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Summary of the doctorate thesis:

INTERNATIONAL SPECIALIZATION AND THE COMPETITIVE ADVANTAGE

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KEY WORDS

international specialization, international trade, absolute advantage, comparative advantage, competitive advantage / competitiveness, scale economies, imperfect competition, revealed comparative advantage indicator, Porter′s diamond, causality, competitiveness and exchange rate, competitiveness and productivity, cross correlation function, VAR, VEC.

INTRODUCTION

During the time, economists asked themselves about the rules that govern the trade between countries. Answering to questions such as: „Why trade exist?", „Which are the factors that determine trade specialization?", „What wins a country through trade?", „Which are the factors that influence the advantages of one country in its relations with the trade partners?" began to represent key elements for the development of international trade theory.

The theory of absolute advantage and then that of comparative advantage generated a revolution regarding the role of trade to increase the wealth of participating countries. Practically, it was proved, that given a certain endowment with factors of the two countries, through specialization, the produced and consumed quantities of the countries increased.

In this context, the theory of competitive advantage was developed, at the end of ′80. Meanwhile there were many transformations in the global economy, which required the use of other models in order to explain the trade with goods and services between countries.

Among these transformations, we mention: the imperfect competition, scale economies, intra-industry trade, technical progress, economic integration etc.

From the moment of the first studies to present, there were many contributions which tried to define and measure the competitive advantage both at the economy and at the industry or firm level. At the middle of ´90, appeared some institutes which tried to clarify the significance of the concept and to hierarchy the economies according to their competitiveness. Although there is no standard definition for competitive advantage, this term is very oft used by the theoreticians and politicians in order to adopt some measures of socio-economic policy. That is why; we considered that this theme is extremely provocative and actual. We chose this theme because our wish was to have a real contribution to the better understanding of the phenomenon.

The objectives of our paper are the following:

- to present the traditional international trade theories;
- to analyze the new models regarding the flows with goods and services among countries;
- to point out the factors that influence the international specialization both in production and trade;
- to study the points of view regarding the concept of „competitive advantage" and „competitiveness", as one can find them in the literature;
- to reveal the contribution of Michael Porter for the better understanding of the above mentioned concepts;
- to express our own opinion regarding the terms;
- to present various methods used to measure the trade competitiveness with their strengths and weaknesses;
- to use these methods for the case of Romania, in order to obtain a list of the most competitive products of our country, for the entire period: 1990-2009;
- to apply some econometric models such as daltonian regression and Markov chains in order to reveal the changes in Romania´s international specialization between 1990 and 2009;

- to underlie the most important measures of macroeconomic policy used by the governments in order to increase the national competitiveness such as: the currency depreciation and the increase of productivity;
- to analyze through specific econometric time series methods of the causality relations on the short and long run and of the impact of such measures on competitiveness both regarding the Romanian economy and those of others countries in the European Union.

In order to reach these objectives, we elaborated a research methodology, which contains various methods, in order to better understand the phenomenon of international specialization and competitive advantage.

In this respect, we used methods like: hypothesis, comparison, analogy, analysis, synthesis, induction, deduction, logic method, historic method, econometric method.

Hypothesis, like a scientific assumption, was used mainly when we studied the theoretic models based on imperfect competition in the international trade. Another method very used by us was *comparison*, because our paper focused on the evolution in time of various entities, between 1990 and 2009 (products, industries, exports, imports, market shares etc.) In the last chapter we also compared the role of currency depreciation and that of productivity on trade competitiveness both in our country and in some nations from the Central and East Europe. *Analysis* and *synthesis* can be found in many places of our doctorate thesis. For example, when we focused on defining competitiveness, we analyzed every point of view and its components, and after that, using synthesis, we tried to gather the parts in a sole concept in order to express our own point of view with respect to the phenomenon. *Induction* and *deduction* are other two methods oft met in the economic research. Meanwhile the induction shows the evolution from particular to general, deduction indicate the reverse process. For example, we studied the product competitiveness, based on which we concluded if the Romanian trade is characterized by the resource, labor, capital or technology intensive goods.

The *historic method* can be found mainly in the first three chapters because we presented both the traditional theories and the new models of international trade, taking in consideration their development in time.

Least, but not last, we tried to apply some *econometric models*, because the new tendencies in the economic research use these extensively. However, the econometric models must be used to test some relations or influences which were already established at the theoretical level land not set above them.

SHORT PRESENTATION
OF THE DOCTORATE THESE'S CHAPTERS

The doctorate thesis named "International Specialization and competitive advantage" was organized in six chapters of which the first four have mainly a theoretical core while the last two have a practical feature.

The first chapter is called „Traditional theories of international trade" and its purpose is to define as clear as possible certain concepts such as „international specialization", „traditional", „new theories" and so on, in order to avoid confusion while going over the study. We mention that we chose to separate „traditional theories" from „new theories" in order to systematize the models regarding international trade without their strict classification.

We chose to settle these boundaries with the help of the new configuration of contemporary international trade that we talked about at the beginning of the paper. These new theories that arose in the 80's and that are based on imperfect competition, the existence of scale economies, technical and technological progress etc. are very important for our study. At the same time we find useful also the short presentation of models of international trade that are based, amongst others, on perfect competition and the existence of constant scale economies.

