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Determinants of International Competitiveness: Evidence from Selected OECD Countries

Rüstem YANAR[a]*, Hüseyin ÇELİK[b]

[a] Gaziantep University, Department of Economics, Gaziantep / TURKEY
[b] Kilis 7 Aralık University, Department of Economics, Kilis / TURKEY

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ABSTRACT

The aim of this study is to investigate determinants of export competitiveness. In the study the RCA coefficient values as taken as export competitiveness indicator whereas GDP, openness, exchange rate, FDI and human capital are taken as determinate of competitiveness. The paper cover time period from 1994 to 2017 for OECD-18 countries . Time period and country group are selected as data availability. Firstly, cross section dependency and heterogeneity of the data set were examined. Then, models predicted by the AMG estimator were obtained that account for cross-sectional dependence and heterogeneity. The results show that although GDP and openness are mostly statistically significant, it has positive impact on just high-tech goods group competitiveness. Exchange rate have significant impact on just raw material-intensive and hard-imitable goods competitiveness, however, it has positive effect on hard-imitable goods competitiveness. On the other hand, FDI have significant and negative impact just on raw material-intensive goods. Lastly, human capital have significant impact only on competitiveness of labor-intensive goods.

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1. Introduction

After 1950's, with various integration and agreements like WTO, NAFTA, EU, Customs Tariffs and Trade General Agreement, liberal policies began to replace protectionist policies for foreign trade in the time (Pilinkinie, 2016;185). The global economy is both becoming a market for each country, and each country becomes a market for other countries with the softening restrictions and protections in foreign trade. On the other hand, developments in information and communication technologies, improvements in international transfer systems, and the decrease in the costs of goods and passenger, and inter-state relations pave way for globalization. As a result of globalization, nations have been influenced by each other. This progress causes demand to be structurally similar. In other words, countries began to demand the same or similar goods. Thus competitiveness in international trade is increasing gradually.

Under the conditions of high competition, countries have to meet the global demand requirement and can change the product structure as a global variety. When countries realize this, they have to produce higher quality and more cheaper goods than other countries. Many factors can affect competitiveness such as technology, education system, quality of health care, tax system, exchange rate, quantity and quality of raw materials and intermediate goods, labor cost and productivity, legal system, etc. However, these factors may differ from country to country. Therefore, for a better and higher competitiveness, each country has to show which factors affect its competitiveness. From this point of view, we explore the determinants of competitiveness in the 18 OECD countries.

The remainder of this work is structured as follows: Section 2 provides a review of the available literature. Section 3 represents the method, data, and model. And in Section 4 empirical results are presented and discussed. Paper results with a discussion of

* *Corresponding author*.
e-mail:. yanar@gantep.edu.tr

the policy implementation of the findings in Section 5.

2. Literature Review

There are many studies on competitiveness in the literature. While some of these studies deal with a certain sector such as manufacturing, agriculture, some of them were carried out on general export data. Pilinkiene (2016) search relationship between export competitiveness, Economic Growth and openness for 11 Europe countries. It revealed that competitiveness has a positive effect on economic growth. Similarly, Galovic (2018) displays that economic growth has a positive effect on competitiveness. But the effect of openness on competitiveness is smaller than the economic growth.

Kondal (2018) investigated determinant of coffee sector in Ethiopia. He dealed with domestic demand, total production amount, exchange rate and export value index as competitiveness determinate. The result shows that while domestic demand negatively effect competitiveness, exchange rate, production amount and export value index effect positively.

Muratoğlu and Muratoğlu (2016) investigated the competitiveness of certain manufacturing industries in 12 OECD countries. In the study, mental capital, labor costs, foreign direct investments and R&D expenditures were examined. As a result, other expected variables for FDI had an impact on competitiveness. On the other hand, Lui and Xie (2020) examined the impact of technology innovation, human capital and FDI on China's manufacturing industry competitiveness. He found that the above-mentioned indicators had a positive impact on competitiveness. Wang (2016) also explores the effect of GDP on the competitiveness of capital-intensive goods. The results show that GDP has a negative impact on competitiveness. Similarly, Chilian et al. (2014) found that GDP has a negative impact on competitiveness. According to Subanti et al. (2019) considers the effect of Exchange rate on competitiveness for ASEAN countries. It shows that the exchange rate affects the competitiveness negatively for ASEAN countries. Mulliqi et al. (2019) analyzed the relationship between human capital and competitiveness. This analysis is also valid for Central and Eastern European countries. According to the results of the research, the higher the education level of people, the higher their competitiveness.

Yapraklı (2011), on the other hand, deals with the determination of the competitiveness of the Turkish manufacturing sector. The effects of GDP, labor cost, exchange rate and openness on manufacturing competitiveness were investigated. The result of the study shows that exchange rate and labor cost negatively affect competitiveness, while GDP and openness affect competitiveness positively. Çınar and Özçalık (2013) investigate the structure of the competitiveness of the manufacturing sector. They investigate the effect of GDP, exchange rate and money supply on competitiveness. It has been determined that when GDP and money supply affect competitiveness negatively, exchange rate affects competitiveness positively. Erdem and Köseoğlu (2014) also investigated the effect of patent, GDP and exchange rate on the competitiveness of the Turkish manufacturing sector. They revealed that GDP and patent affect competitiveness positively, but exchange rate affects competitiveness negatively. Rubalcaba and Gago (2001) reveal that exchange rate positively affects competitiveness.

