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Impacts of Participation in Export Value Chains on TFP Growth*

İhracat Değer Zincirlerine Bağlanmanın Toplam Faktör Verimliliği Üzerine Etkisi

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ABSTRACT

The level of forward participation in global value chains is expressed as the presence of domestic value added in the exports of other countries while the level of backward participation in global value chains is expressed as the presence of the foreign value added came from other countries in the exports of the domestic country. In this study, in addition to the gross exports, GDP and exports of value added are used as denominators in the participation indices in the empirical analysis. Thus, the impacts of domestic and foreign value added in the export value chains on the total factor productivity growth are estimated for the years between 1995 and 2014 by using the dynamic panel data techniques. Our estimation results from the full sample indicate that although higher backward participation reduces TFP growth, higher forward participation raises TFP growth for the full sample. We also find the significant positive results for backward and forward participation only for developed countries. Thus, our results mainly imply that developing countries do not able to benefit from participating in export value chains either backwardly or forwardly.

Key words: Global Value Chains; Export Value Chains; Backward Participation; Forward Participation; TiVA; TFP

ÖZET

Küresel değer zincirlerine ileriye doğru katılım düzeyi başka ülkelerin ihracatında yerel katma değer ile varlık gösterilmesi olarak ifade edilirken geriye doğru katılım düzeyi ise başka ülkelerin ilgili ülkenin ihracatında yerel katma değerleriyle varlık göstermesi olarak ifade edilmektedir. Bu noktadan hareketle, yaygın olarak kullanılan küresel değer zincirlerine katılım endeksleri, küresel değer zincirlerinin alt zincirleri sayılabilecek ihracat değer zincirlerindeki yerel ve yabancı katma değerin rekabetini ifade etmektedirler. Bu çalışmada, ampirik analizlere dahil edilen küresel değer zincirlerine katılım indekslerinin paydalarında brüt ihracata ek olarak GSYH ve katma değer ihracatı da kullanılmıştır. Bu farklı endekslerle ihracat değer zincirlerindeki yerel ve yabancı katma değer rekabetinin toplam faktör verimliliği üzerindeki etkileri dinamik panel veri modeli kullanılarak 1995-2014 yılları için tahmin edilmiştir. Veri setini ülke gruplarına göre ayırmadan yaptığımız tahminde, ileriye doğru katılımın toplam faktör verimliliği üzerindeki anlamlı pozitif etkisini ve geriye doğru katılımın da anlamlı negatif etkisini gösterdik. Veri setini gelir düzeyine göre ayırdığımızda, gelişmiş ülkeler için hem geriye hem de ileriye doğru katılımın pozitif etkisini tahmin ettik. Özellikle vurgulanması gereken bir bulgu olarak da, gelişmekte olan ülkelerin ihracat değer zincirlerine gerek geriye gerekse ileriye doğru katılımlarının verimlilik artışı üzerinde olumlu bir etkisini tahmin etmedik.

Anahtar Kelimeler: Küresel Değer Zincirleri; İhracat Değer Zincirleri; Geriye Doğru Katılım; İleriye Doğru Katılım; TiVA; TFV

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Countries or nations undertake various sequences of activities, defined as export value chains (EVCs) here as sub chains of global value chains, to bring each goods or services ready for an export. Some of these value chains start with imports of different intermediate goods or services to produce various export goods and some of them start with primary industry activities within countries or nations. Many different actors participate in such export value chains and they add values until the very last stage of the export. This is a valid case within each country or nation.

As to the contemporary global world, main drivers of international trade and investments are Global Value Chains (GVCs) and they can be defined as the full range of activities that firms and workers perform to bring a product from its conception to end use and beyond (Gereffi and Fernandez-Stark, 2016, p.7). The value chain concept is first coined by Porter (1985), which considers a firm level sequence of activities in terms of cost and value. The commodity chain concept is defined as a network of labor and production processes whose end result is a finished commodity (Hopkins and Wallerstein, 1986, p.159). This is an important cornerstone towards GVCs. Thus, Gereffi's (1994) focusing on similarities between commodity chains and Porter's value chain approach are an important attempt to explain current economic activities and relations as GVCs. The core importance of GVCs cannot be ignored in the contemporary world; since the share of GVCs in global trade is approximately 80 percent (UNCTAD, 2013) and probably will continue to increase more in the coming years. However, conventional trade statistics fail to explain complex interconnections of countries along GVCs. The increasing cross-border production fragmentation, which can be defined as vertical specialization in production stages (Johnson and Noguera, 2012a) is the main reason behind this.