We started our presentation with mercantilism after which we insisted upon defining the concept of absolute advantage which represents the export of good that a country care produce with a lower production cost and the import of goods that can be obtained cheaper from abroad compared to the local production. The novelty brought through the theory of competitive advantage by David Ricardo consists in the fact that the relevance lies not in the comparison of cost in their absolute value but in their comparison in relative values. In other

words it is very important for each country to determine which are those goods that can be produced relatively cheaper. In this respect we must calculate the opportunity cost.

Another theory of the international trade, a neo-classical one, which was developed in the first chapter, was the model Hechscher-Ohlin, later improved by the contribution of Paul Samuelson (Postelnicu, 1999: 56). Starting from the assumption of two countries relatively different endowed with the two traditional production factors (labor and capital) and with 2 products (intensive relatively different in the two factors of production), the country relatively endowed with will export goods relatively intensive in capital and will export goods relatively intensive in labor. For the trade partner country the situation is reverse (Borkakoti, 1998: 122). We then focused on the presentation of the theories that result from the H-O model and the empirical analysis of its validity in real economy knowing that it is often rejected by the practice.

In conclusion, the first chapter of our thesis we consider that the models presented to this point are applicable to certain types of commercial flows (especially those inter-industry) and to certain goods (especially raw materials), but the complexity of the new additions requires a new theoretical approach that reflects better the reality.

Starting from these partial conclusions we proceeded to ***the second chapter*** („New theories of international trade and international specialization") by presenting the changes which emerged especially from the postwar period, changes that generated the need to rethink the models of international trade. We focused especially on: the rise of interdependency amongst countries, of the high share held by multinational corporations and of the different forms of imperfect competition.

Then, the chapter deals with the new theories of international trade without the intention of denying the contribution of the traditional ones to the understanding of the complex reality of the international trade relations. Therefore one of the main objectives of this section is the analytical and graphical study of the main types of competition in international trade: monopoly, oligopoly, and monopolistic competition. In order to respect the significance of the paper's title, we tried to emphasize the role of trade specialization because we feel that it represents an important source of wealth of nations. Moreover, while the changes inter-industry can be explained with the help of classical and neo-classical theories, the intra-

industry flows are based on the existence of scale economies. The last do not allow the acquirement of the entire range of products, and if there is a demand for the partner country's products this will lead to intra-industry exchanges. In other words, the scale economies are a distinctive factor in the process of trade flows. In spite of this we cannot estimate the importance of intra-industry flows, which vary according to the internal structure of each international economy. On the other hand, we can say that they will be as more significant as the trade partner countries are more alike to them in matters of structure and endowment with factors. Similarly, as the economies are more different, the trade between them will revolve more around the inter-industry exchanges.

Comparing the models, the fact that draws attention the most is the fact that the exchange is no longer a save income source. Unlike the model of the relative advantage, when the gains were on both sides, now there is the possibility of suffering some loses or registering some less measurable gains (Bowen, *et al.*, 1998: 330, Markusen, 1981: 531-551).Markusen's model shows that a large economy can produce less than in autarchy. Krugman's model (1979), that refers to the role of monopolistic competition in generating international trade flows, proves that the positive effect of trade are not necessarily seen at the level of macroeconomic indicators, but they can be found in a larger variety in individual consumption. Practically the imperfect competition leaves room for a positive or a negative result from trade without guarantying gains.

At the end of the chapter we discussed other international trade theories in order to give as many explanations as possible for the existence of intra-industry -trade. Thus we analyzed new models such as: *neo-technological models of international trade*, *the technology gap theory*, *the product life cycle theory*, *the differentiation product theory*, *neo-factorial theories* etc.

Chapter three (Defining the concept of international competitiveness) approaches less well treated in economic literature such as those regarding competitive advantage", „competitiveness", „factors of competitiveness", and tries to capture the link between them.

We mention that although these terms are used, currently there is no clear definition that can explain exactly what they mean. The approaches in the literature, all sequential or partial, can be regarded as being complementary, each one trying to emphasize one or more aspects of

the necessary competitiveness, but not enough, from our point of view. In order to make a brief presentation of the subject, we have discussed the main concepts regarding competitiveness, which we systematized in macro and microeconomical approaches.

At a macro-economical level we focused on studies and analyses of certain economical specialized organizations, and later on we have completed the picture of opinions of Romanian or foreign famous researchers. The main definition of competitiveness states that it embodies:

- a sum of economical, social, political factors that contributes to the growth of the welfare of a country (*World Economic Forum*, Lopez-Claros *et al.*, 2007: 3, *International Institute for Management Development* , Garelli, 2006);
- exceeding balance of trade and economic growth (OECD, 1992);
- high living standards, level of accidental unemployment as low as possible and exceeding trade balance (European Commission, 1998);
- productivity (Dollar & Wolff, 1993, WEF);
- productivity, high living standards, high export shares (Burnete, 1999);
- the ability to sell, the ability to attract, the ability to adapt and the ability to win (Trabold, 1995);
- exceeding trade balance (Popescu, 2001), the evolution of prices, of unit labor costs, high economic grow rates and social achievements and the protection of environment (Aiginger, 1998, 2006);
- the sum of performances at micro economical level (Reiljan *et al.*, 2000);
- the term has no meaning (Krugman, 1994, 1996).