Castilo et al. (2011) Research on R&D expenditure on the competitiveness of the manufacturing sector in Mexico. The manufacturing sector deals with the classification of high-tech and low-tech. As a result, R&D spending has a significant and positive impact on competitiveness.

Kara and Erkan (2012) examined the factor affecting Turkey's labor-intensive goods competitiveness. In this study, unemployment, GDP, export value index, the amount of private sector credit used, the minimum wage and the number of manufacturing industry investment incentive certificates were determined and discussed. As a result, the minimum wage and the number of manufacturing industry investment incentive certificates positively affect the competitiveness of labor-intensive goods. However, other variables have a negative impact on competitiveness.

3. Data and Model

In this study, we examine the effect of GDP, openness, exchange rate, FDI, human capital on competitiveness. These variables are considered as determining of competitiveness. On the other hand, we consider export competitiveness in five groups as raw, labor and capital intensive goods, easily imitated goods and hard to imitate goods. In this context, we aimed to investigate the effect of the macroeconomic variable in export intensively. For this purpose, we apply the following model.

$$lnX_{it} = \gamma_0 + \gamma_1 lnGDP_{it} + \gamma_2 lnOPEN_{it} + \gamma_3 lnEXC_{it} + \gamma_4 FDI_{it} + \gamma_5 lnHUM_{it} + \alpha_{it} \quad (1)$$

where i=1,…, N express country and t express time series. X is country's REI value on the base of SITC (raw-intensive, labor intensive, capital-intensive goods, easy and hard imitable goods) (Uchida and Cook, 2005; Vergil and Yıldırım, 2006; Lui and Xie ,2020).

We focus on 18 OECD countries (Australia, Chile, Czechia, Denmark, Finland, France, Germany, Hungary, Japan, South Korea,

Mexican, Norway, Spain, Sweden, Switzerland, Turkey, England, USA) and time period from 1994 to 2017. The study period was detected by data availability. Log of real GDP constant 2010 USD (GDP), log of openness (OPEN) date was calculated from selected countries export and import of goods data, log of real exchange rate (EXC), foreign direct investment (FDI) is net inflow of %GDP, log of human capital index (HC). Error term was expressed by α_{it}. This series derive from World Bank data base expect for human capital index. Human capital index too was derived from Penn World Tables. Competitiveness data calculated by data that derive from UNCOMTREDE data base. This export data is SITC Rev.3 classification. And we do that data intensive classification as Hufbauer and Chilas (1974) calculated with Relative Export Index (REI) that displayed by Vollrath (1992).

4. Empirical Result

Firstly, we investigate whether there is cross-sectional dependency. Models are analyzed by all cross-sectional dependency tests such as Bruash and Pegan (1980), Pesaran (1980), Pesaran (2004), Pesaran, Ullah and Yamagata (2008). The cross-sectional dependency result in Table-1 shows that all models have cross-sectional dependency when considering all tests. So when there is a shock in one country, it affects other countries as well.

Table 1. Cross-Section Dependency Tests

Models		**(BP,1980)**	**(Pesaran, 2004)**	**(Pesaran, 2004)**	**(PUY, 2008)**
Model 1.	t-Static.	392.278 [a]	13.67 [a]	11.618 [a]	8.418 [a]
	p-value	0.000	0.000	0.000	0.000
Model 2.	t-Static	1254.385 [a]	62.962 [a]	32.165 [a]	44.861 [a]
	p-value	0.000	0.000	0.000	0.000
Model 3.	t-Static	1277.791[a]	64.300 [a]	33.303 [a]	46.497 [a]
	p-value	0.000	0.000	0.000	0.000
Model 4.	t-Static	705.058 [a]	31.559 [a]	22.380 [a]	17.147 [a]
	p-value	0.000	0.000	0.000	0.000
Model 5.	t-Static	379.776 [a]	12.964 [a]	10.951[a]	10.402[a]
	p-value	0.000	0.000	0.000	0.000

Note.[a] indicates statistically significance at 1% level respectively.

Afterwards cross-section dependency test we apply homogeneity test that developed by Pesaran and Yamagata (2008). This homogeneity test result gives as delta ($\tilde{\Delta}$) and delta adjust ($\tilde{\Delta}_{adj}$). If a model is heterogeneous, this mean the country that generate panel is specific features in panel. Homogeneity test result represent in Table-2. The null hypothesis of slope homogeneity analyzed is rejected, therefore there is heterogeneity in the selected OECD country for all models.

