Changing patterns of export of goods versus macroeconomic competitiveness. A comparative analysis for East-Central European countries in the period 2000-2011.

Lechman, Ewa

Gdansk University of Technology

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Ewa Lechman*

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Abstract:
The paper discusses existing links between changing patterns of export of goods broken down by technology-intensity *versus* macroeconomic competitiveness. The study covers nine East-Central European economies: Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania and Slovak Republic, in the time span 2000-2011. We hypothesize on discovering strong, positive and statistically significant relationship between flows of export of high-tech and ICTs manufactures goods, and level of macroeconomic competitiveness (approximated by Global Competitiveness Index – GCI, see: World Economic Forum). Our methodological approach relies on elaboration of country`s individual export patterns with regard to industries of different technology-intensity, and statistical analysis between macroeconomic GCI variable and variables identifying shares in total export of certain industries. Reversely to what was initially expected, our empirical results do not seem to support the hypothesis on statistically positive links between growing shares of high-tech and ICT manufactures industries in total value of export versus Global Competitiveness Index, in analyzed countries.

* Ph.D. in Economic Science. Faculty of Management and Economics, Gdansk University of Technology.

1. Introduction.

Over last two decades, transition economies have undergone tremendous structural changes on various grounds. Process of liberalization, deregulation of markets and privatization, increased pressure on introducing East-Central European countries into global economy, forcing these countries not only to invest and acquire foreign investment inflows, but also boost volume and value of export. After 1989, most of the former 'Soviet countries' have lost their leading trading partners. This determined diametric reorientation in export markets, and required substantial improvements in quality of goods and services offered abroad. Quality adjustments resulted in shifts in technologies used in different industries. By entering investment-driven phase of economic development, these countries were forced to base its international competitiveness on growing productivity, efficiency, assimilate newly emerging technologies and innovations, to become their production of goods and services more sophisticated and demand-oriented. In transition economies, investing in new technologies, is perceived as enabler of shifting from low-, to high-added value industries (Roztocki&Weistroffer, 2008), which generates economic growth and creates conditions for gaining competitive advantages both in relative and absolute terms. Additionally, new technologies may be used to support macroeconomic competitiveness by growing shares on global export markets.

According to World Economic Forum (2012), international competitiveness can be described as *"the set of institutions, policies, and factors that determine the level of productivity of a country"*[1]. Growth of macroeconomic competitiveness remains one of the most important aspects on the field development economics, as it drives increases in country`s productivity and enhances socio-economic progress and stability. J. Schumpeter (Schumpeter 1934) underlines that technological progress is treated as important determinant of country`s ability to develop in a long-run perspective. In that sense, technology and macroeconomic competitiveness are interrelated, having strong impact on one another.

The paper consists of five essential parts. In section two, followed by introductory part, we present conceptual framework combining issues of macroeconomic competitiveness and export of goods broken down by technology-intensity. Section three explains empirical targets and data applied in the analysis, and section four contains empirical analysis outcomes. The last part concludes and show further research directions.

[1] The Global Competitiveness Report 2012-2013 (Klaus Schwab, Global Economic Forum), 2013.