We have analyzed all these definitions and many others as well as aspects concerning methodology by comparing them and underlining some faults.

At microeconomic level we used the model in which Michael Porter analyzes the competitive advantage of economies because, from our point of view, his study, *The Competitive Advantage of Nations* (1990), was and will be a crucial contribution to the analyses of the competitive advantage. The work is a link between international economy and strategical management.

According to his opinion, a new theory is needed, that must overcome the comparative advantage and explore the competitive advantage of nations: it must understand better the role of competition and should embody the market segmentation, product differentiation, technologic gaps and scale economies (Porter, 1990: 20).

Porter explicitly affirms that no country can be a net exporter in every product. That is why; the international trade offers the possibility to increase the national productivity by eliminating the necessity that a country produces all the goods that she needs. The specializations must take place in the sectors in which the country is relatively more productive and it must import those goods for which the nation is less productive compared to its trade partners (Porter, 1990: 7). We also need to mention that, according to Porter, the national competitive advantage represents those characteristics of one country which allow its firms to create and sustain the competitive advantages in certain sectors (Cojanu, 1997: 45).

Generally speaking, this superior position is gained by the firms in two ways: through a low production costs and/or, sometimes, through product differentiation. The sources of the competitive advantage based on low costs can be the scale economies, technology, facile access to the production factors, while the sources of competitive advantage based on differentiation can be found in: brands, product's characteristics, delivery, post selling services (Işan, 2004: 131).

The determinants of the competitive advantage of nations are: factor conditions, demand conditions, related and supporting industries and the structure and culture of domestic competition. These elements can be completed with other two: chance events and the role of government.

Summarizing the main elements pointed out in the book: *The Competitive Advantage of Nations*, we can mention the following aspects (Davies & Ellis, 2000: 6). Firstly, in order to have a sustainable development, a nation must reach and after that, must maintain the third development stage, based on *innovation*. Secondly, the nation's wealth is determined just by the *firms belonging to the origin country*, which should form *clusters* in the fields which have a strong competitiveness diamond. Moreover, the investments made abroad are a sign of the industry's competitiveness, while the foreign direct investments indicate a lack of competitiveness of the corresponding economic field. Finally, the international success of the

firms cannot be based on elements related to the comparative advantage (like, for example, the endowment with basic production factors), but on the continuous *upgrade* and *improvement* of the industrial branches through *innovation*, *product differentiation*, *brand* and *superior marketing strategies*. Many of the already mentioned ideas were the subject of debates and critics.

Some of these critics claim that:

- the model can not be applied to small economies, because its elements, which depend only on the interal environment, do not take into consideration the competitive position of other economies;
- Porter did not stick to his definition about competitiveness. At the beginning of the book, the term was treated as being similar to productivity. When the actual industries' competitiveness for the 10 countries was determined, the concept was calculated according to their market share (Folcuț, 2005: 69);
- the methodology used to measure the competitive advantage is not very convincing, because the author took into consideration the firms' export shares, no matter if they were or not internationally active. Their activity was considered to be a sign of competitiveness concerning only the origin country and not also the host economy.
- Porter considered that only the investments realized abroad show that the corresponding industry is competitive, while the foreign direct investments show a lack of this characteristic.

Starting with these critics, there were some extensions of Porter's diamond like: the double diamond (Rugman și D´Cruz,1993), the generalized double diamond (Moon, Rugman, Verbeke, 1998) and the nine factors (Cho, 1994), respectively. The main improvements brought by these models are: they divide the inputs in physical and human factors and/or they analyze the also the international (not only national) environment.

At the end of the chapter three, we drawn some conclusions from all the definitions we already presented, trying also to affirm which is own opinion related to the phenomenon and to offer a definition for the term.

From our point of view, the competitive advantage appears and is developed at the firm level and, through aggregation can be extended at the industry and economy level. Competitiveness comprise many factors, which help the economic agent to obtain an advantage towards the competitors, advantage which can be measured in sustainable and increasing market shares, in the context of imperfect competition. Without sustainability, it is difficult to speak about competitiveness. That is why; we think that the competitive advantage is not given only by the financial results such as: revenue, profit or market share. We must take into consideration also the quantity and the quality of the inputs (comparative advantage), but moreover the production process. It must be based on technologies and management and marketing strategies, in order to obtain scale economies. Practically, we have to take into consideration all the elements which help to obtain the added value. From out point of view, nowardays, given the easy access to resources, the focus in more and more on the production processes.

The fourth chapter („Mearurements indicators of the international trade competitiveness") of our PhD thesis desires to be a preamble (compulsory) for the empirical study that we have accomplished, study that wants to measure Romania's international trade competitiveness. The study tries to approach the competitive advantage issue from an empirical perspective, reviewing the main indexes used in the specific literature that aim at showing its complexity. For structuring the statement we have decided to split the indexes in two major classes: the first one of a macroeconomic nature and the second class of a microeconomic nature.