Table 2. Heterogeneity Tests

		Heterogeneity Tests	
Models		$\tilde{\Delta}$	$\tilde{\Delta}_{adj}$
Model 1.a	t-Static.	16.227 [a]	18.613 [a]
	p-value	0.000	0.000
Model 2.a	t-Static	12.057 [a]	13.831 [a]
	p-value	0.000	0.000
Model 3.a	t-Static	8.005 [a]	9.182 [a]
	p-value	0.000	0.000
Model 4.a	t-Static	12.680 [a]	14.545 [a]
	p-value	0.000	0.000
Model 5.a	t-Static	12.452	14.284
	p-value	0.000	0.000

Note.[a] indicates statistically significance at 1% level respectively.

Cross-section dependency and heterogeneity tests show that our models is heterogeneity and have cross-section dependency. Then, we estimate models by AMG coefficient estimation test that account for cross-section dependency and heterogeneity proposed by Bond and Eberhardt (2009).

The first model AMG estimator results are represented in Table-3. In this model, we estimate the effect of the independence variable on the competitiveness of raw material-intensive goods. According to the results of the first model, GDP, OPEN and EXC have a statistically significant effect on RAW, this effect is negative across the panel. Hence, when the competitiveness of a raw material-intensive good increases, GDP, OPEN and EXC decrease. Looking at the individual coefficient, it is seen that GDP positively affects raw material competitiveness in Denmark, South Korea, Mexico and Norway. The OPEN effect on the intense competitiveness of raw materials adversely affects the whole country as well as the panel in general. The EXC effect of intense raw material competitiveness in Finland and Japan is positive. Otherwise, FDI and HC have a statistically insignificant overall panel. Looking at the individual results, the FDI effect of raw material-intensive competitiveness is statistically negative in Chile, Japan and the United Kingdom. In other countries it is statistically insignificant. Although HC is statistically insignificant throughout the panel, it is statistically significant in Czechia, Finland, France, Germany, Hungary, Japan, Norway, Turkey and the USA.

Table 3. Results of AMG Estimator For Rew-Intensive Goods Competitiveness

Countries		**GDP**	**OPEN**	**EXC**	**FDI**	**HUM**
Australia	Coeff.	-0.319	-0.176	-0.005	-0.010	1.293
	P-val.	0.111	0.764	0.992	0.256	0.555
Chile	Coeff.	-1.074[a]	-1.603[a]	0.044	-0.031[b]	-0.077
	P-val.	0.000	0.000	0.893	0.033	0.982
Czechia	Coeff.	-1.183[a]	-0.492[b]	0.286	0.003	-7.038[a]
	P-val.	0.000	0.042	0.315	0.643	0.000
Denmark	Coeff.	1.904[c]	-3.833	-1.552	0.010	-5.580
	P-val.	0.063	0.235	0.534	0.158	0.128
Finland	Coeff.	-0.851[a]	-0.030	1.220[c]	0.039	4.730[b]
	P-val.	0.000	0.959	0.060	0.297	0.041
France	Coeff.	-0.858[a]	-1.937[a]	-1.371[a]	-0.003	-2.530[b]
	P-val.	0.000	0.000	0.000	0.462	0.011
Germany	Coeff.	-0.647[a]	-1.858[a]	-0.995[a]	-0.015	-13.514
	P-val.	0.000	0.000	0.000	0.568	0.022
Hungary	Coeff.	-0.970[a]	-1.674[a]	-1.274[b]	0.001	6.874[a]
	P-val.	0.000	0.000	0.014	0.515	0.005
Japan	Coeff.	-1.378[a]	-0.746[a]	0.644[a]	-0.110[b]	10.894
	P-val.	0.001	0.002	0.004	0.029	0.000
South Korea	Coeff.	0.440[b]	0.194	0.188	-0.005	4.694
	P-val.	0.036	0.389	0.523	0.889	0.413
Mexican	Coeff.	0.751[b]	-0.984	-0.326	0.017	6.483
	P-val.	0.034	0.215	0.426	0.451	0.356
Norway	Coeff.	0.443[a]	-1.012[a]	-0.123	-0.003	-8.536[a]
	P-val.	0.000	0.000	0.448	0.817	0.000
Spain	Coeff.	-0.088	-0.925[a]	-0.051	0.002	-3.180
	P-val.	0.385	0.000	0.661	0.419	0.123
Sweden	Coeff.	-0.204	-0.872[a]	-0.129	0.004	5.098
	P-val.	0.415	0.000	0.443	0.339	0.126
Switzerland	Coeff.	-0.746[a]	-0.819[b]	-0.149	0.0009	-0.861
	P-val.	0.000	0.023	0.574	0.968	0.918
Turkey	Coeff.	-0.958[a]	-1.295[a]	-0.908[b]	-0.0009	-2.657[c]
	P-val.	0.000	0.000	0.031	0.900	0.092
England	Coeff.	-0.514	0.031	0.076	-0.051[c]	2.565
	P-val.	0.236	0.896	0.210	0.065	0.324
USA	Coeff.	-0.344	-2.193[a]	-0.95[c]	-0.002	7.143[a]
	P-val.	0.241	0.000	0.082	0.576	0.000
PANEL	Coeff.	-0.366[c]	-1.123[a]	-0.301[c]	-0.008	-1.177
	P-val.	0.058	0.000	0.084	0.250	0.747

Note.[a],[b] and [c] indicates statistically significance at 10%, 5% and 1% level respectively.