2. Theoretical framework.

Notion of macroeconomic competitiveness is ambiguous. By many it is directly associated with overall economic performance, but – on the other hand, it is often perceived a factor driving economic growth (Nicoletti *et al.,* 2003; Porter, 2006; Fagerberg *et al.* 2007). Taking into account different perspectives, macroeconomic competitiveness is linked with low cost of labor or attractive geographic location for new investments (Spencer, 2008). It captures multitude of dimensions covering issues associated with employment, productivity, economic growth and income inequalities, level of education, political freedom, ability to assimilate innovation, and finally trade openness. Country`s openness to international competition, fosters increases in capital and labor productivity, technology transfers and accessing new knowledge (Bernard *et al.,* 2007). All these mentioned above are acquirable by using international trade channels which influence positively country`s innovativeness, but – at the same time – it pushes country`s industries to international exposure, forcing enterprises to compete on globalized market. Positive effects of broad internationalization leading to growth in macroeconomic competitiveness – *via* trading – have been reported in broad array of studies (Alcala *et al.,* 2004; Dollar *et al*., 2003; Rodriguez *et al.* 2000). OECD`s definition of macroeconomic competitiveness combines it with country`s ability to trade goods in global market (OECD 2005). Trabold (1995) states that *"ability to sell in terms of international competitiveness means the ability to export. Market shares on the main export markets and changes over time can be taken as the basic indicators of international competitiveness"* (see Transnational Corporations, UNCTAD/ITE/IIT/27 (Vol.10, No.2), 2001). Differentiating in trade patterns deeply depends on country`s ability to assimilate and use new technologies, national economy elasticity and dynamism, or availability of high-skilled labour force. As Lall claims (Lall, 2000), crucial differences in export patterns broken down by technology-intensity of industries are only to be explained by difference in "national learning capabilities". Technology and technological capabilities might be strong determinants of growth in macroeconomic competitiveness. Technological advancement radically reshapes ways of competition, constituting a great "promise" for lagging behind economies. New technologies diffusion enables reduction in cost of physical (geographical) and economic distance. Enterprises are enhanced for permanent improvement and technologically upgrading on the field of production of goods and services, intensifying intra-, and international trade flow. Furthermore massive diffusion and adoption of new technologies by industrial sectors determines changes in patterns of international trade. Breaking down industries by technology and R&D intensity level, accounts for common trends of growing relative importance of high-technology industries and ICT manufactures, while medium-

low technology and low-technology industries` shares in country`s global export should potentially decrease.
Additionally, lots of concepts (i.e. Leontief, 1953; Posner, 1961; Cantwell, 1989; Dosi *et al.,* 1990) link macroeconomic competitiveness with international trade flows, which are affected by technological progress. The idea of massive role of technology and trade in growth of country`s competitiveness lies behind the neo-Schumpeterian concepts, where changing patterns of international trade – treated as a proxy of macroeconomic competitiveness – are a direct consequence of interactions between innovation and technologies diffusion on global market. Following the Schumpeterian approach, we assume that existence of absolute differences in technology level of countries influences significantly its export performance, influencing macro-competitiveness. Dosi *et al.*(1990 state that differences in technological advancement particularly influence market share of country on world export markets (Narula&Wakelin, 1993), while country`s trade position is a "product" of country`s absolute advantage with regard to its competitors (other countries). Such empirical evidence is reported in works of Fagerberg (1989), Amable and Verspagen (1995). They claim that existing technology gaps among countries differentiate export of goods and service, influencing macroeconomic competitiveness. Similar conclusions can be derived from works of Chesnais (1992), Dunning (1993) or Wood (1994). Empirical evidence provided by Hatzichronoglou (1997), Buiter (1995), Carlyn, Glyn *et al.* (2001) and Lopez (2005), show that growth of exports correlates positively with competitiveness, while huge part of the export dynamics is conducted by dynamics of high-technology industries (high-tech export).

In broad conceptual framework, macroeconomic competitiveness can be seen through lens of productivity, costs and market shares (Porter *et al.* 2012). To complete our analytical targets we deploy the concept which explains macroeconomic competitiveness through increasing/decreasing market shares. It is then assumed that countries tend to benefit in macroeconomic competitiveness growth and their companies gain new markets (Hausmann *et al.,* 2006; MacGarvie, 2006). Following the logic one country can only improve its macroeconomic competitiveness at the cost of another country (Fagerberg *et al.,* 2007). Such concept implies that macro-competitiveness refers to country`s ability to gain better position in the "play" on global markets, which should potentially lead to wealth creation (Aiginger, 2006).

3. Empirical targets and data.

Main goal of the study is twofold. Firstly, we aim to uncover substitution effects with regard to export patterns in high-tech/medium-high-tech export *versus* medium-low-tech/low-tech export of goods. Secondly, statistical links are tested

between following pairs of variables: high-tech export and Global Competitiveness Index; ICT manufactures and Global Competitiveness Index; low-tech export and Global Competitiveness Index.

To achieve our goals, we adopt a sample covering nine East-Central European countries, namely: Bulgaria (BG), Czech Republic (CZ), Estonia (EST), Hungary (HU), Latvia (LV), Lithuania (LT), Poland (PL), Romania (RO) and Slovak Republic (SK), over 11-year period (2000-2011). All nine selected countries are post-communist economies, relatively homogenous in kind, which makes inter-country comparisons rationale. Data on country`s export are derived from OECD STAN[2] Bilateral Trade Database by Industry and End-use Category (BTDIxE). All statistics report exclusively on value of export of goods[3] (in current US dollars) broken down by industry technology-intensity level. Therefore, export of goods is classified in four industrial categories: high technology industries[4] $(HTInd_{i,j})$, medium-high technology industries $(MHTInd_{i,j})$, medium-low technology industries $(MLTInd_{i,j})$, and low technology industries $(LTInd_{i,j})$, where i – denotes country, and j – year. Additionally, we deploy data on export of Information and Communication Technology (ICT) Manufactures $(ICTMan_{i,j})$.

