MODELING THE DETERMINANTS OF EXPORTS AND IMPORTS: ASSESSMENT OF THE MACEDONIAN COMPETITIVE PERFORMANCES

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Abstract:
So far Macedonia has undergone an unsuccessful attempt to transition, distinguished by low growth rates, high unemployment, extensive poverty, balance of payments unfavorable position, technological lag etc. The external sector, as a core element to growth perspectives of a small open economy is critically dependant upon the export competitiveness. Consequently, this paper will address some critical points of the Macedonian economy, particularly the vulnerability of the external sector alongside with the price and trade liberalization. The set of analyses is to be carried out to explore the foreign trade structure, current account developments, as well as the major aspects of qualitative competitiveness. In addition, we have examined the impact of macroeconomic variables on exports and imports within the selected timeframe. We have therefore applied a comprehensive approach of dynamic modeling based upon a vector - autoregression model determined to control for endogeneity and set to estimate the long - run equilibrium relations, as well as the short-run dynamics of the key variables.

Keywords: exports, imports, competitiveness, vector - autoregression model

Introduction

Trade liberalization, severe competition, as well as the intensive technological changes has increased the policy debates on possibility to improve the international competitiveness of sectors, industries and national economy as a whole. Special emphasis should thus be placed on the concept pointing at reduced effectiveness for the policies once oriented towards local industrial and economic advantage (UNCTAD, 1999). Countries are therefore compelled to adopt such economic and trade policies that directly affect the ability of firms and industries to slot in and capture as much as possible of potential gains in growing trade and investment. Noteworthy is here to mention that losses are inevitable at the same time, taking into consideration the pressure of competitive environment. Analyzing the issue of competitiveness one may certainly go into the proper combination of comparative and industry-specific advantages so as to contribute to increase the competitive advantage.

The concept of competitiveness, however, is one of the most elusive and misapprehend as given various interpretations. Comparative advantage though stringently described within the Ricardian model has been also unlikely inferred and measured when extended beyond the classical trade theory. Worth mentioning here is the use of equilibrium prices once costs are being assessed. Insofar as markets are not in equilibrium wage or currency adjustments may possibly reduce the ability to export. That is to say, costs weigh against the market prices are to be the basis of competitive but not

comparative advantage. It is the most common in empirical trade literature to use Balassa index of 'revealed comparative advantage' (RCA) so as to measure the particular advantage, although the better indicator for such assessments is Domestic resource cost criterion, proposed by Bruno (1965) and argued onwards by Balassa and Schydlowsky (1968), Bruno (1972), Krueger (1972), Srinivasan and Bhagwati (1978). Even though very simplified, the principle of comparative advantage is not to be applied in explaining the intra-industry trade that clarifies economies of scale, monopolistic competition and product differentiation (Krugman and Obstfeld, 2000). Many scholars argue that international competitiveness arises from the theory of comparative advantage using the term alike, while the others observe the concept within the economy – wide characteristics. The most divisive, as well as mainly popular is the macroeconomic concept of competitiveness despite the microeconomic that is less controversial even with the variety of indicators in the group. Economic literature comprises different indices measuring the competitiveness considered as the widespread version of the macro concept. The best known among the others is the Global competitiveness index that stands for the composite of various elements compacted into a single index (World economic forum). The second approach to measure the macro competitiveness is to be an aggregate of microeconomic concept underlying the terms of labor and total factor productivity (Dollar and Wolff, 1993). Applied economists have been too much aware about the importance of competitiveness as determinant of macroeconomic performances as specially focus on real exchange rate and the real effective exchange rate (Lipschitz and McDonald, 1991; Marsh and Tokarick, 1994). This indicator is to be considered as clearly macroeconomic taking into consideration that measures the level of currency misalignment based upon the purchasing power parity assumption. Nevertheless, one may possibly use it as a micro-level concept if applies the price index of particular industry rather than the economy-wide price indices (Helleiner, 1991). Despite various measures of microeconomic competitiveness, by far the most popular are cost competitiveness (Turner and Gollup, 1997; Siggel and Cockburn, 1995), as well as the price ratios (Durand and Giorno, 1987).

As shown above, the concept of competitiveness comprises loads of dimensions which may well explain the complexity of the particular issue. Special emphasis should thus be placed on balance of trade, living standard or real income as the two-dimensional case in point (Hatsopoulos, Krugman et al, 1990). The authors assert that countries can attain the export improvements at the cost of reduced real income that is not to be considered as increased competitiveness. Put differently, the country is said to be competitive if only manage to achieve the central economic policy goals, especially growth in income and employment, without running into balance of payments difficulties (Fagerberg, 1988, p. 355). On the other side, the real effective exchange rate is supposed to be uni-dimensional indicator since it measures the level of currency misalignment that may improve or reduce the international competitiveness. Although the most invasive and by far the most influential, price competitiveness indicators are usually believed to be one-dimensional concept since those are mainly focused on unit labor cost criterion. This measure is to be very important for policy making as certain monetary aggregate in the small open economies. It is argued that the unit labor cost increase may lessen the market share, hinder the economic growth and add to

unemployment. There is widespread evidence, however, that some of the most growing economies in terms of GDP and exports have also experienced a faster growth in relative unit labor cost (Fagerberg, 1988). The particular phenomenon is sometimes known as "Kaldor paradox" pointing at the best simplification when unit labor cost is put forward to determine the concept of international competitiveness.

Several concepts suggested in the theory are deterministic since they observe and measure actual performances (cost, prices, market share etc). The minority of them accentuate the potential performances that are not promptly observable. They depend upon the variables which determine the competitiveness in accord with the models of stochastic nature (Fagerberg, 1988). This author develops an example of macroeconomic stochastic indicator of competitiveness in order to explain the market share of a country by three variables: technical competitiveness reflected in R&D expenditures, price competitiveness determined by terms of trade and unit labor cost, as well as the output capacity. Among the micro-economic models of competitiveness the most stochastic is the one that compares the expected price of products, based upon quality characteristics with the actual price, at which expected price is regressed on the measured quality elements (Swann and Taghavi, 1992).

Taking into consideration the importance of competitiveness within the context of increased trade liberalization, as well as different approaches to explain the elusive but crucial concept, this paper intends to broadly analyze the international competitiveness of the Macedonian economy as a case in point. Thus, the first part will examine the current account developments and external vulnerability. The second part of the study points to the structure and dynamics of foreign trade. The third part covers the qualitative aspects of competitiveness and the last part of the paper refers to econometric analysis of the set of variables which represent the fundamental elements of price and cost competitiveness.

Current account developments and external stability assessment

Nearly two decades Macedonia has faced an irregular transition after the independence in 1991. The UN sanctions against the northern neighbor, one of the Macedonia's major markets, the two Greek economic embargoes (1992 and 1994) and the lack of an appropriate infrastructure have damaged the economic growth until 1996.