The evidence of Model 2 is shown in Table-4. GDP, OPEN and HC effect 10% overall panel labor-intensive goods competitiveness level. Although GDP and OPEN negatively affect competitiveness, the HC positively affects competitiveness. Except for Mexico, Sweden and the UK, the results have a statistically significant negative impact on GDP competitiveness in other countries. Otherwise, OPEN has a statistically significant positive impact on competitiveness in Hungary, Mexico, Norway, Turkey and the USA. The EXC effect is statistically positively significant in South Korea and Spain, while the EXC effect is statistically negative in Australia, Japan, Swizland, England and the USA. Foreign direct investments had a statistically positive effect in France and Switzerland, and a negative effect in Japan and South Korea, while it did not have a statistically significant effect in other countries. The HC results from the AMG test show that HC has a statistically positive 10% effect on the entire panel. It has a statistically significant positive effect in Denmark, France, Germany, Japan, South Korea, Sweden and the USA, as individual results affect HC on labor-intensive goods competitiveness.

Table 4. Results of AMG Estimator For Labor-Intensive Goods Competitiveness

Countries		**GDP**	**OPEN**	**EXC**	**FDI**	**HUM**
Australia	Coeff.	-1.164 [a]	-0.617	-0.651 [c]	0.007	3.107
	P-val.	0.000	0.171	0.067	0.498	0.199
Chile	Coeff.	-0.355 [a]	-0.149	-0.237	0.012	2.004
	P-val.	0.001	0.495	0.361	0.152	0.117
Czechia	Coeff.	-0.628 [a]	0.118	-0.039	0.0003	-3.438 [a]
	P-val.	0.000	0.420	0.820	0.939	0.002
Denmark	Coeff.	-2.732 [a]	0.731	0.692	0.012	12.571 [b]
	P-val.	0.000	0.544	0.489	0.276	0.059
Finland	Coeff.	-0.864 [a]	0.107	-0.149	-0.021	-2.136 [a]
	P-val.	0.000	0.790	0.741	0.185	0.003
France	Coeff.	-2.732 [a]	-0.509	0.429	0.033 [a]	9.013 [a]
	P-val.	0.000	0.565	0.663	0.001	0.000
Germany	Coeff.	-0.473 [a]	0.419	-0.054	0.043	9.762 [a]
	P-val.	0.000	0.179	0.861	0.251	0.063
Hungary	Coeff.	-0.729 [a]	-0.724 [c]	-0.629	-0.003	1.869
	P-val.	0.000	0.095	0.185	0.110	0.369
Japan	Coeff.	-0.583 [a]	-0.096	-0.473 [a]	-0.053 [a]	1.797 [a]
	P-val.	0.001	0.302	0.000	0.003	0.003
South Korea	Coeff.	-1.33 [a]	0.038	1.140 [a]	-0.087 [b]	13.542 [a]
	P-val.	0.000	0.845	0.000	0.032	0.004
Mexican	Coeff.	0.080	-1.526 [b]	0.199	-0.006	-6.800 [c]
	P-val.	0.779	0.016	0.400	0.685	0.069
Norway	Coeff.	-0.733 [a]	0.386 [b]	0.113	0.006	-0.637
	P-val.	0.000	0.012	0.448	0.541	0.497
Spain	Coeff.	-0.198 [b]	0.017	0.138 [c]	-0.002	-2.359 [b]
	P-val.	0.013	0.817	0.095	0.220	0.024
Sweden	Coeff.	1.547	-1.036	-1.289	-0.010	-10.046
	P-val.	0.149	0.231	0.123	0.632	0.283
Switzerland	Coeff.	-1.091 [a]	-0.420	-0.812 [b]	0.082 [a]	17.082 [c]
	P-val.	0.000	0.289	0.011	0.006	0.061
Turkey	Coeff.	-0.529 [a]	-0.513 [b]	-0.366	-0.001	0.372
	P-val.	0.000	0.039	0.306	0.848	0.737
England	Coeff.	0.380	0.252	-0.152 [a]	-0.048	-1.939
	P-val.	0.342	0.219	0.004	0.146	0.531
USA	Coeff.	-0.832 [a]	-0.395 [c]	-0.747 [a]	-0.002	7.827 [b]
	P-val.	0.000	0.061	0.000	0.199	0.025
PANEL	Coeff.	-0.721 [a]	-0.217 [c]	-0.160	-0.002	2.866 [c]
	P-val.	0.002	0.098		0.803	0.098

Note.[a],[b] and [c] indicates statistically significance at 10%, 5% and 1% level respectively.