To assess macroeconomic competitiveness of countries, we apply an index developed by World Economic Forum (WEF) – Global Competitiveness Index that was introduced in year 2006. In 2006, WEF has changed an algorithm to calculate macroeconomic competitiveness index. To assure in-time comparability we exclusively analyze the period 2006-2011 with regard to relationship between value of export of goods and macroeconomic competitiveness in analyzed countries.

4. Export of goods and macroeconomic competitiveness – an evidence for East-Central European countries.

In the following section, we analyze changing patterns of export of goods broken down by technology intensity, in nine East-Central European countries. We report on trends in changing shares of industries ($(HTInd_{i,j})$, $(MHTInd_{i,j})$, $(MLTInd_{i,j})$, $(LTInd_{i,j})$, $(ICTMan_{i,j})$) in total value of export ($TotEXP_{ij}$) in each country separately. Plotting separate export patterns for each country individually allows assessing each variables behavior in time. In case of high-technology industries $(HTInd_{i,j})$ and ICT Manufactures $(ICTMan_{i,j})$, it is expected to uncover significant growth in share of total export of goods. We also expect to detect that decreasing shares of low-technology industries in

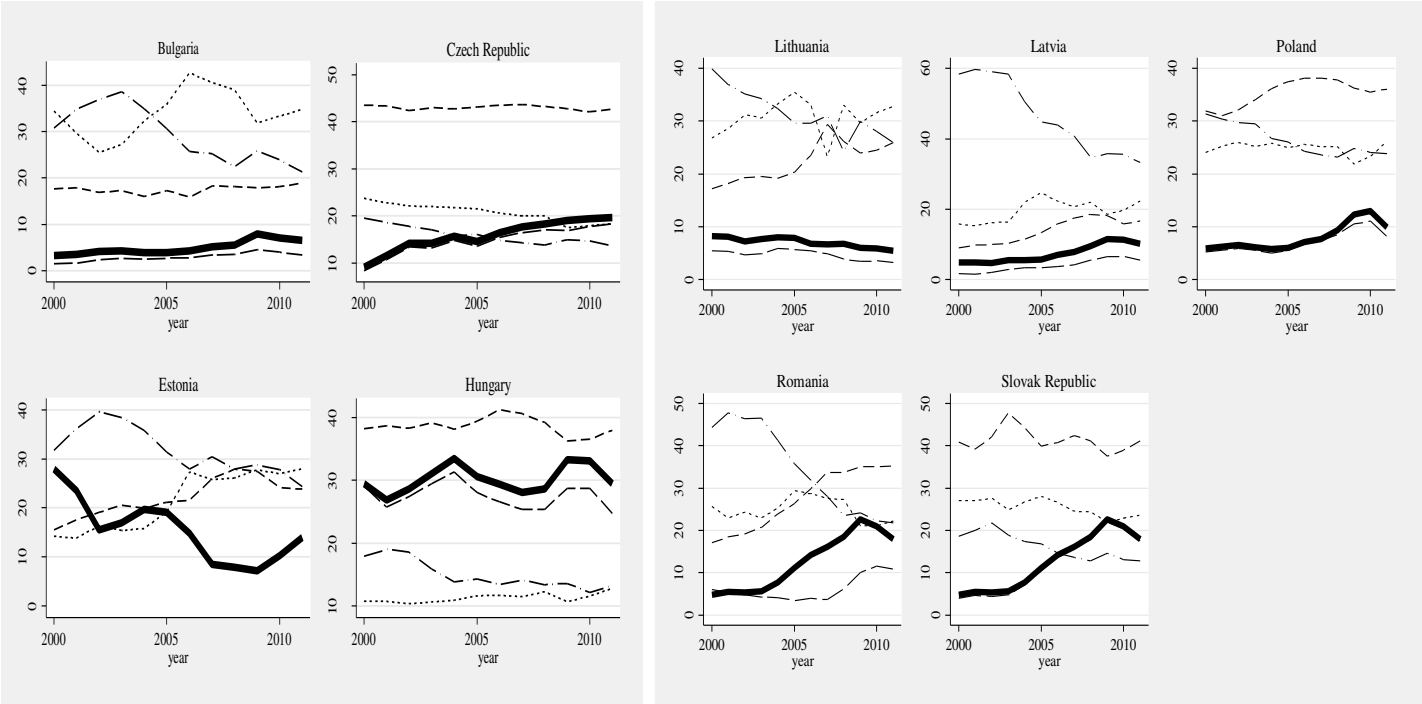
[2] STAN – Structural ANalysis Databes provided by OECD (www.oecd.org)
[3] Refers to value of export of goods to all international trading partners.
[4] For details see Appendix 1.