Table 1

Selected economic indicators

average	1998-2002	2003-2008
Inflation (average)	2,44	2,5
Unemployment (%)	32,3	35,98

Source: NBRM

Even though the economy was exposed to GDP subsequent rise up to the year 2000, the commitments to free trade, economic reforms and regional integration were undermined by the Albanian uprising in 2001. GDP growth managed to retrieve in 2003 notwithstanding, it was much less

prominent to the one of Central and Eastern Europe transition economies (Figure 1). Macedonian economy held on to restored dynamic in 2006 even with the considerable collapse in manufacturing and construction. Economic situation remained optimistic in 2007 amid the stronger domestic demand set off by improved terms of trade and remittances, as well as the rising investment that increased the GDP growth to 5 %. Although these positive episodes have been once reversed, the real growth has reached 6 % in the first half of 2008 driven particularly by construction, transport and retail sector. Strong investment, the industrial production growth, but also the high unemployment rate put forward few capacity restraints and possibility to persevere with this favorable supply response.

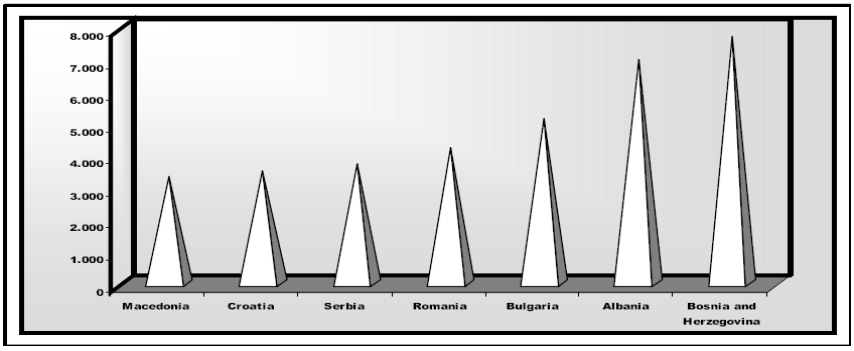

Figure 1. Real GDP growth (average 1998-2008)

The unemployment has been actually a problem for Macedonia for a long period of time. During the transition process the unemployment rate has fluctuated at around 35% as it was considered the highest one within the region. Macedonia's consumer price levels stay ahead relatively low, although sometimes followed with periods of deflation. The inflation, however, accelerated to 3,2% and 10% in 2006 and early 2008, respectively even with the exchange rate anchor. The situation behind emerged from the principal increase in excise taxes for alcohol and tobacco, as well as the higher energy and oil prices (Table 1).

Within the past years, Macedonia is one of few transition economies which productivity levels have turned down weigh against the country's mayor trading partners.

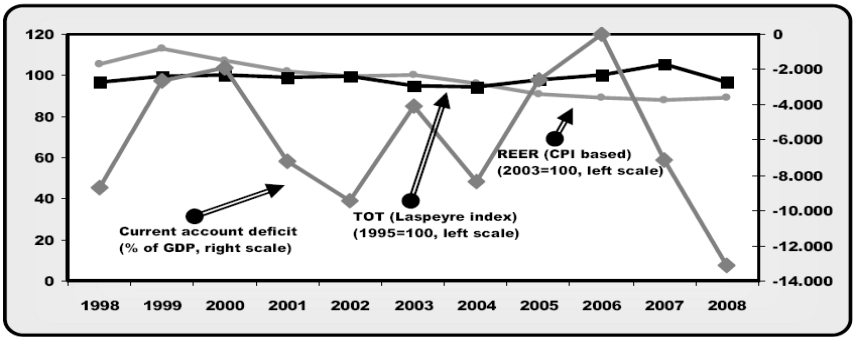

Figure 2. Current account deficit, TOT and REER

The low investment levels have not been compensated with proper allocation of the resource to growth-oriented sectors of the economy. As the productivity and exports fell down, the current account deficit continued to grow deeper undermining the growth and macroeconomic stability of the country. Specifically, the current account deficit averaged to 6,51% of GDP for the period of 1998-2008 and was strongly accompanied by the negative trade balance accounted for 18,98% within the same period. In the first half of the particular period the average trade deficit was estimated to 16,74%. The increase in oil price, revitalization of some industrial capacities, trade liberalization process and thereby the tariff decrease have fueled imports within the second half, thus imposed worsening of the trade balance to 20,85% of GDP. The lowest current account deficit was recorded in 2006, determined principally by the large increase of private transfers (Figure 2). As of 2007, the situation started to considerably change, at which the highest current account and trade deficit was accounted in 2008 setting up the questions about competitiveness, real exchange rate and external vulnerability. The main reasons behind are to be found in rising imports of investment, intermediate goods and energy, strong decline in terms of trade, drop down of private transfers due to the events in Kosovo and domestic elections, as well as the sharp fall in exports owing to the slower global growth (Figure 3).

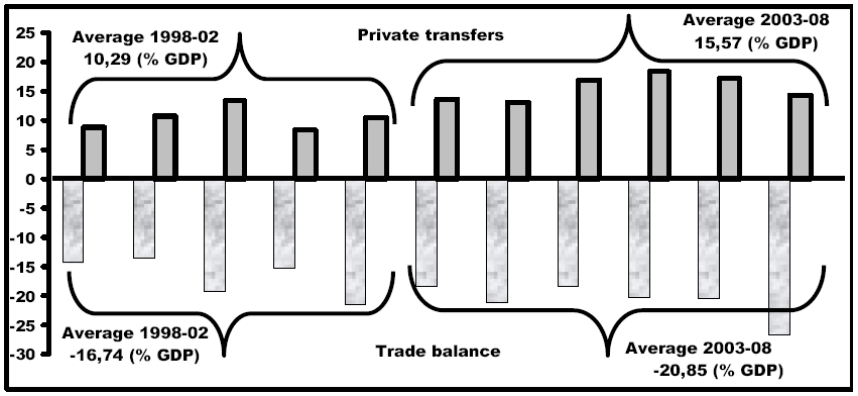

Figure 3. Trade balance and private transfers

The large current account deficit imposed an external vulnerability increase, although the external debt remains manageable (IMF Country report, 09/61). The rice of external debt especially pointed in some period is to be a reflection of large current account deficit and the necessity to increase the reserve coverage (Figure 4). While the capital inflows have been recovered from 2004 onward, the decline in reserve coverage was reversed once within the same period, as well as in 2008. However, noteworthy is to mention that any decrease in foreign reserve ratio does not necessarily boost the external vulnerability if the foreign reserves save for an adequate level. That is to say, the estimated coverage ratio of 3,5 months for the imports projected in 2009 is to be considered an adequate level taking into account the size and exposure of the country onto the international capital markets (NBRM Annual Report, 2009).

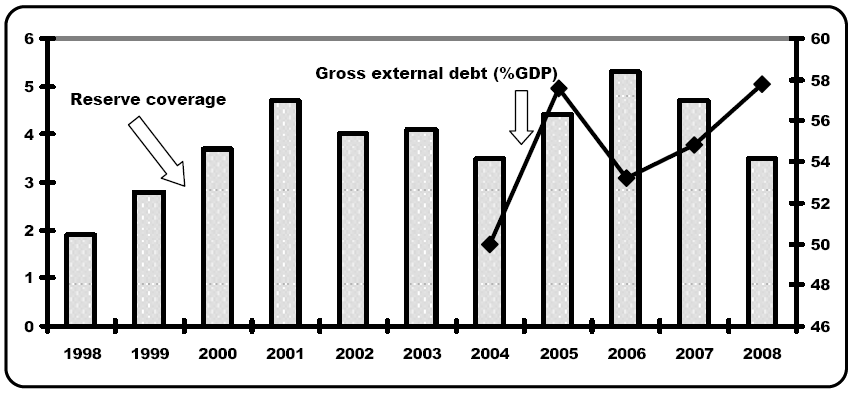

Figure 4. Reserve coverage and external debt

Dynamics and structure of foreign trade

Within the recent years Macedonia continued with the high levels of foreign trade liberalization. Thus, the country became a WTO member state, but also managed to sign a number of free trade agreements amid the one for enlarging CEFTA to a new framework. Consequently, the levels of openness to trade are to be very high amounting for 87,62% in 2000 to 100% in 2007. Nevertheless, majority external and internal shocks the country has undergone through the transition imposed a permanent setback and low participation of exports to GDP (31,7% to 41,57% in 1999 and 2008, respectively), unlike the imports that have raised dramatically within the same period (48, 06% to 71,60% of GDP).