Gross measurement of trade flows results in counting the value of products multiple times (OECD-WTO, 2012), where approximately two-thirds of international trade is the trade of intermediate goods. Another important point is that the flows of value added rather than goods across countries has become an increasingly debated topic (Stehrer et al., 2012, p.1). The TiVA Database which is a joint WTO-OECD initiative is a revolutionary attempt for decomposition of contemporary gross trade flows into value added contents. Thus, TiVA both eliminates multiple counting of the values and enables many distinguished trade specifications in terms of "trade in value added" and "value added in trade".

Regarding participation in GVCs, Value chain participation is defined in terms of the origin of the value added embodied in exports both looking backward and forward from a reference country: backward when it comes to foreign value added embodied in exports, and forward when it refers to domestic value added which is used as inputs to produce exports in the destination country (Kowalski et al., 2015, p. 13). Whether participation in GVCs and competition along EVCs really bring total factor productivity gains to domestic economies is an important question in the EVCs dominated world. Our study is an empirical attempt to answer this question. Our paper initially extends the most well-known GVCs participation index (as a percentage of gross exports) (Koopman, 2010) by calculating backward and forward participation indices as shares of GDP and shares of exports of value added to capture the impacts of competition along EVCs as sub chains of GVCs. This paper then investigates the impact of backward and forward participation in EVCs on total factor productivity (TFP) growth for developing and developed countries for the years 1995-2014 by using the dynamic panel data models. Our estimation results indicate that while higher backward integration in EVCs reduce TFP growth, higher forward integration raises TFP growth for all countries. Our results clearly imply that backward and forward participation in EVCs fail to benefit developing countries through raising TFP growth. We find that backward and forward participation raise TFP growth for developed countries though. Thus, our estimation results clearly imply that the current state of GVCs is not much beneficial for developing countries contrary to the common arguments present.

Section 2 discusses the relevant literature on the participation in export value chains. The data and model are discussed in section 3. Section 4 presents the empirical results. Section 5 concludes the paper.

Literature Review

In the literature, scholars mainly focus on the development of accounting frameworks and variables for analyzing the contemporary trade flows in the GVCs dominated world. Johnson and Noguera (2012b) calculate the value added content of trade by combining input-output data and bilateral trade statistics. Their methodology in tracking intermediate input flows is the same with the methodology of

Trefler and Zhu (2010). Trefler and Zhu (2010) apply this for calculating the factor content of trade but Johnson and Noguera (2012b) use for calculating the value added content of international trade. Thus, they prepare a data set for value added exports showing where value added produced and where absorbed. They develop a measure that is a ratio of value added to gross trade and estimate the role of distance on the yield of gross and value added exports. They find that the rise of fragmentation is related with the growing localization of international trade. Johnson and Noguera (2012c) also analysis the value added content of trade for forty-two countries from 1970 to 2009 by their framework developed in their previous studies. Foster-Mcgregor and Stehrer (2013) based on Trefler and Zhu (2010) decompose not only the exports but also the imports into value added contents. Stehrer et al. (2012) decompose the value added and factor content of trade into domestic and foreign contents considering both exports and imports. They present this decomposition for World Input-Output Database[1] (WIOD) from 1995 to 2009.