(TotEXP$_{ij}$), total value of export should be substituted by export of high-technology and medium-high-technology goods.
Chart 1 (see below) describes patterns of export of goods in 9 selected countries. Patterns showing changes in high-tech export of goods are marked as solid line. Clearly, in 2000, the best performing countries in terms of HTInd/TotEXP$_{ij}$ were Hungary and Estonia, where the shares were respectively: HTInd/TotEXP$_{Hungary,2000}$=29,5%, and HTInd/TotEXP$_{Estonia,2000}$=27,9%. However in Hungary the share of HTI$_{ij}$/TotEXP was relatively stable in the analyzed 11-year period (in 2011, the value for Hungary was HTInd/TotEXP$_{Hungary,2011}$=29,5%). In Estonia we notice significant drop in share of HTI$_{ij}$ in total value export of goods, and finally in 2011 – HTInd/TotEXP$_{Estonia,2011}$=13,9%. In Estonia, also a negative trend is observed in case of ICT Manufactures, as export path strictly follows high-technology industry sector. Starting from the 2006, shares of medium-high technology industry and medium-low technology industry in TotEXP$_{Estonia,j}$, are significantly higher. Such changes are not accounted as positive, as they do not create preferable relations in Estonian export markets. It is possible that such disadvantageous situation in Estonia is a consequence of economic crisis that the country had to face in the last decade. Again it proofs volatility of Estonia export, and high exposure on external shocks. In the period 2000-2011, Hungary managed to maintain high share of high-tech industry in total export of goods, keeping analogically good scores in 2011. In the analyzed years, Hungary was the best performing country, both in terms of HTInd/TotEXP$_{Hungary,2000-2011}$ and ICTMan/TotEXP$_{Hunagry,2000-2011}$, which can be confronted with relatively lowest share of low-technology industries in total export of goods, both in 2000 and 2011[5]. It shows that Hungary`s relative position with regard to export of goods is stable (for detailed numbers see Table 1). Additionally, in Hungary, the evolvement of all 5 industry-related exports of goods patterns is highly simultaneous, which proofs invariant development path of national economy, and relatively good resistance for external disturbances. Different findings are reported for Bulgaria, Czech Republic, Latvia, Lithuania, Poland, Romania and Slovak Republic. Overall comparative analysis of export patterns reveals their high heterogeneity and instability in time. Export structures, broken down by different technology-intensity industries, are differentiated and extrapolated trends report on their substantial in-time variability. In Slovak Republic, Czech Republic and Romania significant increases in shares in total value of export are reported for high-technology industries. In 2000, the share of *HTInd$_{i,j}$* in total export of goods were respectively: *HTInd/TotEXP$_{SlovakRep,2000}$*=4,75%,

[5] In 2011, analogous low share of LTInd/TotEXP$_{i,j}$ is noted for Slovak Republic (12,8%), and Czech Republic (13,7%).

$HTInd/TotEXP_{CzechRep,2000}$=9,1%, and $HTInd/TotEXP_{Romania,2000}$=6,0%; while in 2011, the analogous values are reported as: $HTInd/TotEXP_{SlovakRep,2011}$=17,9%, $HTInd/TotEXP_{CzechRep,2011}$=19,6% (in 2011 Czech Republic was the second leading economy in the group in terms of $HTInd/TotEXP_{i,j}$, and finally $HTInd/TotEXP_{Romania,2011}$=10,9%.

Chart 1. Trade patterns of export of goods broken down by industry technology-intensity. Central-East European countries. Period 2000-2011.