The first index class groups elements such as:

- *Trade balance indicators,*
- *Indicators of international economic openness,*
- *Indicators of geographic concentration / dispersion of relative import and export price of goods and unit labor costs based competitiveness*
- *Intra-industry trade indicators, etc.*

Representatives of the second class of indexes, those of microeconomic nature are:

- *Products' trade concentration/dispersion indexes*
- *revealed comparative advantage indexes,* as shown by: Balassa, Michaely, Lafay, Vollrath,

An important part of our study focused on this class of indexes. By using them, we can compare the percent of *i* type merchandise export in economy's total merchandise export to the percent of economy's *i* type merchandise export with world's total *i* type merchandise export. In other words, for every class of merchandise we compare its percentage for both national and international levels. A value of the index above the unit indicates a competitive advantage area, then again, a value less than unity reveals a competitive disadvantage.

- *The model of dynamic competitive advantage;*

It consists of developing a chart with four quadrants, similar to the BCG matrix, often used in marketing research. On the x-coordinate we represent the annually percent variation of national export supply, on the y-coordinate the annually international demand variation. International Trade Centre uses almost the same methodology for classifying the competitive export branches. The difference consists in the fact that the percent variation of international demand is being determined as the relative variation of world imports for a merchandise or a class of products.

On the other hand, the relative variation of national supply is determined as a percent change of the share of each merchandises' exports in world specific product market total (INTRACEN, 2007a). In our opinion, such a methodology does not allow showing those goods for which the international demand (as a percent of world imports for a *i* type of goods in total world imports) has dropped because, in common figures imports value have constantly rose. Because of this our methodological improvement, mentioned above consists in the dynamic measurement of international demand and not expressing it as a simple relative variation of a type of merchandise imports but as a relative variation of the share that world merchandise type imports have in total world imports.

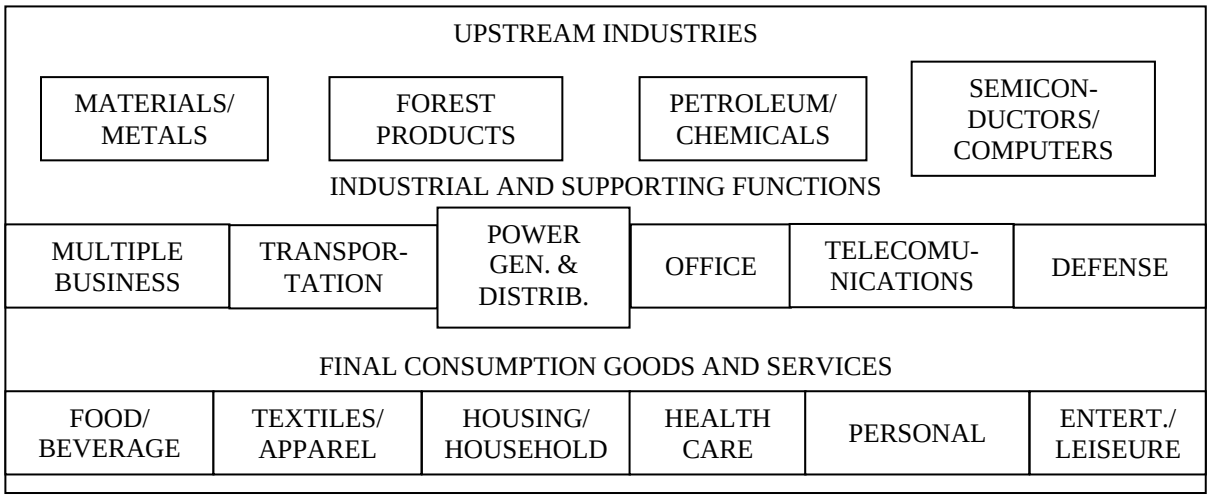
- *Romanian competitive advantage conformation using Michael Porter's cluster model*

The cluster model means building a table (see the next figure) that counts for all industries for which a nation has had advantages in international trade, divided in: upstream industries, industrial and supporting functions and final consumption goods and services. The international success has been measured under the shape of significant, above the national average export quota. Classifying the economic branches has been done under the SITC, at the 3 digit-level. If the share of a specific national industry exports in total world exports of

the specific industry has been better or equal to the national average, then the industry has been taken into consideration for further determination of the national competitive advantage.

These products have been divided into three categories: the first one, having a better international percentage than the national average, but less than double, the second category, having a share of better than double the national average but less than 4 times the average, and the third one, of those merchandise that are most competitive, being very important in the total international exports, and more than 4 times larger than the national average.

Porter's cluster chart



(*Source:* Porter, 1990: 288)

In the end of the chapter we have described and applied two models: that of daltonian regression and Markov`s chains for analyzing the dynamics of specialization. The main idea for Markov`s chains method is the following: having the distribution for the specialization indexes at a certain moment in time (for instance Vollrath`s revealed comparative advantage index) we can estimate which is the probability that an element of a certain competitiveness category will be a part of the same class in the close future or will improve/worsen its position.