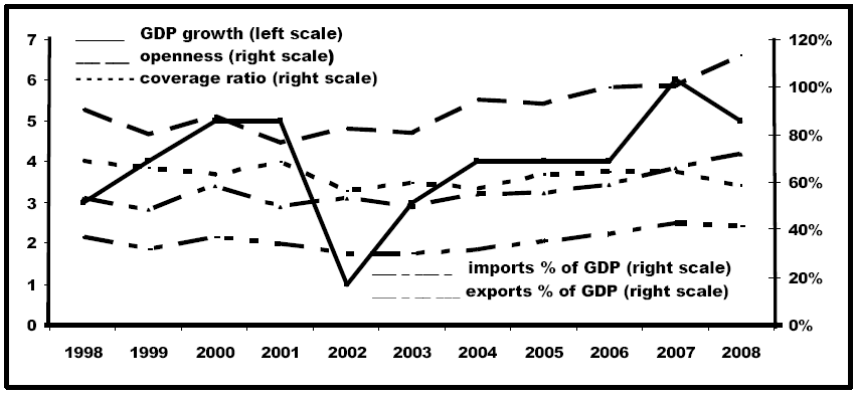

Figure 5. GDP growth, openness, coverage ratio, imports and exports

The export performances went downhill especially in 2001 owing to the political crisis which set off a severe contraction in output the same as exports. The situation started to recover mere in 2004, at which the export share of GDP managed to return on its pre-crisis level in 2005. The foreign trade started to aggravate over again in 2008, principally due to vast changes in the global economy along with the increase of domestic demand for imported goods (NBRM Annual report, 2008). The terms of trade deterioration, intensive private consumption and investment, as well the escalation of the world financial crisis are to be found behind the foreign trade increase in 2008, upon which the imports have been added to a great extent unlike the exports (22,4% and

9,9, respectively). All through the particular period imports have outpaced exports as they have risen by an annual average growth rate of 12% and 14%, respectively. Consequently, the coverage ratio has permanently deteriorated from one year to another (Figure 5).

Patterns of Macedonian foreign trade exhibit high concentration level of the exports, unlike the imports within the period 1998-2008. The particular findings stand for the most widely treated summary measures of concentration, such as Herfindahl – Hirschman (HH) index, as well as the one developed by Hall and Tideman (1967) and Rosenbluth (Niehans, 1961). The both indices suggest that country is heavily dependant on a limited number of sectors the same as trading partners that implies exports instability and vulnerability to business fluctuations and the terms of trade swing. What is more of a concern is the upward tendency after 2004, with some deviations within the last year. Thus, the main drivers of Macedonian export performances are principally the primary products (beverages and tobacco, iron and steel, petroleum products and clothing) which account for around 70% of the total exports. These sectors in aggregate level create surplus in the foreign trade, which means that coverage ratio is to be above the average. Some important sectors, however, record deterioration in the value of particular indicator in 2008 if compared with 1998 (textile fibers, metalliferous ore, scarp and non-ferrous metal).

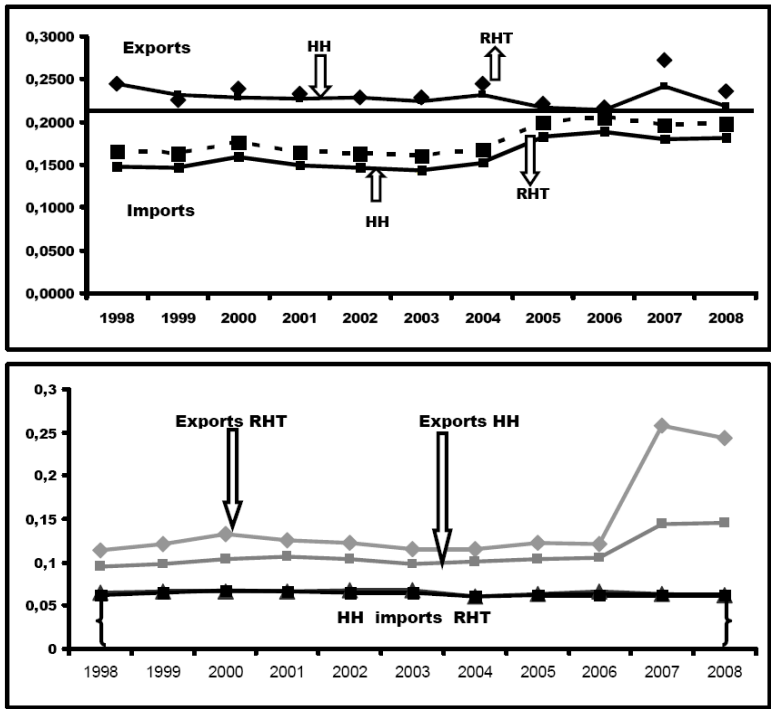

Figure 6. Indices of exports and imports concentration

The recovery of iron and still and certain refined oil products are to be found in the renewal of the large steel factory in 2004, as well as the removal of Serbian protectionist barrier to imports. Yet, exports of petroleum products have decreased for the first time in 2007 owing to the prohibition

imposed by UNMIC (USAID Report on foreign trade, 2008). In 2008, a certain decrease have been noticed in exports of iron and steel down to the reduction of global consumption, as well as the negative shifts in metal price. Quite the reverse, imports by sectors have rather than diversified structure as considered to be fairly understandable if taken into account the size of the country and trade liberalization process (Figure 6). Special emphasis here should be placed on the import structure consisted of high value added manufactures (equipment), as well as the oil products and energy which price is quite changeable on the world markets. As regards the export markets, noteworthy is to mention that few trading partners (mostly EU and western Balkan counties) receive almost 95% of the total exports, unlike the imports that exhibit no structural change within the period into consideration. Further analysis made about the Macedonian manufacturing exports suggest that the loss of competitiveness and the market share is to be a reflection of the strong export concentration and the patterns of specialization. We have therefore examined the development of market share of the ten two-digit sectors accounting for 90% of total Macedonian manufacturing exports (Figure 7).