Source: own elaboration based on data derived from OECD STAN Bilateral Trade Database by Industry and End-use Category (BTDIxE). Note: solid line presents high-tech industries export pattern; on vertical axis – shares of industries in total value of export of goods.

Table 1. Shares of export of goods (%) – by industries – in country`s total export value, and Global Competitiveness Index scores. Years 2000, 2006 and 2011.

	2000						2006					
	High-tech industries	*Medium-high-tech industries*	*Medium-low-tech industries*	*Low-tech industries*	*ICT manufactures*		*High-tech industries*	*Medium-high-tech industries*	*Medium-low-tech industries*	*Low-tech industries*	*ICT manufactures*	*Global Competitiveness Index*
Bulgaria	3,3	17,7	34,5	30,8	1,5		4,3	15,9	42,7	25,7	2,8	3,96
Czech Rep	9,1	43,6	23,7	19,5	8,4		16,4	43,5	20,6	14,9	15,5	4,74
Estonia	**27,9**	15,5	14,2	31,8	**27,8**		**14,8**	21,5	27,4	**27,9**	15,0	5,12
Hungary	**29,5**	38,2	10,7	17,9	**29,0**		**29,3**	41,2	11,7	13,4	**26,6**	4,52
Latvia	4,9	9,1	15,8	**58,3**	1,8		7,1	15,8	22,3	**43,8**	3,8	4,57
Lithuania	8,2	17,2	26,8	39,9	5,4		6,9	23,5	33,1	29,7	5,5	4,53
Poland	6,0	32,0	24,0	31,3	5,2		7,1	38,2	25,6	24,3	6,9	4,3
Romania	6,0	17,1	25,7	**44,3**	5,5		4,0	29,8	28,7	24,3	4,3	4,02
Slovak Rep	4,7	40,9	27,0	18,7	3,9		14,2	40,8	26,6	14,6	13,7	4,55
	2011											
	High-tech industries	*Medium-high-tech industries*	*Medium-low-tech industries*	*Low-tech industries*	*ICT manufactures*	*Global Competitiveness Index*						
Bulgaria	6,5	18,9	34,8	21,3	3,4	4,27						
Czech Rep	**19,6**	42,8	18,4	13,7	**18,3**	4,51						
Estonia	13,9	23,8	28,0	24,3	13,6	4,64						
Hungary	**29,5**	38,0	12,8	13,2	**24,8**	4,3						
Latvia	10,3	16,6	22,3	**33,3**	5,6	4,35						
Lithuania	5,5	25,9	32,8	**26,0**	3,2	4,41						
Poland	9,9	36,1	26,2	23,9	8,2	4,46						
Romania	10,9	35,2	22,2	23,9	10,2	4,07						
Slovak Rep	17,9	41,1	23,7	12,8	17,5	4,14						

Source: estimates based on raw data derived from OECD STAN Bilateral Trade Database by Industry and End-use Category (BTDIxE).

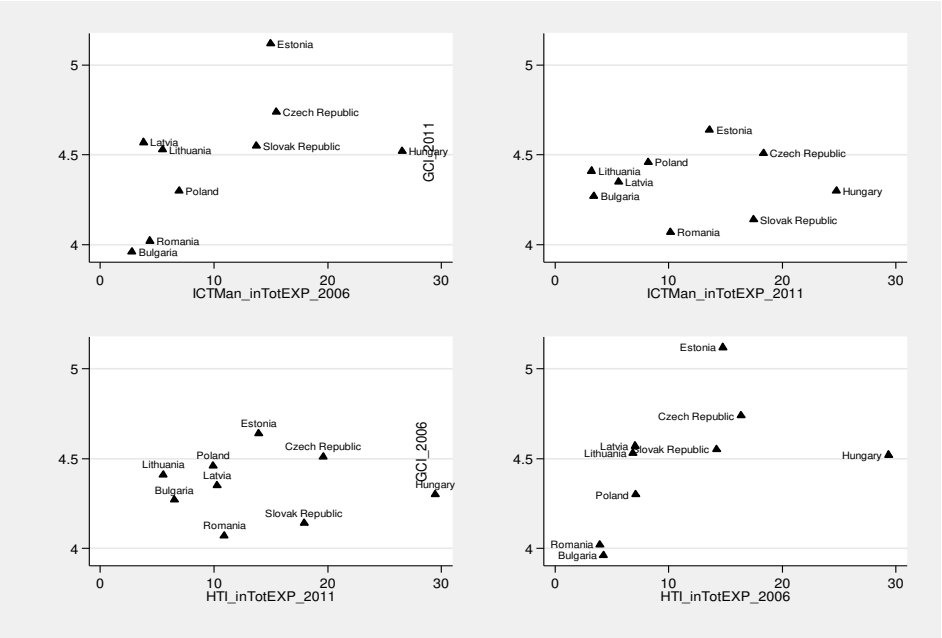
Note: Industries classified according to technology-intensity. Scores for Global Competitiveness Index – exclusively for 2006 and 2011 (not available before).