Calculating the so-called transition matrix it become obvious if the dynamics of the specialization degree are of large dimensions, or better, if a country has, a basic trend for the structure of international trade (at the end of the interval in comparison with its beginning), or not.

The fifth chapter („Romania's internationa trade competitiveness") marks the intent of sketching the actual competitive advantage of the Romanian economy. It is a step that we consider having a great importance and a lot of reasons for which it becomes an interesting one, mainly for researchers, as to see if the theoretical points of view have a practical dimension, and in particular to see which of these theories apply to our national economy. Secondly, every fundamental study that reveals the strenghts and weaknesses of an economic operation can become attractive for the authorities as a mean of implementing various economic policies.

First part of the fifth chapter shows the results of several indicators meant to measure competitiveness at a macroeconomic level for foreign trade activities, for the trade balance, of international openness, geographical concentration of trade, terms of trade, the importance of intra-industry flows and from the perspective of world market share.

For Romania, the analysis of the above mentioned indexes shows both positive and negative aspects, one of the positive ones being the increased openness, the result of larger shares of foreign trade in national GDP. So, if the beginning of the 90`s meant that exports plus imports (foreign trade) had a share of 40-45 % of national GDP, in present, foreign trade counts for 60-65 % of our GDP.

The convenient evolution marks the ever increasing potential of Romanian foreign trade over our economic development. Meantime, a growth in geographical integration of Romanian trade flows can be observed. The evolution is a direct consequence of a higher dispersion of exports and imports with trade partners, most of them European countries.

Estimating the percent of the trade operations with a single industry merchandise (intra-industry trade) we have discovered that this kind of operations have an uptrend. This could be a sign that our trade structure becomes more similar to that of our trade partners (most of them EU member states). Another positive aspect are the increasing quotas of Romanian exports and imports at the world level, for now, at a level of 0,4 % for exports and 0,5 % for imports, having also into consideration the fact that the two were at a level of 0,2 % -0,3 % at the beginning of the research interval. The negative macroeconomic issues are mainly those of the large trade deficit, which even though accountable, can have serious negative effects over the internal equilibrium. The negative effects can appear, as every deficit has to be

covered with some kind of resources, and if the economic growth cannot sustain the needed amount of resources, the status of not being able to finance own activities can easily be reached.

Then, the exposal of other empirical foreign trade competitiveness issues continues, but from a microeconomic perspective. The focus falls on the dispersion degree of merchandise categories over the indexes of specialization and those of its dynamic. The central element in determining the international competitive advantage is Porter's model, applied for Romania, and other models: revealed comparative advantage indicators and the dynamic competitive advantage model. For being fair to the title of the PhD thesis I have considered advisable finding a relationship between the revealed comparative advantage through the various indexes and Romania's specialization degree. Study on Romania has into perspective the competitive advantages of our country in comparison with the rest of the world, for the interval 1990 to the present day, more accurate for the interval 1990-2009. It is definitely interesting to point all changes in the foreign trade structure brought by 1st of January 2007 and the present economic crisis. Our contribution is of interest especially because it has planned and achieved a merchandise category analysis, because the actual study is more accurate (using REV. 3 of SITC). Also, for better appreciation of the dynamics of international merchandise specialization we have appealed to techniques that have been used in estimations of income distribution and not for the distribution of revealed comparative advantage indexes. So, we could better appreciate the manner in which a shift of the Romanian trade flows emerged and if Romania is still a country that exports more raw materials and labor force. The results showed that our national economy is not one that exports only labor intensive goods but counts for competitive advantages in capital and technology intensive products. More, this kind of merchandise has an uptrend while the others a downtrend.

The *cluster* model (industrial clusters) of Porter confirms our analysis` conclusions, revealing the uptrend of some industries like: transportation, energy (production and distribution). Even if it is still one of the main industries, the textile industry is facing a strong downturn, after reaching the climax in 2000-2002. Other similar industries are the chemical one and furniture manufacturing.

The analysis of the dynamic competitive advantage has shown that even if the majority of Romanian merchandise categories have increased their quota as a part of the international trade, their progress manifests on markets in decline, the international demand for that category of merchandise being a descending one. This has to be a meditation issue as we have to synchronize our national supply with the international demand.

The final part of the fifth chapter studies the dynamic of specialization. Using the basis of the obtained figures we can assert that even if some mobility in the distribution of competitive advantage existed, we cannot discuss about an obvious increment of the specialization degree (excepting 2006-2008). On the contrary, we have observed an increasing trend for the elements in the middle of the distribution and not a focusing of these elements towards the tails. So, even if all studies show an increasing degree of specialization for the countries that have become E.U. member states lately, and even if such a result would be an expected one for the Romanian economy having into consideration the fact that trading with partners became more facile, Romania is still an exception.

Good evolutions of the specialization index, having values over 5, 10 or 15 have the following types of products: 001 Live animals, 288 Non-ferrous waste, scrap, 282 Ferrous waste, scrap, 842 Womem, girl clothing, knitted, 773 Electric distribution equipments, as for negative evolutions we could mention 611 Leather, 65 Textile, yarn, babric, etc., 261 Silk.

