and represent values for the 2002-2009 timeframe. The sample had a reduced number of observations, due to the availability of the existing data. Both chronological series have values expressed in percentages. The data from the model are for the EU-27 zone. GERD series represent Eurostat estimations, according to the values for each country.

By analysing the graphs of the evolution of the two indicators at the level of European Union, one may see that in this moment there is an ascending trend. The average of the gross expenditures allocated to research and development in the EU-27 area, calculated as percentage of GDP, for the period 2002-2009, is about the value of 1,876%. Given the fact that this indicator should be considered for the “*Agenda 2020*” *Project*, the average for the last years is quite small compared to the target which should be reached, i.e. 3% of GDP. In 2009 has been noticed an increase of 7,1% compared to the average of the analysed period, the recorded value for the last year which have been taken into consideration being of 2.01% of GDP.



Graph 1. The export evolution of goods from the European Union towards Extra-EU (2002-2009)

Source: The processed data were taken from Eurostat (2011b)



Graph 2. GERD Evolution (2002-2009)

Source: The processed data were taken from Eurostat (2011c)

After an intuitive assessment, one may say that they are positively correlated. In order to sustain this statement, we will use a simple regression model. The regression model used for this analysis has the following format:

$$X_{EU_t} = \alpha + \beta * GERD_t + \epsilon_t, t = 2002, \dots, 2009 \tag{1}$$

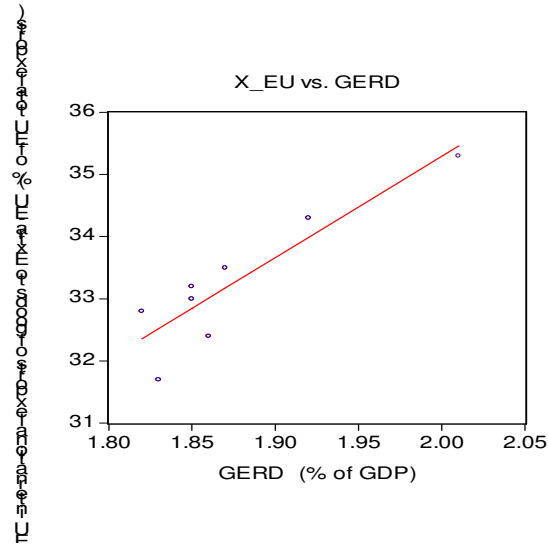
where X_{EU} is a dependent variable, and GERD is an independent variable.

After estimating the regression equation, the resulting data are:

$$X_{EU_t} = 2.649136724 + 16.32291181 * GERD_t \tag{2}$$

In accordance with the statistical tests, the model is valid. The slope of the regression line (β) is significantly different from 0. The constant term (α) is not significant from the statistical point of view. We may consider as cause of this error the restriction given by the size of the sample which was processed.

In accordance with the points cloud, the link/correlation between the two variables can be evidenced:



Graph 3. The Points Cloud of the link
 Source: authors

We have the confirmation that between the two indicators there is a direct positive linear correlation. It results that the two variables are functional correlated ($R^2 = 0,8152$). Thus, the variance of the European Union exports towards extra-EU zones is explained at a rate of 81.5% by the gross expenditure for research and development processes (as percentage of GDP); for the interest area EU-27, this figure shows that the regression fits at a rate of about 81.5%.

CONCLUSIONS

The model presented in the above section of this paper confirms that the research-development processes, including innovation, affect the commercial flows, mainly within an economic system in which the local markets gradually lose their power. In order to deepen this study, this model can further be developed to enable a comparison between two countries opposite located on the innovation axis. A comparative example can be built by a country with a powerful industrial tradition, for instance Germany, and a less industrialised country, whose budgets for R&D processes are not very high. Germany is also a leader in innovation in European Union between 2006 and 2008, where 79.9% of the companies had innovation activities (Eurostat, 2011a).

We can conclude emphasizing the fact that, for an economic re-launch, at least during this grey period of the global economy, it is necessary that the budgets for research and development to be redesigned, so that in future to have a plus of competitiveness in front of the economic competitors. In this way various finances which are not covered by goods and services might return in the real economy.

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