The results of competitiveness of capital-intensive goods are shown in Table 5. As a result, the overall panel only has a statistically significant effect on GDP and ON capital-intensive goods competitiveness. However, EXC does not statistically significantly affect FDI and HC. Looking at individual results, GDP in Chile has a significant positive impact on capital-intensive commodity competition. In other countries, GDP usually has a statistically negative or insignificant effect. As an individual result of OPEN, OPEN has a significant statistically negative impact in Czechia, France, Hungary, Mexico, Norway, Spain, United Kingdom and USA. Individual results for EXC have been significant and positive in Australia, Chile, Mexico and Norway. For other countries, however, the effect of EXC on the competitiveness of capital-intensive goods is statistically negative or insignificant. Individual results of FDI are statistically insignificant for most countries. FDI has a statistically significant effect on competitiveness of capital-intensive goods in Denmark, Japan, South Korea, Norway, Spain and the USA. This only has a positive effect in Norway and Spain. The effect of HC on the competitiveness of capital-intensive goods is significantly negative only in France, while this effect is positive in those countries which are statistically significant.

Table 5. Results of AMG Estimator For Capital-Intensive Goods Competitiveness

Countries		**GDP**	**OPEN**	**EXC**	**FDI**	**HUM**
Australia	Coeff.	0.077	-0.572	0.982 [c]	0.005	11.556 [a]
	P-val.	0.777	0.410	0.069	0.807	0.021
Chile	Coeff.	1.042 [b]	-0.222	3.457 [a]	-0.004	-1.160
	P-val.	0.033	0.771	0.000	0.994	0.885
Czechia	Coeff.	-0.237 [b]	-0.521 [a]	-0.136	-0.001	-2.185
	P-val.	0.041	0.001	0.416	0.895	0.261
Denmark	Coeff.	-0.494 [a]	-0.141	-0.037	-0.005 [b]	2.528
	P-val.	0.000	0.587	0.863	0.027	0.112
Finland	Coeff.	-0.106	0.817	0.533	0.004	3.670 [a]
	P-val.	0.493	0.181	0.427	0.924	0.075
France	Coeff.	-0.655 [a]	-1.537 [a]	-1.316 [a]	-0.005	-2.078 [a]
	P-val.	0.000	0.000	0.000	0.341	0.038
Germany	Coeff.	-0.745 [a]	-0.246	0.244	-0.031	-8.470
	P-val.	0.000	0.477	0.445	0.390	0.216
Hungary	Coeff.	-0.154	-2.152 [a]	-1.264 [b]	-0.005	8.255 [b]
	P-val.	0.280	0.000	0.023	0.154	0.013
Japan	Coeff.	0.101	0.183	-0.207	-0.102 [a]	2.419 [b]
	P-val.	0.749	0.326	0.334	0.001	0.022
South Korea	Coeff.	-0.050	0.155	0.046	-0.039 [c]	-4.468
	P-val.	0.716	0.298	0.796	0.057	0.110
Mexican	Coeff.	-0.934 [b]	-1.724 [b]	0.815 [b]	0.004	16.962 [a]
	P-val.	0.049	0.040	0.029	0.819	0.000
Norway	Coeff.	-0.186	-0.788 [a]	0.440 [b]	0.040 [b]	0.985
	P-val.	0.235	0.000	0.032	0.034	0.528
Spain	Coeff.	-0.643 [a]	-0.292 [b]	-0.012	0.006 [b]	3.598 [a]
	P-val.	0.000	0.045	0.930	0.023	0.003
Sweden	Coeff.	-0.343	-0.339	-0.298 [c]	0.001	6.987 [a]
	P-val.	0.212	0.116	0.077	0.715	0.003
Switzerland	Coeff.	-1.041 [b]	-0.562	-0.636	-0.009	-9.200
	P-val.	0.014	0.430	0.262	0.859	0.587
Turkey	Coeff.	-0.229 [c]	-0.191	-0.513	-0.008	-0.248
	P-val.	0.053	0.602	0.275	0.385	0.878
England	Coeff.	-0.128	-0.508 [b]	-0.108 [c]	0.019	1.348
	P-val.	0.753	0.040	0.051	0.706	0.771
USA	Coeff.	-0.156	-1.057 [a]	-0.852 [a]	-0.009 [c]	-3.804
	P-val.	0.456	0.004	0.001	0.035	0.591
PANEL	Coeff.	-0.271 [b]	-0.539 [a]	0.063	0.271	1.483
	P-val.	0.014	0.001	0.800	1.483	0.341

Note.[a],[b] and [c] indicates statistically significance at 10%, 5% and 1% level respectively.

The results of the easily imitated goods competitiveness are demonstrated in Table-6. When we look at the result of the general panel, only GDP has a statistically significant effect. However, other independent variables did not have a statistically significant effect. Looking at the individual results, GDP has a statistically significant positive effect on the competitiveness of easily imitated goods in Finland, Hungary, Turkey and the United Kingdom. This has a statistically negative or insignificant effect in other countries. While OPEN has a significant and positive impact on the competition for imitation goods in the Czech Republic, OPEN does not have a significant impact in all other countries. EXC has a statistically significant effect on the competitiveness of easily imitated goods in the Czech Republic, Japan and the UK, while in other countries it is insignificant. Looking at the result for FDI and HC, FDI has a significant impact on the competitiveness of easy counterfeit goods in Hungary, Japan and South Korea. HC has a statistically significant place in most countries. The significant impact of HC on competitiveness is positive in some countries and negative in others.