It is also interesting that in 1990 the merchandise having the largest competitive disadvantage were 322 Briquettes, lignite, peat, 325 Coke, semi-coke, 351 Electric curent, and the opposites, having the largest competitive advantage were goods like: 821 Furniture, cushions, 841 Men's, boys clothing, knitted, 334 Petroleum products, 791 Railway vehicles, equipment In 2008, the worst results from Vollrath`s competitive advantage index perspective can be seen in 261 Silk, 583 Monofilament of plastics 611 Leather and 325 Coke and semi-coke.

Probably, in this point of our study, the reader asks himself which role plays the state in increasing the trade competitiveness. In order to respond to such a question, in ***chapter six*** („Macroeconomic policies used to stimulate the trade competitiveness") we analyze if for Romania and other eight countries from Central and East Europe, the exchange rate fluctuations and the labor productivity have a certain impact both on the long run and on the short run.

It is considered that, *on the short run*, a currency depreciation/devaluation is used in order to increase the competitiveness (Razafimahefa & Hamori, 2007). In this way, the national currency has a lower purchasing power compared with the foreign currency, which stimulates the exporters to sell their products on the international markets because they will be paid in a stronger currency, obtaining more money in national currency. In the same time, the importers are discouraged to buy goods from outside, because their effort to buy the necessary sum in foreign currency will be higher. The main negative consequences of the national currency depreciation consist in a higher consumer price index in the origin economy. In the moment, in which the imports become more expensive and they are needed in order to produce other goods and services, given the fact that the producers do not diminish their profit share, there is the possibility that the local prices will rise. This rise can later be remarked in the export sectors. The more dependent one economy is from the imports of raw materials used after that to obtain the exported goods, the higher the inflation will be. In other words, the inflation caused by the currency depreciation can nullify the gains from the exports' growth.

On the long run, every government in interested in stimulating the international competitiveness based on some structural factors such as: *productivity* and *innovation* (Fagerberg, 1996). Regarding the relation competitiveness-productivity, there are studies (Bernard & Jensen, 1999, 2001, Wagner, 2002; Arnold & Hussinger, 2004, Clerides *et al.*, 1998, Aw *et al.* (2000), Aw *et al.* (2001)) which emphasize the difficulties met by the firms when they want to sell their product on the international markets. These difficulties consist mainly in the sunk costs, which must be supported by the producers and in the cutthroat international competition compared to the local one. Only the economic entities which can face these challenges are capable to resist on the international markets and to gain profits from it. This approach is called like the self-select theory. On the other hand, there is another category of studies (Bloch & Tang, 2007, Van Biesebroeck, 2005, Kim *et al.*, 2009) which emphasize the firm's process of gaining new knowledge from the external market (*learning effects theory*). The explanation is that the relations with the international partners allows the access to better technology, management strategies but also to a certain feed-back from the consumer with respect to the production process and the product design. Simultaneously, the producer can reach scale economies because he sells his product on a larger market.

Starting from these remarks, we analyzed firstly if we can find in our country (and in those which became members of European Union starting with 2004) the so-called process of *pass through* from the exchange rate fluctuations to the internal consumer price level. In this respect, we used the *cross-correlation function* which involves the estimation of univariate models for every variable taken in consideration (the evolution of exchange rate and the inflation rate). After several versions, we concluded that the best univariate model is: AR(*k*)-EGARCH(*p*,*q*), developed by Nelson (1991).

$$X_t = \pi_0 + \sum_{i=1}^{r} \pi_i \cdot X_{t-i} + \varepsilon_t$$

$$\log(\sigma_t^2) = \omega + \sum_{i=1}^{q} \beta_i \cdot \log(\sigma_{t-i}^2) + \sum_{i=1}^{p} \alpha_i \cdot \left| \frac{\varepsilon_{t-i}}{\sigma_{t-i}} - E\left(\frac{\varepsilon_{t-i}}{\sigma_{t-i}}\right) \right| + \sum_{i=1}^{p} \gamma_i \cdot \frac{\varepsilon_{t-i}}{\sigma_{t-i}}$$

where the errors ε_t follow the GED distribution (*general error distribution*) or the normal one and $\log(\sigma_t^2)$ is the logarithm of conditionate variance. The coefficients for the ARCH terms (α_i) reveal the information about the volatility of the previous periods and they correspond to the lags of the quadratic values of the errors from the mean equation. The coefficients of the GARCH (β_j) terms show the persistence of the previous shocks on volatility.

Taking into consideration the given equations, we estimate two series: those of standardized errors and those of quadratic standardized errors, as follows:

$$\varepsilon_t = \frac{X_{1,t} - \mu_{y_1,t}}{\sqrt{h_{y_1,t}}};\ \text{respectiv}\ U_t = \varepsilon_t^2 = \frac{(X_{1,t} - \mu_{y_1,t})^2}{h_{y_1,t}}$$

$$\zeta_t = \frac{X_{2,t} - \mu_{y_2,t}}{\sqrt{h_{y_2,t}}}\ \text{respectiv}\ V_t = \zeta_t^2 = \frac{(X_{2,t} - \mu_{y_2,t})^2}{h_{y_2,t}}.$$