In Bulgaria, Lithuania, Latvia and Poland, the share of high-tech industries in total export of goods remained at relatively low level. Analogously poor results repeat when ICTMan/TotEXP$_{i,j}$ variable is taken into account.
Tracing countries` individual trade patterns in all economies, the specific substitution effects are displayed. Different dynamics in exports, shape trade patterns differently with regard to certain industries. These imply substitution effects in changing shares of divers industries in country`s total export value, which can be identified (see Chart 1) in Bulgaria, Estonia, Lithuania, Poland, Romania and Slovak Republic. In Bulgaria it is demonstrated that in 2004 and 2005 medium-low tech and low-tech industries they substitute one another, as shares of MLTInd/TotEXP$_{Bulgaria,j}$ were rising, and falling for LTInd/EXP$_{Bulgaria,j}$. In Lithuania it is observed a definite substitution of low-tech industries by medium-low-tech industries (year 2004), in Poland – 3-time substitution between low-tech industries and medium-low-tech industries (finally the effect is not stable, and possibly not permanent), in Romania – a definite substitution between low-tech industries and medium-high-tech industries (year 2007), finally in Slovak Republic – a definite substitution between low-tech industries and high-tech industries/ICT Manufactures (year 2007).

In the second part of our empirical analysis, we check for the relationships between HTInd/TotEXP$_{ij}$, ICTMan/TotEXP$_{ij}$ and level of macroeconomic competitiveness of countries is identified. As recognized in the previous section, the data coverage – both including time and number of countries, is highly limited, which suggests that results obtained from econometric modeling might be misleading. For this we arbitrary exclude econometric approach from our empirical evidence. Alternatively, interactions between selected variables are captured using graphical approximation; as such approach allows assessing existing relationships straightforwardly. We hypothesize on uncovering positive and statistically significant relationships between values of HTInd/TotEXP$_{ij}$, ICTMan/TotEXP$_{ij}$ and GCI$_{ij}$ variables.
Charts 2 and 3, plot sequent pairs of variables: Chart 2 – GCI$_{i,2006}$ *versus* HTInd/TotEXP$_{i,2006}$; GCI$_{i,2011}$ *versus* HTInd/TotEXP$_{i,2011}$; GCI$_{i,2006}$ *versus* ICTMan/TotEXP$_{i,2006}$ and GCI$_{i,2011}$ *versus* ICTMan/TotEXP$_{i,2011}$; Chart 3 – GCI$_{i,2006}$ *versus* LTInd/TotEXP$_{i,2006}$ and GCI$_{i,2011}$ *versus* LTInd/TotEXP$_{i,2011}$. According to the empirical evidence, the hypothesis on existence statistically significant and positive relationship between level of share of high-technology industries in total export of goods and macroeconomic competitiveness has to be rejected. In Chart 2, dots referring to countries are highly scattered both for 2006 and 2011 (the correlation coefficients for 2006 and 2011 are respectively: r^2=0,25 and r^2=0,0004).

Paradoxically, in the period 2006-2011, macroeconomic competitiveness measured by $GCI_{i,j}$ has dropped in 6 analyzed countries (out of 9). Declining achievements in terms of value of macroeconomic competitiveness were accompanied by constant increases in export shares of high-technology industries in 7 out 9 analyzed cases. Four countries: Czech Republic, Hungary, Latvia and Slovak Republic, have experienced slight decreases in $GCI_{i,2006\text{-}2011}$, while the $HTInd/TotEXP_{i,2006\text{-}2011}$ have increased. Only Bulgaria, Poland and Romania accounted for increases in $GCI_{i,2006\text{-}2011}$ in the period 2006-2011, while the value of $HTInd/TotEXP_{i,2006\text{-}2011}$ was changing in the same direction. Bulgaria was the country which made relatively greatest progress in terms of macroeconomic competitiveness - in 2006 the $GCI_{Bulgaria,2006}$=3,96, and 5 years later: $GCI_{Bulgaria,2011}$=4,27. The dynamics of $HTInd/TotEXP_{Bulgaria,2006\text{-}2011}$ was at about 8,34% annually[7], achieving the second best score in the group.