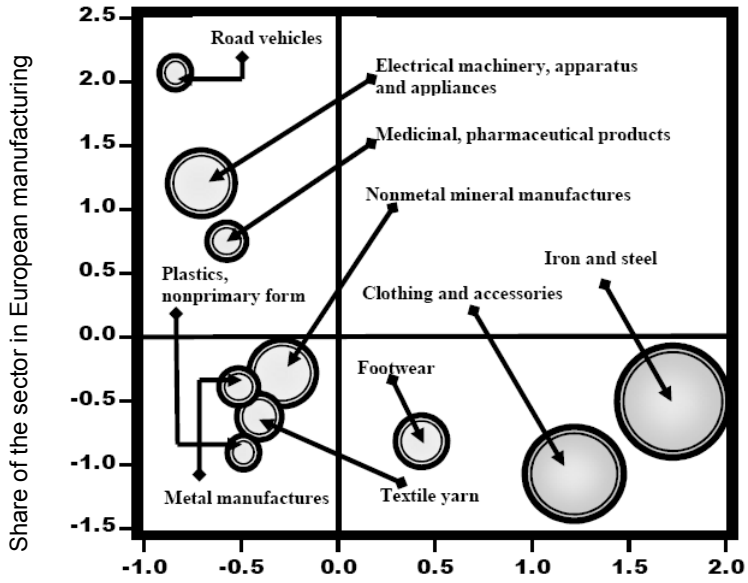

Figure 7. Share of manufacturing exports (average 2000-2008)

Subsequently, we have made a comparison with the share of the particular sectors into the European manufacturing exports as the largest trading partner. The evidence obtained suggests that Macedonian exports have increased in most of the sectors the country is being specialized and export concentrated. These sectors, notwithstanding, are those with decreasing share into the European manufacturing exports. The analysis, principally, points toward the weaker near – term export growth prospects, although the latest FDI was supposed to diversify exports.

Estimating the qualitative aspects of the Macedonian foreign trade

The concept of qualitative competitiveness has become especially important as developed countries turned out a downward position in the international trade. The assessment of competitiveness qualitative aspects is going to be herewith performed using the unit value index in accordance with Laspeyres method (the index is obtained by dividing the nominal exports and imports with the appropriate quantities). In addition, the revealed price elasticity approach is to be implemented so as to make exports industry segmentation (Aiginger, 1998). The analysis herewith is based upon 2-digit SITC 3 classification of the products to be exported. Principally, the unit value index distinguishes between markets with price and quality competitiveness. Thus, if unit value costs and the product are homogenous, then countries with lower costs should be net exporters in quantities, while those with higher costs should be net import countries. If a country is net exporter in quantities despite the fact that it has higher unit values then this must be due to quality differences. This assertion makes use of the fact that economic theory tells us that under quite broad circumstances demand is price elastic (Aiginger, 1998, p.7). Evidence suggests that Macedonian unit value of exports is lower then the one of imports considered as being usual for transition or undeveloped countries. The reason behind is to be found in the export structure dominated by raw materials, labor intensive products and others with low processing phases instead of technology driven products which usually have high unit value. The exemption is made in 2007 when unit value of exports is higher than the one of imports since those were highly increased due to some crude materials (metalliferous ore) and few manufactures (iron and steel) which have lower unit values compared to the exports. On basis of quantities and unit value of exports and imports one could make product segmentation dependant upon the markets dominated by price or quality competition (hereafter, Px denotes unit value of exports, Pm stands for unit value of imports, Qx is the export quantity and Qm represents import quantity). Thus, the first segment combines the industries in which the exported quantities exceed imports despite higher unit value (Px>Pm and Qx>Qm). This has to be the consequence of a quality lead which is reflected in demand or signals successful specialization in the most sophisticated market segment. This sector is the very target for an advanced country (successful quality competition, sector of excellence). The second segment contains price elastic goods which have a low unit value in the home country (Px<Pm and Qx>Qm). This sector yields a trade surplus (successful price competition). The third segment contains price elastic goods which have a high unit value in the home country and consequently lead to a trade deficit in the economy (Px>Pm and Qx<Qm). Industries in this sector have lost price competitiveness in a market in which prices are important. This part of the deficit is said to be the consequence of high production costs (deficit in price competitiveness, out priced sector). The fourth segment is the sector where industries run a trade deficit despite low prices (Px<Pm and Qx<Qm). In this sector there have to be some exit barriers (structural problem area). The most promising, however, is the first segment from the perspective of technological and dynamic competitiveness. A country with high costs is well prepared for future competition if a large part of the industry is located in the sector where high unit values are consistent with an export surplus (Aiginger, 1998, p.7).

The analysis performed for the year 2006 shows far more groups within

the uncompetitive sectors (III and IV) consisting around 35% of the Macedonian exports (Table 2). Special emphasis should thus be placed on the first segment which is hopefully to be consisted of products from 8 and 9 SITC sectors. Currently, it is warring to conclude that the segment comprises just 3 product groups distinguished with low value added. Almost all the industries which show a qualitative competitiveness are those with very little imports (hides, skins, fur skins, raw) and few industries with natural advantages (iron, fruits and vegetable). Almost all industries where the analysis shows revealed price competitiveness are products principally sold on the neighbor markets, like beverages and tobacco, whereupon 70% of their total exports are directed towards the closest neighbors. Additionally, the particular segment comprises also some raw materials, chemicals, as well as clothing and footwear considered as to be important since they have a very large share in commodity exports.

Table 2

Segmentation of the product groups

Segment	Number of two-digit SITC 3 group	Share in commodity exports	Trade balance (mil. US $)	Coverage ratio
First segment Px>Pm and Qx>Qm	3	32,52	123,37	236,18
Second segment Px<Pm and Qx>Qm	6	32,88	110,33	449,26
Third segment Px>Pm and Qx<Qm	15	15,72	-40,51	42,53
Fourth segment Px<Pm and Qx<Qm	22	17,47	-64,16	19,46

Source: State statistical office, NBRM and own estimates

The price competitiveness of clothing and footwear is quite favorable taking into consideration the falling share of these sectors into the European markets. Over again they are sectors with very low value added, thus not create huge revenues as it would be expected, which means that there are unexplored possibilities in this area. The third segment includes products whose export unit value is high and therefore the exported quantities are smaller than imported ones. In this segment, however, might be potentially found some products that theoretically can move into one the competitive segments. Some of them could become price competitive and increase the physical volume of exports by achieving more efficient production and optimization of transportation costs. The fourth segment comprises the largest number of product groups. Noteworthy is to mention that it is extremely uncompetitive with the highest trade deficit. The structure of this segment varies a lot. There some products with no possibilities to be sold elsewhere except on the small domestic market at prices lower than the similar imports. Namely, these commodities are produced in capacities constructed as parts of business value chains of the predecessor country which disruption imposed no other export possibilities for such products. This segment in particular also comprises products that are not to be found in Macedonian exports, as well as the ones which theoretically should have grater influence in exports (basically equipment and other final products). Although these groups of products are to be considered uncompetitive and

generate the largest part of trade deficit, it remains to be seen if the restructuring process and the possible influx of foreign direct investments may perhaps change their competitive position. That is to say, the only way Macedonia can establish an adequate structure of trade, a high level of competitiveness and appropriate foreign economic position is the possibility some products from this segment (among those that generate higher value added) to move into segments I and II and thereby obtain a significant share in exports.

