Technology-driven competitiveness of selected OECD countries. A macroeconomic evidence for the period 2000-2011.

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Abstract

The paper discusses existing causal and statistical links, which are assumed to be revealed between the international trade flows of high-tech goods and ICT manufactures and macroeconomic competitiveness of nations. The study covers selected OECD countries, and the time span is set for the period 2000-2011.

Growth of competitiveness of nations remains as one of the most important issue discussed on the field development economics. Starting from J.Schumpeter [Schumpeter 1934] and his seminal works, technological progress is thought as one of the most important factors determining countries ability to develop in a long-run perspective. Economic development and country`s ability to increase its international competitiveness seem to be in the line with each other and detection of reverse causality is highly probable. Macroeconomic competitiveness drives increases in country`s productivity and enhances socio-economic progress and stability in the worldwide landscape. According to the World Economic Forum [2012], the international competitiveness can be described as *"the set of institutions, policies, and factors that determine the level of productivity of a country"*[1]. As it is treated as complex and multidimensional phenomenon, its relative level and in time dynamic is determined in a multitude of ways. Shares in international trade are often treated

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

as a proxy explaining competitive power of nations [see i.e. Krugmann 1996, Porter 1990, Kunst&Marin 1989, Alcala&Cicione 2004, Lin 2009, Scherer 1992].

In the paper we analyze the data on international trade flows of goods classified as high-technology industries ($HTInd_j$[2]), medium-high technology industries ($MHTInd_j$), medium-low technology industries ($MLTInd_j$), low-technology industries ($LTInd_j$) and ICT manufactures ($ICTMan_j$). Applying the logistic growth equations with imposed growth limits, we aim to uncover firstly: whether there exist any substitution among the different technology-intensive industries (as listed above) at individual country level (referred to international export of goods).

If so, it is fully justified to assume that greater technological progress shall contribute strongly to the country`s relative strength on the global market. The technological progress, economic development and macroeconomic competitiveness they all are interrelated, having strong impact on one another. The technological progress of a country can be somehow approximated by observing the international trade flows of a country broken down by technology-intensity level, as well as the ICT manufactures.

Data and methodology

In the study, we run an exhaustive empirical analysis, which aims to detect statistical links between the level, and dynamics of international trade in the group of goods and services of difference technological requirements as well as of ICT manufactures. Driven by general intuition, we hypothesize on existence of strong, positive and statistically significant relationship between the magnitude of export/import trade flows of high-tech and medium-high-tech products as well as ICTs manufacturing goods and services, and level of macroeconomic competitiveness of selected countries. For export, we expect to detect stronger links, than in case of import. We aim to run a detailed analysis of the data considering trade flows of goods and services classified as high-technology industries ($HTInd_j$[3]), medium-high technology industries ($MHTInd_j$), medium-low technology industries ($MLTInd_j$), low-technology industries ($LTInd_j$) and ICT manufactures ($ICTMan_j$), each analyzed separately. For the $HTInd_j$, $MHTInd_j$ and $ICTMan_j$ variables we expect to uncover strong and positive links, while in the case the $MLTInd_j$ and $LTInd_j$, we expect weak but still positive relationships. The variables listed are treated as proxies of the overall technological advancement of a country. We confront the data on trade flows with the estimated level of macroeconomic competitiveness of nations (approximated by the level of Global Competitiveness Index), assuming that countries with relatively high share of $HTInd_j$,

[2] j - denotes a country.
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$MHTInd_j$ and $ICTMan_j$ shall perform better on the ground of international competitiveness. To report on the hypothesized relationships we apply semiparametric and nonparametric techniques. Graphical approximations are adopted to reveal the existing relationships between the paired variables. We check the relationships for $HTInd_j$, $MHTInd_j$, $MLTInd_j$, LTI_j and $ICTMan_j$ versus GDI separately. The study is set for the time span 2000-2010, and each relationship is tested year by year.