Chart 2. High-technology industries and ICT Manufactures industries (shares of total national export) and Global Competitiveness Index. Years 2006 and 2011.



Source: authors own elaboration based on data derived from OECD STAN Bilateral Trade Database by Industry and End-use Category (BTDIxE) and World Economic Forum statistics. Note: on X axis – shares of $HTI_{(i,j)}$ and $ICTMan_{(i,j)}$ in total value of export of goods.

[7] Author`s own estimates based on time trends.

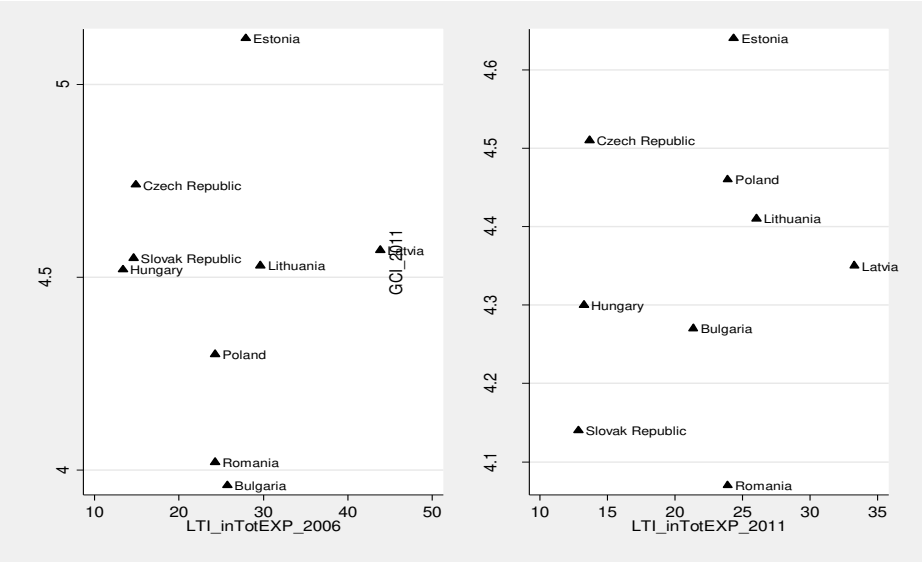
The best performing country, in terms of $HTInd/TotEXP_{i,2006\text{-}2011}$ dynamics, was Romania with the average annual growth of approximately 20,23%. Relatively best scores achieved by the two relatively weakest countries in the sample, is probably caused by the catching-up effect that these countries are experiencing. Very low initial levels of $HTInd/TotEXP_{i,j}$ enhanced faster growth than in initially "richer" economies.

As might be expected, quite analogous conclusions can be derived when analyzing plots in Chart 3. They explain relationships between variables $ICTMan/TotEXP_{i,j}$ and $GCI_{i,j,}$ again in 2006 and 2011. Correlation coefficients are statistically insignificant and low: in 2006 – r^2=0,27, and in 2011 – r^2=0,000, which disable us to uncover any statistical regularities between the variables. In case of Estonia, Hungary and Lithuania, the variables changes in value follow similar paths. Additionally drops, both in global competitiveness and export shares of goods delivered by ICT Manufacturing industry, are reported. However the most tremendous fall occurred in Lithuania, while in 2006 – $ICTMan/TotEXP_{Lithuania,2006}$=5,5%, and in 2011 – $ICTMan/TotEXP\text{-}_{Lithuania,2011}$=3,2%.These changes were accompanies by slight decrease in GCI value ($GCI_{Lithuania,2006\text{-}2011}$=(-0,12)%pp), comparing it to Estonia ($GCI_{Estonia,2006\text{-}2011}$=(-0,48)%pp), and Hungary ($GCI_{Hungary,2006\text{-}2011}$=(-0,22)%pp). Results for Czech Republic, Latvia or Slovak Republic may be confusing. In following countries we observe growth of export in ICT Manufacturing sector in total export value, which opposites with falls in macroeconomic competitiveness. Most significant and dynamic changes in ICT Manufacturing sector are reported for Romania, which accounts for 5,8%pp growth of $ICTMan/TotEXP_{Romania,2006\text{-}2011}$. However this seems to have no significant impact on macroeconomic competitiveness growth of Romania.