Modeling the determinants of exports and imports aimed at assessing the competitiveness of the Macedonian economy

Trade equations are usually interpreted as for the time series behavior of the appropriate exports and imports quantities and prices. There is no single answer among the scholars on the possibilities these equations to be specified since those depend on number of factors, such as: type of the commodity to be traded, the final use, institutional framework, purpose of modeling, as well as the data availability. Generally the theory suggests two principle models: model of imperfect and the one of perfect substitutes (Goldstein and Khan, 1985, p. 1044).

Within this part of the study a selected set of macroeconomic variables is going to be applied so as to examine their influence on exports and imports. The analysis is to be completed for the period 1998Q1 to 2008Q3 proceeded by intensive trade and price liberalization. In addition, the selected timeframe was limited to availability of some variables before the year 1998, as well as the possible abstraction from the break imposed by 1997 devaluation. However, the total number of 43 observations allows the specific econometric approach to be applied without reflecting more significantly on reduction of the degrees of freedom. The assessment of trade equations is to be made by employing the maximum likelihood estimator of Johansen so as to estimate a long-run (cointegration) relationship between exports or imports and the appropriate macroeconomic fundamentals. This method in particular is suitable for multivariate analysis (can detect more than one cointegrating vector) and might also account for autocorrelation of the endogenous variables. One of the most important advantages over the single-equation (Engle – Granger) is the possibility to include both jointly dependant I(1) and I(0) variables (Harris and Sollis, 2003). The Johansen method goes through several steps, beginning with the Vector Auto Regression (VAR) model that is to be transformed into Vector error correction model (VECM). Thus, the lag length specification of the underlying VAR model has to be made at first. Furthermore, one should make an appropriate selection of the deterministic components intended for the long- and short-run relation among the variables. The estimation proceeds by jointly testing for cointegration and deterministic components. Finally, the restrictions have to be imposed on the cointegrating vector (s) obtained.

$$\Delta y_t = \Pi y_{t-1} + \sum_{i=1}^{p-1} \Gamma_i \Delta y_{t-i} + \mathrm{B} x_t + \varepsilon_t$$

where

$$\Pi = \sum_{i=1}^{p} A_i - I \,, \Gamma_i = -\sum_{j=i+1}^{p} A_j$$

Within the above equation, y_t stands for the k-vector of non-stationary I(1) variables (exports or imports and the respective macroeconomic determinates), x_t indicates the d-vector of deterministic variables and ε_t is a

vector of innovations. Granger's representation theorem states that if the coefficient matrix Π has reduced rank r<k, one should consider k x r matrices α and β each with rank r such that Π =αβ' and β' y_t is I(0). Additionally, r corresponds to the number of cointegrating relations (the cointegrating rank) whereupon each β column is to be considered a cointegrating vector. Special emphasis should be here placed on the elements of α known as adjustment parameters in the VEC model. In principal, Johansen's method is to estimate the Π matrix as of the unrestricted VAR and to test if one may reject the restrictions implied by the reduced rank of Π.

The analysis of exports

The econometric analysis of exports is based upon the variables which represent the basic elements of price and cost competitiveness (Jefferson Institute, 2006). Accordingly, the neo-classical economic theory special attention pays to the real exchange rate (RER) and real effective exchange rate (REER) as a measure of price competitiveness (Edwards, 1989; Lipschitz, 1979). In addition, the appreciation/depreciation of the real exchange rate of the particular country exhibits loss/gain in the levels of competitiveness (Edwards, 1989). The equilibrium real exchange rate is to be implemented as a reference to determine the currency misalignment (RER appreciation or depreciation). Principally, there are few problems related to RER as a measure of competitiveness (Minale, 2002). At first, measuring the competitiveness as a relative price may certainly narrow the definition of competitiveness. Moreover, competitiveness of the economy is not to be just a function of wages and prices (relative to other countries) but it is also greatly influenced by the non-price factors. Secondly, the intuition behind RER as a measure of competitiveness is hardly applied to developing countries which have the advanced ones as their trading partners (Minale, 2002). Implicitly, the RER definition is based upon the assumption of the tradable homogeneity, as well as availability of technology to all the countries without cost. Productivity measures are also very important to study the export competitiveness. However, competitiveness is not to be determined merely by productivity, but also cost of inputs in the production. Indeed, a well-known measure of international competitiveness combines labor cost and productivity into a single measure of labor cost per unit output. Unit labor cost (ULC) are broadly used for international comparisons of cost competitiveness but also have been compared in terms of ULC trends or the real effective exchange rate. The meaning of the ULC concept might be even better understood when expressed in terms of the ratio of labor compensation per unit of labor (wage or the total labor cost per employed person or per hour worked) and the productivity of labor (measured as output per employed person or per hour). The country may therefore improve its competitiveness either by decreasing its labor cost per person employed or raising the productivity performance. Unit labor costs are most easily measured and best understood for tradable sectors of the economy but it is also useful for analysis at the level of the aggregate economy. Noteworthy is here to mention that a change in unit labor cost in the non-tradable sector also impacts the tradable sector, in particular when non-tradable products or services are used as an input by the tradable sector. Moreover, many service industries are becoming more tradable themselves, which is an indication that the distinction between tradable and non-tradable sectors of the economy is becoming increasingly anachronistic. An exclusive focus on unit labor cost in the manufacturing industry may therefore

be a too restrictive approach to study competitiveness (van Ark, Stuwenwold et al, 2005). Even for tradable, the ULC index may not to be considered as comprehensive measure of competitiveness for several reasons. Firstly, ULC measures deal exclusively with the labor cost. Although they account for the major share of inputs, the cost of capital and intermediate inputs are to be also the crucial factors for comparisons of cost competitiveness between countries. Secondly, the measure reveals only the cost competitiveness as some durable consumer and investment goods competitiveness is also determined by other factors than costs, such as technological and social capabilities and demand factors. Thus, in the literature of competitiveness attention is given not only to the factor input, but also the innovation and production capacity (Porter, 1990; Fagerberg, 2005). The importance of export supply function is specially emphasized in the literature (Stern, Francis et al, 1976) since most of the empirical studies have not put this variable in the models handled by the assumption of infinite price elasticity. This is to be probably justified in the case of import supply as for the small open economy it is quite hard to believe that infinite price elasticity of export supply holds. Principally, if the world demand for goods coming from a certain small open economy increases, the country will be most probably unable to meet the demand without the change in export price (Goldstein and Khan, 1978). Taking into consideration the above theoretical notations the model herewith exhibits exports as a function of the real effective exchange rate (CPI based), real unit labor cost at the level of the aggregate economy, as well as the index of industrial production to capture the production capacity (Figure 8). In addition, real unit labor cost is obtained as the unit labor cost has been deflated by the producer price index. The seasonal factor from the variables has been removed by using three quarterly seasonal dummy variables.

$$EXPORTS = f(reer, real\_ULC, ind\_prod)$$

Following the proposed model of Jefferson institute the initial set of variables has included the one as a proxy for the fiscal burden of the economy. In addition, different VECM specifications were estimated. However, the fiscal burden was not a significant determinant of exports and therefore was excluded so as to avoid losing degrees of freedom. All the data are expressed in logarithmic values thus stand for the variable elasticity. Furthermore, the data for exports (nominal, dollars) are obtained by the Macedonian state statistical office. Unit labor cost and industrial production are expressed in index number and have been attained by the National Bank of Macedonia. The real effective exchange rate is obtained by the International Financial Statistics, whereupon the increase stands for the real appreciation i.e. reduction in the price competitiveness or vice versa.