Koopman et al. (2012) propose an accounting framework for estimating the share of domestic and foreign value added contents in exports when processing trade is prevalent. They apply this framework for decomposing aggregate foreign and domestic shares of China's exports for the years 1997, 2002 and 2007 and find that foreign value added content accounts for approximately 50% of Chinese exports for the 1997-2002 period. Koopman et al. (2014) decompose a country's gross exports into various value added components by source country and additional double counted terms. Their framework bridges a gap between official trade statistics in gross value terms and national accounts in value added terms. Thus, they achieve the integration of available vertical specialization measures and value added trade measures with each other. Wang et al. (2013) generalize Koopman et al[2]. (2014)'s framework from the country level for exports to the sector, bilateral or bilateral sector level for both exports and imports and apply this decomposition for bilateral sector level gross trade flows among 40 trading nations in 35 sectors from 1995 to 2011 based on the WIOD database.

Researchers continue to develop new datasets and variables, especially the integration efforts of Foreign Direct Investments (FDI) and OECD-WTO TiVA variables[3] are among most important ones. Ma et al. (2015) extend the framework developed by Koopman et al. (2012) to further decompose Chinese exports by firm ownership and to estimate factor ownership by firm types (Foreign Invested Enterprise (FIEs) or China Owned Enterprises (COEs)). Their study is an important contribution to the literature and gives us clues about where further decomposition of trade statistics goes. They find that FIEs created approximately 45% of domestic content in Chinese exports and 52,6% of the value of Chinese exports is captured by foreign factor owners as income.

The series of efforts as discussed above are important attempts to decompose trade flows. Although many institutions and scholars report descriptive statistics by the new trade specifications as decomposition of current trade flows, the number of empirical studies analyzing their impacts on other macroeconomic parameters is very limited and unsatisfactory. A well-known indicator of participation in GVCs, is developed by Koopman et al. (2010) is usually used for descriptive purposes in the literature. In its wide use, backward participation refers the amount of foreign value added embodied in gross exports and forward participation refers to the share of domestic value added embodied in foreign exports. In addition to the standard these two measures of export value chains, our paper defines four more measures of participation indices by calculating backward and forward participation as shares of GDP and shares of exports of value added to capture the impacts of competition along export value chains as sub chains of GVCs.

Methodology

An empirical productivity growth model commonly used in the literature is employed to analyze the effects of export value chain participation indices on total factor productivity growth. The model has the general form:

$$\dot{TFP} = \alpha_0 + \alpha_1 \mathrm{li}Y + \alpha_2 \mathrm{lcappc} + \alpha_3 \mathrm{hc} + \alpha_4 \mathrm{polity} + \alpha_5 \mathrm{lLfertility} + \alpha_6 \mathrm{EVCs\ participation} + \varepsilon \quad (1)$$

where is the rate of total factor productivity (TFP) growth; l is the log values of initial per capita income for each period (iGDPpc); lcappc is the log values of capital stock per person; hc is an human capital index; polity is a well-known measure of political regimes of countries; lLfertility is the log values of one-period lagged fertility rates; EVCs backward and forward participation indices are measured as percentages of GDP, gross exports, and exports of value added. Our paper employs the latest version (PWT 9.0) of Penn World Table (Feenstra et. al., 2015) (for variables initial GDP per capita, capital stock per person, and human capital index. Polity variable is as a well-known measure of political regimes of countries from Regime Authority Characteristics and Transitions Datasets of Polity IV Project. Fertility rates are taken from the World Bank World Development Indicators database.

The backward participation and forward participation indices in export value chains are obtained from the last edition of trade in value added (TiVA) database (2015 version). Data on EVC indices taken from the OECD-WTO TiVA (2015 version) are available for the individual years 1995, 2000, 2005, 2008, 2009, 2010 and 2011. Our paper thus prepares the other variables employed in the estimates in four five-year periods averages: 1995-1999, 2000-2004, 2005-2009 and 2010-2014 by associating TiVA variables 1995, 2000, averages of 2005, 2008, and 2009 and averages of 2010-2014, respectively. Note that we try to employ the data for EVCs indices corresponding to the very beginning of the period averages as much as possible to avoid the endogeneity problem.