Chart 3, explains relationships between export shares of low-technology industries ($LTInd/TotEXP_{i,j}$) and macroeconomic competitiveness ($GCI_{i,j}$). Led by general intuition, again, we expected to find statistically significant and negative correlation coefficients. Reversely, in both years (2006 and 2011), the coefficients are like: r^2=0,000 (in 2006) and r^2=0,028 (in 2011)[8]. In the analyzed period 2006-2011, in each country downward trends reporting on $LTInd/TotEXP_{i,j}$ are revealed. Except Latvia (see Chart 1), low-technology industries are substituted by industries of higher technology-intensity. The process however positive in its nature, seems to have no significant impact on macroeconomic competitiveness growth measured by Global Competitiveness Index.

[8] Regressing GCI on LTInd/TotEXP, both for 2006 and 2011, the coefficients are positive, but statistically insignificant.

Chart 3. Low-technology industries (shares of total export value) and Global Competitiveness Index. Years 2006 and 2011.



Source: authors own elaboration based on data derived from OECD STAN Bilateral Trade Database by Industry and End-use Category (BTDIxE) and World Economic Forum statistics. Note: on X axis – shares of $LTI_{(i,j)}$ in total value of export of goods.

Obtained empirical results, differ dramatically from what was initially expected. We hypothesized on identifying significant and positive relationships between development of high-technology industries and ICT Manufacturing sector, and country`s global competitiveness. But relying on our analysis outcomes one should conclude just the opposite. Such results odd with general economic intuition, and may seem to be paradoxical. It is hard to admit that growth in export of high-tech industries has no impact on macroeconomic competitiveness.

However, our *"strange"* results may be a consequence of four aspects. Primary, geographic and time coverage was very limited, which resulted in very few observations. Secondly, the measure of macroeconomic competitiveness – $GCI_{i,j}$, is highly complex, covering multitude of different variables, which affects negatively its in time variability. Thirdly – selected countries are highly specific. In former "transition countries", some trends observed in national economies are direct result of dynamic structural adjustment that these countries need to undergo to catch-up with highly developed economies. Additionally, trade patterns depend not only on current country`s individual endowments, but

are conditioned by wide bundle of different – often exogenous factors. High vulnerability and lack of ability to resist external shocks, constitutes an obstacle for entering stable development path. Fourthly – the period taken into consideration (2006-2011) was highly unstable due to economic crisis spread across the world. The turmoil had disrupted development process, which was especially serious in case of Estonia. All imperfections listed above, account for significant lack of robustness of final results presented in the empirical part.

5. Concluding remarks.

The main aim of the paper was to check for intensity of changes in trade patterns of nine Central-East European countries over the period 2000-2011, concentrating exclusively on export of goods classified by technology-intensity industries level. Referring to traditional concepts that technological progress explains international trade flows and national competitiveness, we also targeted to identify the response to changing trade patterns on macroeconomic competitiveness, measured by Global Competitiveness Index. Our empirical results rejected the hypothesis on existence positive links between growth of exports in technology-intensive industries and macroeconomic competitiveness in analyzed countries. However obtained outcomes shall be interpreted with cautious. Trade patterns uncovered in each country, show that technological changes impact positively international trade flows and examined economies gradually open their internal markets to global economy. The study also revealed substitution effects in industry shares in total country export of goods, contributing positively to changing national economy`s structure. As countries become more export-oriented, growth of high-tech and medium-high-technology industries in total export of goods legitimates the assumption on increasing their competitive potential. The link between the two is not direct, and possibly reveals with significant time lags, and – above all – macroeconomic competitiveness is not to be explained solely by technological factors. However, as technology potentially constitutes an important catalyst of growing macroeconomic competitiveness, enhancing countries to transform from technology-importing countries into efficiency and innovation-led development driven by growing export of high-technology industries, future studies of these aspects are desirable.

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