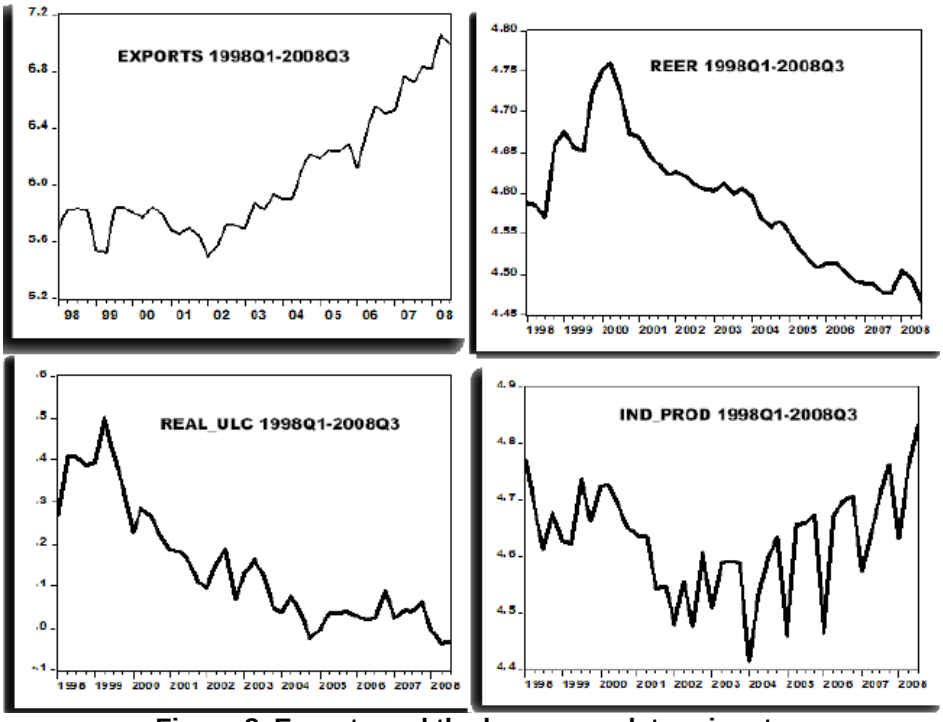

Figure 8. Exports and the long – run determinants

Prior the cointegration analysis one should apply unit root test for each series in the VAR since the test for cointegration is only valid when working with series known to be nonstationary. Thus the applied Augmented Dickey-Fuller and Phillips-Perron tests failed to reject the hypothesis of unit root at 1%, 5% and 10% level, although without intercept and trend in the case of industrial production. Furthermore, the lag order selection of the test VAR was obtained by two criteria: the residual tests, as well as the information criteria. In addition, the three seasonal dummy variables are included in the VAR model as the exogenous ones. The residual tests suggest that the most appropriate model is VAR (1), while the information criteria as expected propose different lag order (Schwarz and Hannan-Quinn information criteria indicate one lag, while Akaike information criterion suggests 4 lags). Taking into consideration the small sample, as well as the importance of residual tests the further analysis of the export regression is going to proceed with one lag included. The Johansen maximum likelihood method is applied on the set of endogenous variables, thus the next step refers to testing the number of cointegrating relations. Moreover, the procedure may be implemented by two test statistics, such as: maximum eigenvalue of the stochastic matrix and the trace of the stochastic matrix. The both statistics suggest one cointegrating vector (Table 3). Yet, the vector individual assessment does not give proper information on the economic relations, thus some restrictions have to be imposed in accordance with economic theory (Harris and Sollis, 2003). Within the case in point the vector coefficients are normalized on the coefficient of the export variable i.e. this variable is considered to be an endogenous.

Table 3

Unrestricted cointegration rank test (exports)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.677007	74.73144	47.85613	0.0000
At most 1	0.336675	27.26615	29.79707	0.0953
At most 2	0.210618	10.02558	15.49471	0.2788
At most 3	0.002197	0.092360	3.841466	0.7612

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.677007	47.46530	27.58434	0.0000
At most 1	0.336675	17.24057	21.13162	0.1609
At most 2	0.210618	9.933220	14.26460	0.2164
At most 3	0.002197	0.092360	3.841466	0.7612

Note: Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
** denotes rejection of the hypothesis at the 0.05 level*
*** MacKinnon-Haug-Michelis (1999) p-values*

In line with economic theory the very high positive coefficient on industrial production implies no infinite price elasticity for a small open economy such as the Republic of Macedonia. In other words, the exports are also led by the suppliers i.e. 1% increase of output implies an exports rise for about 3,49%. The reason behind is to be found in the revitalization of the metal manufacturing industry in 2004, the start over process of the mining factory and enhanced vine production in 2005, as well as the increased FDI inflows within the manufacturing industry (iron, steel and ferrous-nickel). The positive signals of export supply in 2008 were imposed by the higher metal price. The analysis also points towards the exports high price elasticity (REER depreciation of 1% leads to an exports increase of 2,9%). The coefficient seems to be reasonable taking into consideration the low value added products of Macedonian exports (45% of total exports). In principal, the quantitative effects dominate the price effects on long run, so the expected influence of REER depreciation on trade balance is to be observed eventually (Kipici and Kesriyeli, 1997). Namely, after the devaluation of around 16% in 1997 the real exchange rate has appreciated mostly owing to the NEER appreciation (Serbian dinar depreciation). However, the sustained appreciation has not been materialized due to the Balassa – Samuelson effect, thus REER started to decline again caused by the depreciation of the relative price of domestic to foreign tradable goods mostly with transition economies. One possible explanation of this depreciating REER-tradable trend is increasing differentiation of tradable output. Low profitability, low investment, and lack of technological enhancements have prevented Macedonian firms from producing high-value-added and high-quality goods, which also explain Macedonia's inability to improve export performance and access new markets (Loko and Tuladhar, 2005, p.3).

Table 4

Vector error correction estimates (exports)

Coint. Eq:	lexports (-1)	lind_prod (-1)	lreer (-1)	lreal_ulc (-1)	c
CointEq1	1.000000	-3.485789 (0.30737) [-11.3408]	2.926085 (0.43874) [6.66924]	1.137636 (0.24574) [462940]	-3.50853
Error Correct.	D(lexports)	D(lind_prod)	D(lreer)	D(lreal_ulc)	
CointEq1	-0.018210 (0.07667) [-0.23749]	0.250995 (0.03869) [6.48726]	-0.003662 (0.01687) [-0.21712]	-0.115618 (0.02880) [-4.01471]	
c	0.021011 (0.03307) [0.63541]	0.021515 (0.01669) [1.28944]	0.008236 (0.00727) [1.13228]	-0.037953 (0.01242) [-3.05593]	
@seas (1)	0.105369 (0.04703) [-2.24267]	-0.102215 (0.02373) [-4.30751]	-0.004020 (0.01034) [-0.38863]	0.008848 (0.01766) [0.50096]	
@seas (2)	0.083403 (0.04637) [1.79863]	0.025131 (0.02340) [1.07403]	-0.015574 (0.01020) [-1.52687]	0.090071 (0.01742) [5.17165]	
@seas (3)	0.049327 (0.04570) [1.07940]	-0.008977 ((0.02306) [-0.38930]	-0.023161 (0.01005) [-2.30401]	0.019285 (0.01716) [1.12357]	

Standard errors in ( ) and t-statistics in [ ].
Note: If the variable lexports is interpreted as a LHS one in a causal model, then the coefficient of the "RHS" variables must be multiplied by -1.