Based on these values, we calculate a correlation coefficient which corresponds to the k-th lag:

$$\widehat{r_{\varepsilon\zeta}}(k) = \frac{c_{\varepsilon\zeta}(k)}{\sqrt{c_{\varepsilon\varepsilon}(0) \cdot c_{\zeta\zeta}(0)}}\ \text{respectively}\ \widehat{r_{uv}}(k) = \frac{c_{uv}(k)}{\sqrt{c_{uu}(0) \cdot c_{vv}(0)}}$$

where $c_{\varepsilon\zeta}(k) = \frac{1}{T} \cdot \sum(\widehat{\varepsilon_t} - \overline{\hat{\varepsilon}}) \cdot (\widehat{\zeta_{t-k}} - \overline{\hat{\zeta}})$ ist the covariance at the level of k-lag, with $k = 0, \pm 1, \pm 2$ ..., $c_{\varepsilon\varepsilon}(0)$ and $c_{\zeta\zeta}(0)$ are the variances of the residuals ε_t,, respective ζ_t. The correlation coefficients for the series U_t and V_t are similarly determined.

We test the causality at the lag-level, by using the statistic value of the following expressions: $CCF - statistic = \sqrt{T} \cdot \widehat{r_{\varepsilon\zeta}}(k)$ and $CCF - statistic = \sqrt{T} \cdot \widehat{r_{uv}}(k)$ c, respectively, which follow the standard distribution. The null hypothesis is that there is no causality in mean or variance and a value of the statistic test larger than the critical value of the standard distribution involves the rejection of the null hypothesis (Constantinou *et al.*, 2005: 10).

Applying the model for several economies, we concluded that for our country the correlation coefficient, between the errors of the inflation model and the 10 month-lag errors of the nominal effective exchange rate, is negative and statistical significant, which shows the presence of causality in mean from the exchange rate towards inflation. In other words, a shock in the nominal effective exchange rate will be remarked after 10 month in a variation of inflation, in Romania. Because the sign of the correlation coefficient is negative, this means that a lower exchange rate (the national currency depreciation) will generate higher inflation rate.

After establishing the nature of causality relation between the exchange rate and inflation rate, we got to the analysis of the Granger causality regarding: competitiveness-exchange rate and competitiveness-productivity, using the method of autoregressive vector.

In order to establish the appropriate model (VAR or VEC), we tested the existence of the stationary and cointegration and after that we developed the models. In polynomial form, a bivariate VAR(p) model can be written(Kirchgässner, 2007):

$$X_{1,t} = \delta_1 + \sum_{k=1}^{p} a_{11}(k) \cdot X_{1,t-k} + \sum_{k=1}^{p} a_{12}(k) \cdot X_{2,t-k} + u_{1,t}$$

$$X_{2,t} = \delta_2 + \sum_{k=1}^{p} a_{21}(k) \cdot X_{1,t-k} + \sum_{k=1}^{p} a_{22}(k) \cdot X_{2,t-k} + u_{2,t}$$

Every variable from the two is both endogenous and exogenous and it depends on its own laged values and on those of the other variables. If we can find a cointegration relation between the series, then the equations written above will be corrected with this relation, by introducing it in the model. We say that X_2 does Granger cause X_1, if and only if all the matrices of the coefficients are triunghiular and have zero above the main diagonal, in other words, if $a_{12}(L) \equiv 0$ Similarly, X_1 does not Granger cause X_2 if and only if $a_{21}(L) \equiv 0$.

After applying the model for the Romanian economy, for the period 1998-2009, we concluded that the international competitiveness, measured like export quote, and the real effective exchange rare do not evolve simultaneously on the long run, because we did not find any cointegration relations between them. This conclusion is a very important one, because in the economic literature, there are numerous empirical studies which underline the pass through from exchange rate through inflation. In other words, the initial positive effects obtained after the currency depreciation, are overcome by the negative effects of the rising production costs. That is why; this policy should be carefully use. If the pass through phenomenon would not be available for the case of Romania, then we could identify a cointegration relation between the competitiveness and the exchange rate. But, because it exists, this means that the Ron depreciation relatively to the currencies of the main trade partners lead to a price increase which annulled the initial competitive advantage. We succeeded, using ADRL model to find a relation on the long run between competitiveness and labor productivity. Regarding the Granger causality, on the short run, we obtain the results presented in the next table:

The Granger causality between competitiveness (EXP) and the exchange rate (REER)

Model	Null hypothesis	Prob.
VAR(2)	REER does not Granger cause EXP	0,025
	EXP does not Granger cause REER	0,008

(*Source*: own calculations in Eviews)

We test for every equation of the model if one variable can be treated or not as an exogenous one (at the level of 5%). A small probability associated with this test rejects the null

hypothesis and indicates the fact that that variable must be further treated as endogenous because she brings more information which help to better predict the dependent variable. Analyzing the table above, we can remark that in the case of competitiveness-exchange rate relation, the Granger causality is reciprocal.