Table 1 presents the summary statistics for the variables used in the estimates. For the list of countries used in the estimates, see Table A1 in the appendix. Although 61 countries are available in the 2015 version of the OECD-WTO TiVA database, the availability of other variables limits us to with 54 countries in the empirical analysis.

Findings

The model presented above is estimated for the sample period of 1995-2014. The baseline specifications include the following determinants of growth of total factor productivity: the natural logarithm of the initial level of real GDP per capita; the log of capital stock per capita for physical capital; the human capital index for human capital; the lagged log of the fertility rate for population growth; the polity index for institutional quality; and various measures of participation indices.

Table 1: Summary Statistics

	Observations for all countries	All Countries	Developing Countries	Developed Countries
Variable	Obs	Mean Values		
TFP growth	232	0.6479869	0.9575488	0.3590625
liGDPpc	244	9.896583	9.297425	10.47641
lcappc	244	11.23339	10.53984	11.90455
hc	244	2.896917	2.659837	3.12635
polity	228	7.439474	5.748333	9.318519
lLfertility	240	0.6169275	0.7238028	0.5100523
Backward_EVC_GEXP	244	25.43012	25.39056	25.46841
Forward_EVC_GEXP	244	19.65717	19.08653	20.20941
Backward_EVC_GDP	244	12.21151	11.46851	12.93053
Forward_EVC_GDP	244	7.756463	7.305201	8.193169
Backward_EVC_VA	244	37.784	37.68446	37.88032
Forward_EVC_VA	244	26.66554	25.84045	27.46402

Notes: Backward_EVC measures are the foreign value added in gross exports as percentages of GDP, gross exports, and exports of value added. Forward_EVC measures are the amount of domestic value added in foreign exports as percentages of GDP, gross exports and exports of value added. See the text for variable definitions and sources.

Our model is estimated by using the system GMM (Generalized Method of Moments) methods. GMM estimators are frequently employed in the literature to deal with a number of problems such as endogeneity heteroscedasticity, overidentification, and validity. Baum et al. (2003) state that heteroscedasticity is an omnipresent problem in empirical works, and using GMM is a more efficient way of handling heteroscedasticity problem than instrumental variable (IV) estimator. The system GMM estimation results for TFP growth are reported in Tables 2 to 5. In all estimations, AR (2) tests are insignificant which are important indicator for the validity of system GMM results. This means that there is no autocorrelation in first difference levels of AR (2). While considering autocorrelation in GMM, validity of instruments is tested with the Hansen test. Baum et al. (2007) argue that the Hansen J is used test to overidentifying restrictions, which makes the researcher more confident about the appropriateness of the instrument set. The number of groups (countries) should be more than or equal to the number of instruments, and we test the validity of instruments with the Hansen test. Hansen test statistics with high p values (insignificant statistics) in Tables 2 to 5 suggest that the models are correctly specified, considering that there are no evidences of correlation between instruments and errors for most of the specifications.

Table 2 reports the system GMM results for the full sample. In the first three columns of Table 2, we present the results for the commonly used GVCs participation indices as percentages of gross exports as developed by Koopman (2010). We first include them in the estimates separately and then include them together. When included individually, while backward participation index has a significantly negative effect, forward participation index has a significantly positive impact on TFP growth. Our results imply that while countries with higher backward integration have slower TFP growth, countries with higher forward integration have faster TFP growth. When included them in the same specification, (see the 3rd column of Table 2), none of the participation indices has a significant coefficient though.

Furthermore, as shown in the columns 4-6 of Table 2, we employ EVCs participation indices as percentages of GDP in the estimates. Regardless the inclusion of backward participation index in the estimates, forward participation index has significantly positive effect on TFP growth for all countries. However, backward participation index has a significant and negative effect only when included with the forward participation index. Finally, our study adds EVCs participation indeces as percentages of exports of value added in the estimates (see columns 7 to 9 of Table 2). Estimation results for these participation indices are qualitatively similar to the previous ones. Overall these estimation results indicate that while the backward participation index has (marginally significant) negative effect, the forward participation index has significantly positive impact on TFP growth for all countries.