Finally, the exports exhibit an expected (in terms of the coefficient sign) but moderate elasticity to the real unit labor cost. The reason behind is to be found in the upward productivity movements caused by the GDP growth with simultaneous decline of the persons employed. Additionally, the higher productivity levels have been noted principally within the non-tradable sector that is to be not unusual considering the FDI inflows within the service sector. The higher productivity levels have been discreetly recorded within the tradable sector, however, pointing towards finalization of the reforms. Nevertheless, the productivity gains have improved the unit labor costs, thus outpaced the gross wage increases considered higher compared to the other countries in the region. The adjustment coefficient is very low heading for inertia in the movements. In other word exports should fall sufficiently to bring about 1,8% of the total adjustment needed per quarter until equilibrium is restored (Table 4). In order to examine the importance of each variable explaining the total variability of the initial VAR the variance decomposition has been made by applying the Cholesky procedure.

Table 5

Variance decomposition of the exports prognosis error

exports	62,79	62,79
reer	6,70	12,19
real_ulc	28,51	23,42
ind_prod	2,00	1,60
Total	100	100

Note: The variance of the prognosis error was decomposed after the period of 8 quarters. The unrestricted VAR of first order in levels was estimated.

As the relative contribution of the variables to the total variability depends upon the sequence of their setting into the procedure the two sequences have been established: 1) reer → real_ulc → ind_prod → exports and 2) real_ulc → ind_prod → reer → exports. According to the results obtained one may notice a significant inertia in the export movements, which is partially confirmed by the adjustment coefficient. Thus, the real unit labor cost in the first sequence explain 28,51% of total variability. The change of sequence, however, imposed an increased influence of reer, while unit labor cost has smaller share in explaining the total variability (23,42%). The change of the sequence does not significantly alter the role of industrial production, which means that it has a very stable influence in explaining the fluctuations of exports (Table 5).

The analysis of imports

As for the analysis of exports the model developed by Jefferson institute has been followed to analyze Macedonian imports. Thus, the econometric analysis performed within their study was commenced by including a set of variables presenting the import demand function. Principally, the import demand makes imports to be a function of domestic income (activity) and domestic price relative to the price of import substitutes. Thus, import demand function if assumed constant price and income elasticity may be written as follows:

$$IMPORTS=\left[\frac{P_d E}{P_f}\right]^{\lambda} Y^{\Omega}$$

whereupon, *Y* stands for the domestic income (activity), P_d is domestic price, P_f is foreign price, *E* corresponds to nominal effective exchange rate, while λ and Ω indicate the price and income elasticity of import demand, respectively. Thus, the income is expected to have positive sign, as well as the relative domestic to foreign price approximated by REER (an increase indicate REER appreciation that positively corresponds to import demand). Taking logs of the previous equation and differentiating with respect to time the imports growth might be expressed as:

$$imports=\lambda(p_d+e-p_f)+\Omega(y)$$

The partial adjustment of import demand in which import growth is assumed to adjust partially to difference between equilibrium imports growth in period *t* and the actual import growth in the previous period can be written as follows:

$$m_t=\beta_0+\beta_1 pm+\beta_2 y+\beta_3 m_{t-1}+\mu_t$$

where, β_1 is λ, β_2 corresponds to Ω (short run price and income elasticity), *pm* is the growth of domestic relative to foreign prices and μ_t is the error term.

So far, the analysis of import income and price elasticity i.e the import demand function either in developed or developing countries has been widely observed among the scholars (Khan, 1974; Goldstein and Khan, 1985; Warner and Kreinin, 1983; Haynes and Stone, 1976; Marquez, 1990). The general conclusion of the studies is that income and price elasticity are considered to be significant determinants of imports, although the price elasticity is likely to be below the income elasticity (in most studies below unit, unlike the income elasticity that has a propensity to be above unit). However, a small number of studies analyzed the impact of trade liberalization on imports behavior (Bertola and Faini, 1991). One of the earliest studies of the trade liberalization impact on import demand was obtained by Faini, Pritchett et al (1992). The authors assumed two types of imports, such as: those subject to quantitative restrictions and imports that might freely enter into the economy. They suggest that the estimated income elasticity is generally higher than unity, and the relative prices (approximated by REER) are significant with elasticity less than unity. The authors have also found that the real effects of income and price changes on import behavior are more evident when the analysis also includes the impact of import controls and/or liberalization policies. Thus, import demand studies, which do not evaluate the effect of import policy changes, should be interpreted with caution, as far as the estimates of the income and price elasticity are concerned.

Taking into account the above theoretical considerations the analysis within this paper is going to be performed as imports is considered to be a function of domestic income (economic activity), relative prices (approximated by REER) and openness, as a variable employed as a proxy for import tariffs.

IMPORTS = f(reer, GDP, openness)

Additionally, all the data are expressed in logarithmic values thus stand for the variable elasticity. The seasonal factor from the variables GDP and imports were removed by the conventional methods for seasonal adjustment (Census X12, multiplicative). Furthermore, the data for imports (nominal, dollars) are obtained by the Macedonian state statistical office. The degree of openness is a variable computed as a ratio of foreign trade and GDP. Moreover GDP is considered as a variable representing the domestic income (economic activity). The data on GDP (in millions of national currency, 1997=100) has been obtained by the Macedonian state statistical office. Yet, for the purpose of this analysis it has been converted to dollars using the average exchange rate on monthly base for the particular period obtained by the National bank of Macedonia. The real effective exchange rate is obtained by the International Financial Statistics, whereupon the increase stands for the real appreciation i.e. rise in imports (Figure 9). As in exports the unit root test for each series in the VAR has preceded the cointegration analysis. Thus the applied Augmented Dickey-Fuller and Phillips-Perron tests failed to reject the hypothesis of unit root at 1%, 5% and 10% level. Furthermore, the lag specification of the test VAR was also obtained by two criteria: the residual tests, as well as the information criteria. The residual tests suggest that the most appropriate model is VAR (1), while the information criteria as expected suggest different lag order (Schwarz information criterion indicate one lag, Hannan-Quinn proposes 2 lags, while Akaike information criterion suggests 4 lags).