At this point, it is important to explain the significant coefficients from the model, which can be found in our thesis. Starting from the equation in which REER is the dependent variable, it can be observed that a growth of exports in the last two quarters will determine a growth of the real effective exchange rate, because the estimated coefficient is positive and equals 0.461, which means a currency appreciation. This situation can be explained as follows: a growth of exports determines a rise of foreign currency supply and the appreciation of the national currency. On the other hand, the estimated value of the coefficient corresponding to the REER(-1) is positive and equals 0.301, which means that a real depreciation of the national currency (a decrease of REER) from the last quarter will be followed by a decrease of exports. The phenomenon is known in the literature with the name J-curve. On the short run, given the inelasticity of exports and imports, the depreciation determines the growth of the exported quantity, but in a smaller percentage, which means that the value of exports decreases. Analyzing the results, we can say that the real depreciation of Ron will stimulate the exports and the result will be seen in two quarters.

Regarding the causality between competitiveness, the results are given in the next level:

The Granger causality
between competitiveness (EXP) and the labor productivity (WL)

Null Hypothesis:	Obs	F-Statistic	Probability
WL does not Granger Cause EXP	33	1.48395	0.24403
EXP does not Granger Cause WL		8.06493	0.00171

(*Source*: own calculations in Eviews)

According to the values in the table above, we can reject the null hypothesis that the exports do not cause the increase of labor productivity. Initially, we were surprised about the results, but studying the economic literature the causality from exports towards productivity is a

phenomenon oft met especially in the case of transition economies and some Asiatic countries.

At this point of our research, we must be aware of the limitation of the econometric models, which offers results with a certain probability, given a certain statistic data for a certain period of time. From the economic point of view, we think that the firms must have a level of development above the mean of the industry in order to carry on activities of international trade, and from this point of view, the productivity determines their decision to internationalize their activity. After that, once the firms are involved in international transactions, the phenomenon "learning by exporting" is prevailing. We consider that the causality chain is: productivity-competitiveness-productivity.

In our opinion, our paper has an added value both in theory and practice and can be also useful for the politicians when the economic policies are to be taken in order to improve the performance of the Romania's trade.

CONCLUSIONS

While going over the paper, we tried to reach the objectives mentioned at the beginning of the paper. In this respect, along with the theoretical approach, from the first part of the paper, we realized also a practical approach in the second half of it. The main conclusions were already mentioned in the short presentation of the chapters. However, we want to make some remarks:

I. As a result of our analysis, we could not observe a radical change of Romania's international specialization. However, we have clues that our country's trade activity is becoming competitive in products that are intensive in capital and technology difficult cu imitate, even if in the period of time 1990-2002 it was dominated by the raw materials and labor intensive goods.

II. After studying the consequences of currency depreciation on the price evolution, we can say, within the limits of statistical probability, that in our country there is the pass-through phenomenon, which means that a depreciations leads to an increase of prices after 10 months. The same phenomenon could be remarked in the countries of Central and East Europe, but the reaction gap was larger or shorter, depending on the size of economy and its trade openness.

III. Analyzing the relation competitiveness – productivity by using the VAR and VEC models and the Granger causality, we concluded that the exports have an important role for the productivity both in our country and the other studied economies. The phenomenon is known as "learning by exporting" and indicates the fact that the information obtained by the exporters from the external market regarding their products lead to a better productivity. However, we think that firms can internationalize their activity, only after having reached a

certain level at the local level, so that the complete causality chain is: productivity-competitiveness-productivity.

From our point of view, the most important scientific achievements included in this paper are:

- the study of the competitive advantage at the product level was done in detail, at the 3-digit-level according to the Standard International Trade Classification, taking into consideration more than 260 products for the entire period 1990-2009, offering a better image about the goods that are the object of Romania's international specialization.
- another achievement was the determination of a largely number of competitiveness indicators, less known in the economic literature in Romania, such as: Balassa, Michaely, Lafay, Vollrath etc.
- the analysis of national competitiveness was done on clases of products according to their intensity: in resources, labor, capital and technology;
- we also studied the specialization's dynamic of Romania with the aid of Markov chains;
- we built a Boston Consulting Group matrix which reflects the place and the dynamics of the most competitive Romanian products, taking into consideration the evolution of their share at the international level compared to the dynamic of international demand. Similar studies are offered by INTRACEN, but not for Romania. We presented the situation for our country and simultaneously we improved the methodology used by the above mentioned organization especially when measuring the dynamic of international demand.
- we realized the table of industrial clusters for Romania, according to the methodology proposed by Porter, our novelty being that it is presented for more years line 1990, 2000, 2006 and 2008 and which make the changes observables.
- our paper analyses, through specific econometric models, the impact of exchange rate and the labor productivity on international trade competitiveness. Through specific econometric models we mean the cross correlation function, which was used to observe the relation exchange rate-inflation finding evidences about a higher inflation

generated by the currency depreciation. The cross correlation has the advantage of studying the causality relations both in mean and variance.

- we also applied the newest econometric techniques regarding the time series analysis by creating the so called VAR and VEC models and by determining the Granger causality between the competitiveness and exchange rate on the one hand, and on the other hand, between the competitiveness and productivity, on the other hand. We remarked in the case of Romania the causality from competitiveness through exports. This confirms other international studies which show that in the transition economies we can talk about the phenomenon of "learning by exporting". The econometric analysis was applied also for other country from the Central and East Europe, members starting with 2004.

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