It is possible that the estimated coefficients for backward and forward participation levels vary between income levels. Thus, we divide our sample into two groups as developing and developed countries. Table 3 reports the participation indices as percentages of gross exports for developed and developing countries separately. Estimations results in Table 3 do not provide much fruitful results though. Of the eight estimated coefficients, only is the estimated coefficient for backward participation for developed countries significantly positive. This result implies that backward participation brings productivity gains for developed countries.

Table 2: Impacts of Participation in EVCs on TFP Growth: The Full Sample

	1	2	3	4	5	6	7	8	9
liGDPpc	-7.59** (0.018)	-6.362** (0.056)	-5.81** (0.034)	-6.75** (0.038)	-4.666** (0.045)	-4.504** (0.042)	-7.20** (0.034)	-5.320* (0.087)	-5.251* (0.085)
lcappc	4.426 (0.139)	3.364 (0.272)	3.214 (0.158)	3.720 (0.231)	2.098 (0.287)	2.069 (0.292)	3.932 (0.230)	2.307 (0.389)	2.154 (0.438)
hc	-1.218 (0.703)	-2.797 (0.409)	-0.420 (0.851)	-1.621 (0.690)	-0.680 (0.748)	-0.598 (0.737)	-1.517 (0.672)	-1.933 (0.517)	-1.490 (0.616)
polity	0.410* (0.094)	0.571** (0.032)	0.278 (0.142)	0.548* (0.105)	0.488** (0.014)	0.347* (0.065)	0.499* (0.078)	0.589** (0.022)	0.491** (0.056)
lLfertility	-1.159 (0.633)	-2.660 (0.290)	-1.298 (0.549)	-1.428 (0.617)	-3.222 (0.172)	-3.560 (0.199)	-1.451 (0.595)	-2.561 (0.301)	-2.089 (0.405)
Backward_EVC (as % GEXP)	-0.045* (0.117)		-0.005 (0.913)						
Forward_EVC (as % of GEXP)		0.156*** (0.011)	0.109 (0.137)						
Backward_EVC (as % of GDP)				-0.007 (0.724)		-0.07*** (0.011)			
Forward_EVC (as % of GDP)					0.254*** (0.015)	0.335*** (0.002)			
Backward_EVC (as % of VA exports)							-0.014 (0.143)		-0.018* (0.101)
Forward_EVC (as % of VA exports)								0.133* (0.075)	0.115 (0.125)
AR(2)	0.512	0.488	0.575	0.329	0.210	0.567	0.459	0.274	0.448
Hansen test	0.134	0.279	0.203	0.218	0.305	0.257	0.159	0.356	0.289
# of Instruments	28	28	32	28	28	32	28	28	32
# of Groups	54	54	54	54	54	54	54	54	54
# of Observation	216	216	216	216	216	216	216	216	216

Notes: See Table 1 notes for variable definitions. Hansen test checks the validity of instruments where the null hypothesis is instruments are not correlated with the residuals. AR test measures the second order (AR (2)) autocorrelation. T test p values (based on robust standard errors) are in parenthesis. *, **, *** indicate significance at 10%, 5% and 1% levels, respectively.

Table 4 shows the estimation results for the participation indices as percentages of GDP for income levels. The statistically significant and positive estimated coefficients on forward participation indices clearly indicate that the positive impact of forward participation on TFP growth for the full sample is mainly driven by the estimates for developed countries.

Table 5 presents the estimation results for the participation indices as percentages of exports of value added. Estimation results in Table 5 are very similar to the results presented in Table 3. Statistically significant and positive estimated coefficient on backward participation indicate that backward participation raises the TFP growth only in developed countries.