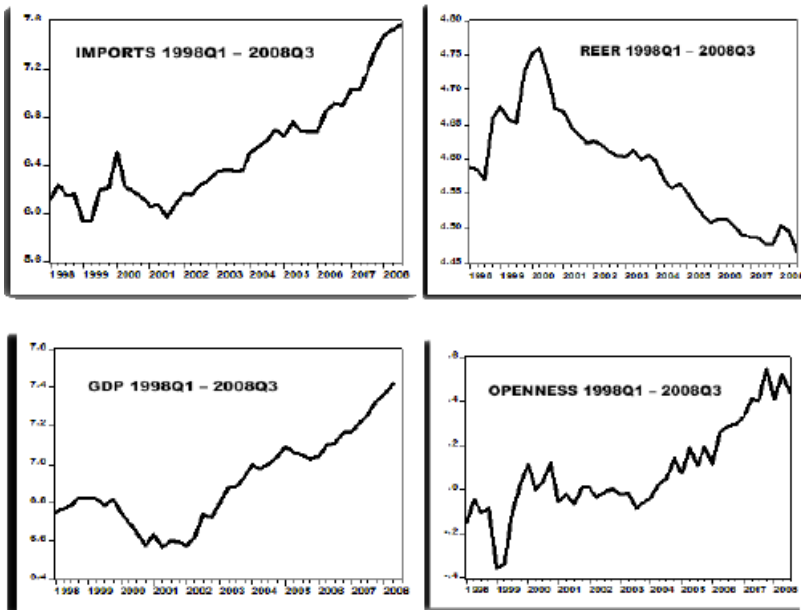

Figure 9. Imports and the long – run determinants

Taking into consideration the small sample, as well as the residual tests suitability for VAR (1) the further analysis is going to proceed with one lag included. As the Johansen maximum likelihood method is applied on the set of endogenous variables, the number of cointegrating relations has to be estimated. Subsequently, the two test statistics recommend one cointegrating vector (Table 6).

Table 6

Unrestricted cointegration rank test (imports)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.590963	61.73256	47.85613	0.0015
At most 1	0.337112	25.08061	29.79707	0.1586
At most 2	0.175400	8.223513	15.49471	0.4418
At most 3	0.007687	0.316366	3.841466	0.5738

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.590963	36.65195	27.58434	0.0026
At most 1	0.337112	16.85710	21.13162	0.1788
At most 2	0.175400	7.907147	14.26460	0.3882
At most 3	0.007687	0.316366	3.841466	0.5738

Note: Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
** denotes rejection of the hypothesis at the 0.05 level*
*** MacKinnon-Haug-Michelis (1999) p-values*

Finally, vector coefficients within the import equation are normalized on the coefficient of the import variable i.e. this variable is considered to be as endogenous. As expected in economic theory explained above, Macedonian imports exhibit positive income elasticity above unit i.e. 1% GDP increase imposes 1,12% rise in imports. In principal, the economic activity in the Republic of Macedonia has undergone two external shocks (1999 and 2001). The both of them have determined a certain decrease in the economic activity, especially within the production to be exported, as well as the gross capital formation. The increased economic activity has been recorded in the year 2000 owing to the reforms performed within the fiscal policy. The value added tax implementation had a positive impact on net exports, but also accelerated the private consumption and investment. One of the highest rates of economic activity was noticed in 2005 (4% GDP increase) principally due to the increased domestic demand and exports. At the same time a certain rise has been noticed in the gross fixed capital formation (capital goods), as well as the private consumption owing to the increased wages, credits and retail.

Table 7

Vector error correction estimates (imports)

Coint. Eq:	limports (-1)	lGDP (-1)	lopenness(-1)	lreer (-1)	c
CointEq1	1.000000	-1.121499 (0.07456) [-15.0419]	-1.109049 (0.06968) [-15.9158]	-0.698609 (0.19931) [-3.50521]	4.547053
Error Correction:	D(limports)	D(lGDP)	D(lopenness)	D(lreer)	
CointEq1	-0.289170 (0.25893) [-1.11681]	0.332638 (0.09155) [3.63337]	0.247394 (0.22201) [1.11436]	-0.025159 (0.05671) [-0.44363]	
c	0.034142 (0.01709) [1.99834]	0.016145 (0.00604) [2.67263]	0.016334 (0.01465) [1.11499]	-0.002228 (0.00374) [-0.59550]	

Standard errors in ( ) and t-statistics in [ ].
Note: If the variable limports is interpreted as a LHS one in a causal model, then the coefficient of the "RHS" variables must be multiplied by -1.

The particular tendency continued in 2007 when the improved terms of trade and remittances boosted incomes and domestic demand. The favorable chocks, however, have been reversed by the end of 2008. The Republic of Macedonia is overall a small country highly dependent upon different kind of goods to be imported (on average 65% production materials, 12% capital goods and 23% consumption goods). The particular situation, as well as the high levels of trade liberalization imposed by the reduction of many trade barriers due to the WTO accession and free trade agreements stipulate very high openness to trade. That is to be confirmed by the positive coefficient that indicate 1,11% rise in imports for a unit increase in openness. The situation is quite expected taking into consideration the ratio "import/GDP" that has been running from 53% in 1998 to 72% in 2008. On the other hand, imports impose low levels of price elasticity (0,7% increase in imports at REER

appreciation of 1%). Taking into consideration that Macedonia is a small open economy highly dependent upon imports on intermediary and investment goods (in average 77% of total imports) coefficient is considered to be quite reasonable. That is to say, Macedonia has increased the imports for energy and oil in 2007 and 2008 although their price on world markets has recorded a certain increase (Table 7). The adjustment coefficient is moderately high i.e. imports should fall sufficiently to bring about 29% of total adjustment needed per quarter until equilibrium is restored (90% of total adjustment might be achieved within one year and half).

Since it is very difficult to interpret the estimations of VAR parameters the method of variance decomposition has been also applied in order to examine each variable contribution to total variability of imports. Thus, two sequences have been used for the decomposition procedure of the estimated prognosis after the period of two years: *1) GDP → reer → openness → imports and 2) reer → GDP → openness → imports* (Table 8).

Table 8

Variance decomposition of the imports prognosis error

Estimating the random shocks in the variable of the initial VAR	The first sequence in the variables (%)	The second sequence in the variables (%)
imports	18,38	18,38
reer	39,72	31,95
openness	38,35	38,35
GDP	3,56	11,32
Total	100	100

Note: The variance of the prognosis error was decomposed after the period of 8 quarters. The unrestricted VAR of first order in levels was estimated.

According to results obtained it may be noticed a certain change in explanation of total variability in different sequences only in the case of GDP and REER, while imports and openness are to be quite stable while explaining the fluctuations. Thus, the import fluctuation after the two year period are explained 18,38% by its own variance and 38,35% by the variance of the openness indicator .

Conclusions

Within the past decade Macedonian total exports have fallen as a percentage of the world totals, while increase has been noticed in most of the sectors the country is being export concentrated. These sectors in particular are those with decreasing share into European manufacturing exports, as one of the main trading partners. As exports and productivity fall the current account deficit exposed vulnerabilities in coverage ratio and external debt. Additionally, the measures on qualitative aspects of competitiveness indicate that most of the Macedonian trading sectors belong to the out priced segment or the one with structural problems. Finally, the trade equations have exhibit the major sensitivity to the assumptions about the income elasticity of exports and imports. Exports are also dependent upon the REER movements, unlike imports which are responsive to the certain shifts of openness indicator. Exports explicitly show a high inertia in their movements. Put differently, exports should fall sufficiently to bring about 1,8% of the total adjustment needed per quarter until equilibrium is restored. In principal, the both sequences used to examine

the influence of random shocks within the variables after the period of two years indicate higher levels of REER and real unit labor cost in explaining the total variability unlike the industrial production that remains quite stable. On the other hand, imports prove faster adjustment to the equilibrium level. Additionally, GDP and REER exhibit some changes in explanation of total variability after 8 quarters, while openness indicator is quite stabile at explaining the certain imports fluctuations.

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