Table 6. Results of AMG Estimator For Easy Imitable Goods Competitiveness

Countries		**GDP**	**OPEN**	**EXC**	**FDI**	**HUM**
Australia	Coeff.	-0.672 [a]	0.020	-0.170	-0.006	-1.945
	P-val.	0.000	0.236	0.495	0.950	0.382
Chile	Coeff.	-0.183	0.075	0.150	-0.006	5.566 [a]
	P-val.	0.229	0.791	0.706	0.544	0.003
Czechia	Coeff.	0.042	1.500 [a]	0.982 [b]	-0.018	-6.485
	P-val.	0.890	0.000	0.029	0.248	0.151
Denmark	Coeff.	0.016	-0.526	-0.121	0.007	12.161 [c]
	P-val.	0.949	0.441	0.831	0.368	0.036
Finland	Coeff.	0.915 [a]	0.886	-0.295	-0.028	-17.071 [a]
	P-val.	0.000	0.396	0.800	0.472	0.000
France	Coeff.	-0.865 [a]	0.320	0.708	0.009	5.385 [a]
	P-val.	0.000	0.444	0.129	0.180	0.000
Germany	Coeff.	-0.376 a	0.438	0.191	0.024	-4.890
	P-val.	0.000	0.106	0.478	0.577	0.563
Hungary	Coeff.	0.683 [a]	1.239	0.799	-0.001 [a]	-4.052
	P-val.	0.006	0.128	0.366	0.004	0.309
Japan	Coeff.	-0.362	-0.015	-0.742 [a]	-0.076 [a]	-6.667 [a]
	P-val.	0.197	0.923	0.000	0.000	0.000
South Korea	Coeff.	0.341	-0.129	-0.760	0.150 [a]	-2.993
	P-val.	0.296	0.699	0.123	0.003	0.661
Mexican	Coeff.	0.206	-0.033	0.033	0.017	7.926 [c]
	P-val.	0.542	0.966	0.910	0.275	0.065
Norway	Coeff.	-1.180 [a]	0.140	0.018	0.022 [c]	8.835 [a]
	P-val.	0.000	0.384	0.907	0.052	0.000
Spain	Coeff.	-0.286 [a]	0.094	-0.105	-0.001	4.293 [a]
	P-val.	0.000	0.218	0.169	0.714	0.007
Sweden	Coeff.	-0.474 [c]	-0.049	0.140	0.002	-1.382
	P-val.	0.055	0.790	0.439	0.701	0.658
Switzerland	Coeff.	-0.082	0.488	-0.104	0.025	37.959 [a]
	P-val.	0.646	0.287	0.769	0.283	0.000
Turkey	Coeff.	0.492 [a]	-0.229	-0.378	-0.0007	-3.259 [b]
	P-val.	0.000	0.250	0.212	0.918	0.019
England	Coeff.	1.355 [a]	-0.487 [c]	-0.232 [a]	0.001	-12.5 62 [a]
	P-val.	0.006	0.057	0.001	0.976	0.000
USA	Coeff.	0.134	-0.788 [b]	1.365 [a]	-0.002	5.686
	P-val.	0.466	0.013	0.000	0.420	0.559
PANEL	Coeff.	-0.016	0.183	-0.069	0.006	1.472
	P-val.	0.912	0.186	0.602	0.493	0.599

Note.[a],[b] and [c] indicates statistically significance at 10%, 5% and 1% level respectively.

The results for our last model i.e hard to imitate goods competitiveness are shown in Table-7. Looking at the Model-5 result from Table-7, we can see that GDP and OPEN have a statistically significant effect on the competitiveness of hard-to-imitate goods. GDP and deficit have a positive effect on competitiveness, unlike other models. We can see from the individual result that we expect GDP for Japan to have a statistically significant positive impact in all other countries. The individual result of OPEN, such as GDP, generally has a statistically significant and positive effect in most countries in the Czech Republic, Japan, Mexico and the UK. The impact of EXC on the competitiveness of simulated solid goods is mostly insignificant, but this effect is statistically significant in France, Mexico, Turkey, the UK and the USA. FDI individual outcome, like EXC, has negligible impact in most countries. Finally, the HC individual result shows that the HC effect is negative in some countries and statistically significant in some positive countries.