Table 3: Impacts of Participation (as % of Gross Exports) on TFP Growth by Income Levels

	Developing Countries	Developed Countries	Developing Countries	Developed Countries	Developing Countries	Developed Countries
liGDPpc	-5.230 *(0.170)*	-6.647 *(0.353)*	-3.014 *(0.396)*	-6.520 *(0.188)*	-4.387* *(0.089)*	-2.651 *(0.352)*
lcappw	3.023 *(0.221)*	2.180 *(0.570)*	2.007 *(0.470)*	2.114 *(0.441)*	3.309 *(0.150)*	-3.767 *(0.433)*
hc	1.153 *(0.725)*	0.466 *(0.836)*	2.064 *(0.382)*	0.926 *(0.578)*	-0.780 *(0.598)*	1.742 *(0.125)*
polity	-0.030 *(0.728)*	-0.012 *(0.939)*	-0.071 *(0.439)*	-0.041 *(0.710)*	-0.010 *(0.859)*	-0.003 *(0.960)*
lLfertility	0.171 *(0.961)*	3.279 *(0.406)*	-1.572 *(0.506)*	1.948 *(0.508)*	-2.507 *(0.116)*	-0.957 *(0.709)*
Backward_EVC (as % GEXP)	0.015 *(0.877)*	-0.009 *(0.846)*			0.034 *(0.582)*	0.056* *(0.080)*
Forward_EVC (as % of GEXP)			0.119 *(0.277)*	0.073 *(0.182)*	0.096 *(0.248)*	0.042 *(0.629)*
AR(2)	0.751	0.743	0.499	0.762	0.519	0.978
Hansen	0.447	0.300	0.456	0.313	0.648	0.411
# of Instruments	25	25	25	25	26	23
# of Groups	28	26	28	26	28	26
# of Observations	112	104	112	104	112	104

Notes: See also Table 2.

Table 4: Impacts of Participation (as % of GDP) on TFP Growth by Income Levels

	Developing Countries	Developed Countries	Developing Countries	Developed Countries	Developing Countries	Developed Countries
liGDPpc	-3.544 *(0.482)*	-7.794 *(0.207)*	-3.607 *(0.147)*	-4.624 *(0.185)*	-5.162 *(0.121)*	-5.016* *(0.060)*
lcappw	2.118 *(0.455)*	1.711 *(0.702)*	2.475 *(0.158)*	-0.385 *(0.879)*	3.948 *(0.115)*	0.091 *(0.979)*
hc	2.745 *(0.449)*	1.480 *(0.606)*	1.227 *(0.514)*	0.936 *(0.626)*	-0.918 *(0.541)*	1.964** *(0.052)*
polity	-0.057 *(0.479)*	-0.008 *(0.970)*	-0.040 *(0.561)*	0.150 *(0.266)*	0.018 *(0.838)*	0.082 *(0.356)*
lLfertility	-0.205 *(0.945)*	2.562 *(0.651)*	-1.226 *(0.561)*	1.910 *(0.515)*	-2.872* *(0.087)*	1.400 *(0.452)*
Backward_EVC (as % of GDP)	-0.023 *(0.707)*	0.016 *(0.721)*			-0.038 *(0.516)*	-0.016 *(0.484)*
Forward_EVC (as % of GDP)			0.041 *(0.642)*	0.234*** *(0.002)*	0.183 *(0.246)*	0.233** *(0.037)*
AR(2)	0.563	0.743	0.541	0.870	0.489	0.984
Hansen	0.498	0.271	0.338	0.298	0.482	0.336
# of Instruments	25	25	25	25	26	23
# of Groups	28	26	28	26	28	26
# of Observations	112	104	112	104	112	104

Notes: See also Table 2.

Table 5: Impacts of Participation (as % of Exports of Value Added) on TFP Growth by Income Levels