Table 7. Results of AMG Estimator for Hard to Imitate Goods Competitiveness

Countries		**GDP**	**OPEN**	**EXC**	**FDI**	**HUM**
Australia	Coeff.	0.363 [b]	0.314	-0.387	-0.004	-0.935
	P-val.	0.015	0.308	0.113	0.609	0.757
Chile	Coeff.	0.637 [a]	0.735 [a]	0.201	0.032 [a]	7.960 [a]
	P-val.	0.002	0.001	0.490	0.006	0.000
Czechia	Coeff.	1.047 [a]	0.243	0-.123	-0.009	6.649 [a]
	P-val.	0.000	0.295	0.630	0.241	0.000
Denmark	Coeff.	0.826 [a]	0.910 [a]	-0.004	-0.004	2.992
	P-val.	0.000	0.000	0.970	0.180	0.163
Finland	Coeff.	0.968 [a]	0.682[b]	-0.311	-0.049 [b]	0.685
	P-val.	0.000	0.038	0.396	0.035	0.473
France	Coeff.	0.592 [a]	0.965 [a]	0.322 [c]	0.0006	4.852 [a]
	P-val.	0.000	0.000	0.086	0.799	0.000
Germany	Coeff.	1.083 [a]	1.040[a]	0.057	0.029	-1.600
	P-val.	0.000	0.000	0.576	0.285	0.756
Hungary	Coeff.	1.348 [a]	0.882 [b]	0.509	0.001	-1.747
	P-val.	0.000	0.049	0.272	0.595	0.423
Japan	Coeff.	0.696	-0.044	-1.146	0.301 [c]	6.733
	P-val.	0.634	0.957	0.275	0.080	0.322
S. Korea	Coeff.	0.884 [a]	0.797 [a]	0.370	-0.100 [a]	4.739
	P-val.	0.000	0.000	0.151	0.000	0.226
Mexican	Coeff.	0.782 [a]	0.203	0.162 [b]	-0.002	4.233 [a]
	P-val.	0.000	0.240	0.012	0.727	0.003
Norway	Coeff.	0.532 [b]	0.811 [a]	0.150	-0.018	6.589 [a]
	P-val.	0.045	0.003	0.534	0.290	0.000
Spain	Coeff.	0.828 [a]	0.612 [a]	-0.130	-0.003	4.870 [a]
	P-val.	0.000	0.002	0.342	0.196	0.000
Sweden	Coeff.	0.650 [a]	0.913 [a]	-0.075	-0.002	3.037 [a]
	P-val.	0.000	0.000	0.157	0.308	0.001
Switzerland	Coeff.	0.513 [a]	0.499 [a]	-0.261	0.007	14.880 [a]
	P-val.	0.002	0.000	0.100	0.569	0.000
Turkey	Coeff.	1.191 [a]	1.246 [a]	0.760 [c]	-0.003	4.908 [a]
	P-val.	0.000	0.000	0.086	0.691	0.001
England	Coeff.	1.113 [a]	0.074	-0.112 [c]	0.041	-4.595
	P-val.	0.004	0.839	0.083	0.160	0.101
USA	Coeff.	1.097 [a]	1.365 [a]	0.827 [b]	0.003	-1.313 [a]
	P-val.	0.000	0.008	0.016	0.394	0.004
PANEL	Coeff.	0.841 [a]	0.681 [a]	0.045	0.012	2.552
	P-val.	0.000	0.000	0.674	0.513	0.113

Note.[a],[b] and [c] indicates statistically significance at 10%, 5% and 1% level respectively.

5. Conclusion

This study examines the competitiveness of selected OECD countries for the period 1994-2017. Competitiveness was taken as the dependent variable. We had competitive power in five groups. These are raw, labor and capital intensive goods, easily imitated goods and hard to imitate goods. We took GDP, foreign direct investment, openness, real exchange rates and human capital as determinants of competitiveness. Then, the Augment Mean Group (AMG) estimation technique was used to examine the effect of the independent variable on competitiveness. Because of cross-section dependence and heterogeneous AMG, we initially investigated cross-section dependence and heterogeneous models of patterns.

The results of cross-dependency test show that there is cross-dependency among 18 OECD. In other words, these counties are sufficiently integrated. And these countries are seen as heterogeneous. According to the evidence of the AMG estimator, it is obtained that the GDP coefficient in all models is negative, expecting the competitiveness of imitative goods. Gross domestic product has an impact on the competitiveness of imitative goods. It is understood that an increase in GDP reduces competitiveness in raw, labor, capital intensive goods and easily imitated goods. However, it increases the competitiveness of imitative hard goods (Wang, 2016). When GDP increases, domestic demand will increase, resulting in increased demand for specialist goods. This situation affects the competitiveness negatively. In addition, this increase in GDP causes an increase in the demand for imported goods. The results show that GDP increases the competitiveness of high-tech products. Similarly, openness has a negative impact on the competitiveness that hard-to-imitate goods expect for high-tech goods exported (Babatunde, 2009; Pilinkiene, 2016).

On the other hand, when we look at the effect of exchange rate on competitiveness, it is mostly insignificant statistically that general models expect for raw intensive goods competition. However, the effect of exchange rate on raw intensive goods is statistically negative. Although the effect of exchange rate on competitiveness is statistically insignificant, it is positive when the level of technology increases.

The effect of foreign direct investment on competitiveness is insignificant in overall models. But statistically it is significant. Finally, according to the results of the effect of human capital on competitiveness, for the overall panel, human capital only has a statistically significant and positive effect on the competitiveness of labor-intensive goods, but the other models mentioned above have this significant effect..

References

Babatunde, A.M. (2009). Can Trade Liberalization Stimulate Export Performance in Sub-Saharan Africa? *Journal of International and Global Economic Studies*, 2(1), 68-92.

Breusch, T.S & Pagan, A.R. (1980), "The Lagrange Multiplier Test and Its Applications to Model Specification Tests in Econometrics". *Review of Economic Studies*, 47, 239-53.