	Developing Countries	Developed Countries	Developing Countries	Developed Countries	Developing Countries	Developed Countries
liGDPpc	-4.521 *(0.306)*	-7.719 *(0.222)*	-3.471 *(0.348)*	-10.581 *(0.121)*	-4.458 *(0.075)*	-3.780 *(0.174)*
lcappw	2.502 *(0.374)*	2.590 *(0.527)*	2.705 *(0.278)*	1.931 *(0.666)*	3.529 *(0.141)*	-3.881 *(0.224)*
hc	1.917 *(0.599)*	1.110 *(0.584)*	1.434 *(0.640)*	0.815 *(0.819)*	-0.732 *(0.740)*	1.700 *(0.137)*
polity2	-0.046 *(0.617)*	-0.046 *(0.771)*	-0.083 *(0.406)*	-0.026 *(0.892)*	-0.022 *(0.802)*	0.011 *(0.873)*
lLfertility	-0.305 *(0.916)*	2.901 *(0.506)*	-1.623 *(0.558)*	0.550 *(0.902)*	-2.591 *(0.117)*	-0.984 *(0.545)*
BackwardVA	-0.009 *(0.817)*	-0.003 *(0.892)*			-0.008 *(0.704)*	0.027* *(0.086)*
ForwardVA			0.073 *(0.513)*	0.131 *(0.186)*	0.084 *(0.389)*	0.076 *(0.226)*
AR(2)	0.613	0.721	0.504	0.581	0.528	0.870
Hansen	0.476	0.295	0.342	0.219	0.646	0.408
# of Instruments	25	25	25	25	26	23
# of Groups	28	26	28	26	28	26
# of Observations	112	104	112	104	112	104

Notes: See also Table 2.

Overall our results fail to provide any significant evidence that developing countries acquire productivity gains through participating in export value chains either backwardly or forwardly. These results contradict the common expectation that participation to EVCs brings productivity gains for developing countries.

One explanation of this non-positive impact of participation to EVCs on TFP growth might be that current composition of trade flows in terms of trade products and trade partners don't provide satisfactory gains to developing countries in terms of TFP growth. The current positions of the export value chains of developing countries in GVCs and failure in effective upgrading in value chains may be other important reasons. Lastly, current relatively more trade protection policies and trade incentives (supports) which are resulted by inefficient diagnosis of current situations of countries within GVCs cannot be ignored as triggering such adverse situations for developing countries.

Our estimation results, however, imply that developed countries significantly benefit from participating in EVCs both backwardly and forwardly. These results for developed countries are not much surprising when regarding the share of the transnational corporations (TNC) coordinated GVCs as 80 percent of global trade (UNCTAD, 2013) though.

DISCUSSIONS

This paper empirically investigates the impact of participation indices in export value chains on TFP growth for developing and developed countries separately. Our estimation results from the full sample indicate that although higher backward integration reduces TFP growth, higher forward integration raises TFP growth for all countries.

We then re-estimate our regressions for income levels. On the one hand, our results indicate that neither backward nor forward participation indices have positive effect on TFP growth for developing

countries. On the other hand, both backward and forward participation have statistically significant and positive effects on TFP growth for developed countries. These results evidently show that while current state of export value chains does not benefit developing countries, they are beneficial developed countries. These results evidently indicate that the unfavorable situation of developing countries in EVCs dominated world is contrary to common expectations, which lead us to question the contemporary expansion of GVCs by backward participation of developing countries. Thus, further empirical analysis is compulsory to discuss the current and future positions of developing and developed nations along value chains in a more detailed way.

Endnotes

[1] WIOD covers 40 countries and 35 industries at that date.

[2] This paper was first published in 2012 as a NBER paper (see references).

[3] About ongoing efforts, see http://www.oecd.org/std/its/oecd-technical-worshop-on-foreign-direct-investment-and-global-value-chains-19-october-2015-paris.htm.

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Appendix:

Table A1: List of Countries

Developing Countries		Developed Countries	
Chile	Colombia	Australia	Netherlands
Czech Republic	Costa Rica	Austria	New Zealand
Estonia	Croatia	Belgium	Norway
Hungary	India	Canada	Portugal
S. Korea	Indonesia	Denmark	Slovenia
Latvia	Lithuania	Finland	Spain
Mexico	Malaysia	France	Sweden
Poland	Philippines	Germany	Switzerland
Slovak Republic	Romania	Greece	United Kingdom
Turkey	Russia	Ireland	United States
Argentina	Saudi Arabia	Israel	Cyprus
Brazil	South Africa	Italy	Singapore
Bulgaria	Thailand	Japan	
China	Tunisia	Luxembourg	