Castilo, O. N. Santibáñez, A. L. V & Bolívar, H. R. (2011). Technological Determinants of Market Shares of Mexican Manufacturing Exports. *Asian Journal of Latin American Studies*, 24 (1), 53-81.

Chilian, M., Simionesco, M., & Iordan, M. (2014). Determinants Of Regional Competitiveness In Romania - A Panel Data Approach. https://www.researchgate.net/publication/268577443 (10.09.2019).

Çınar, S. & Özçalık, (2013). İmalat Sanayi Sektörünün Rekabetçilik Analizi: Türkiye Ve G-8 Ülkeleri Panel Veri Analizi. *Paper presented at EconAnadolu 2013: Anadolu International Conference in Economics* III June 19-21, 2013, Eskisehir, Turkey.

Eberhardt, M., & Bond, S. (2009). Cross-section dependence in nonstationary panel models: A novel estimator, MPRA Paper No. 17692, University Library of Munich.

Eberhardt, M. & Teal, F. (2010). Productivity Analysis İn Global Manufacturing Production, Discussion Paper 515, Department of Economics, University of Oxford.

Erdem, E. & Köseoğlu A. (2014). Teknolojik Değişim ve Rekabet Gücü İlişkisi: Türkiye Üzerine Bir Uygulama. *Bilgi Ekonomisi ve Yönetim Dergisi*, 9 (1), 51-68.

Galovic, T. Bezic, H., & Primorac, D. (2018). The Export Competitiveness Of NAFTA Countries. *31st International Scientific Conference on Economic and Social Development – "Legal Challenges of Modern World"* – Split, 7-8 June 2018.

Hufbauer, G. & Chilas, J. (1974). Specialization by Industrial Countries: Extent and Consequences in H. Giersch (ed.): The International Division of Labour: Problems and Perspectives. International Symposium. *Tubingen, Germany: J.C.B. Mohr*, s.3–38.

Kara, O & Erkan, B. (2011). Türkiye'nin Emek Yoğun Mal İhracatındaki Karşılaştırmalı Üstünlüklerin Makro Ekonomik Büyüklüklerle İlişkisi. *Ekonomik ve Sosyal Araştırmalar Dergisi*,7 (1), 67-93.

Kondal, A. M. (2018). The Determinants of the Export Competitiveness of the Coffee Industry in Ethiopia.

http://213.55.95.56/bitstream/handle/123456789/17169/ASSEFA%20MULUGETA.pdf?sequence=1&isAllowed=y (03.03.2020).

Pesaran, M.H. & Yamagata, T. (2008) Testing slope homogeneity in large panels. Journal of Econometrics 142(1) 50–93.

Rubalcaba, L. & Gago, D. (2001). Relationships Between Services and Competitiveness: The Case of Spanish Trade. *The Service Industries Journal*, 21(1), 35-62.

Lui, J. & Xie, J, (2020). Environmental Regulation, Technological Innovation, and Export Competitiveness: An Empirical Study Based on China's Manufacturing Industry. *International Journal of Environmental Research and Public Health*, doi:10.3390/ijerph17041427

Mulliqia, A. Adnettb, N & Hisarcıklılar, M. (2019). Human Capital and Exports: A Micro-level Analysis Of Transition Countries. *The Journal Of Internatıonal Trade & Economıc Development,* 28 (7), 775–800. https://doi.org/10.1080/09638199.2019.1603319 .

Muratoğlu, G, & Muratoğlu, Y. (2016). Determinants of Export Competitiveness: Evidence From OECD Manufacturing. *Journal of Economics and Political Economy*, 3 (1).

Pesaran, M.H. (2004) General diagnostic tests for cross section dependence in panels. *Cambridge Working Papers in Economics* No. 0435, Faculty of Economics, University of Cambridge.

Pesaran, M.H., Ullah, A. & Yamagata, T. (2008) A bias-adjusted LM test of error cross-section independence. *Econometrics Journal,* 11(1), 105–127.

Pilinkiene, V. (2016). Trade Openness, Economic Growth and Competitiveness. The Case of the Central and Eastern European Countries. *Inzinerine Ekonomika-Engineering Economics*, 27 (2), 185–194. http://dx.doi.org/10.5755/j01.ee.27.2.14013 .

Uchida, Y. & Cook, P. (2005). The Transformation of Competitive Advantage in East Asia: An analysis of Technology and Trade Specialization. *World Development*, 33 (5), 701-728.

UNCOMTRADE, https://comtrade.un.org/data/ (10.11.2018)

Vergil, H. & Yıldırım, E. (2006). AB-Türkiye Gümrük Birliğinin Türkiye'nin Rekabet Gücü Üzerindeki Etkileri. *Erciyes Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi*, 26 (1).

Vollrath, T. L. (1991). A Theoretical Evaluation of Alternative Trade Intensity Measures of Revealed Comparative Advantage. *Weltwirtschaftliches Archiv*. Bd. 127. H. 2, 265-280.

Wang, J. (2016). Revealed Comparative Advantage of Capital-Intensive Industry in China. *International Conference on Computational Modeling*. Simulation and Applied Mathematics. China.