The impact of shared links in global value chains on trade freedom in developing countries

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Abstract:

The study aims to identify the impact of the common links of global value chains on the freedom of trade for developing countries. The study relied on the standard analysis method through panel models, the joint integration test, and the estimation of long-term parameters using the dynamic ordinary least squares method. The study is determined, via static analysis of panel models, that the fixed effects model is suitable and provides evidence of fixed individual differences among the selected developing countries regarding the influence of global value chain linkages on trade freedom, indicating variability in countries' readiness to engage in global value chains. The dynamic analysis showed that both the forward linkages index and the foreign direct investment flows index had a positive and statistically significant impact on the freedom of trade in developing countries, and the backward linkages index had a negative and stati(Arab Monetary Fund, 2019)stically significant impact on the freedom of trade in the selected countries. The study concluded that improving the levels of forward linkages and foreign direct investment flows is important and decisive for developing countries, as each of them constitutes a major means of regional integration and can facilitate the increase in the flow of goods and services and open new channels for trade exchanges between developing countries.

.**Keywords:** Shared Links in Global Value Chains; Trade Liberalization; Developing Countries.

Jel Classification Codes:F14, F13

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I. Introduction :

One of the most important aspects of the previous decades' fast globalization is the rise of global value chains or GVCs. The phenomenon linked to the growth of GVCs has explained by economic literature from several angles, including fragmentation. Despite their relatively low GVC participation rates, developing nations have become more involved in GVC activities in recent decades. Through cooperative production, these countries can reach global markets, promoting sustainable growth and strengthening their national economies.

Emerging economies differ in how they integrate into GVCs. Low levels of domestic value addition and minimal product and service diversification characterize the early manufacturing stages in African nations, when integration is primarily concentrated. Southeast Asian emerging countries, on the other hand, actively engage in the assembly of industrial items and the processing of raw materials. While China, Singapore, and South Korea manufacture parts for mechanical engineering items built in developed countries, Malaysia, the Philippines, and Thailand focus on assembling computers and electrical devices**.**

Research Problem: In light of the aforementioned, we can suggest the following research question: How do the common connections in global value chains affect developing nations' ability to freely trade?

We can divide this research problem into the following sub-questions in order to provide an answer:

- Does participation in the different global value chain connections enhance trade in developing countries?
- What are the primary forces for emerging nations' involvement in global value chains?
- Do emerging nations' economy have an obligation to join global value chains? What is the explanation for this?

Theories:

The following theories can put forth in order to answer the research topic and sub-questions:

- By drawing in investment and technology, developing economies' involvement in global value chains has a favorable effect.
- Forward links in global value chains and trade liberalization in developing nations are significantly positively correlated.
- In emerging nations, trade freedom and foreign direct investment flows are positively correlated in a statistically meaningful way.

- Trade freedom in developing nations significantly correlated with backward linkages in global value chains.

Significance of the Research:

This study is significant since it focuses on a current issue and attempts to explain this new phenomenon. It also aims to determine the predicted economic gains and advantages of developing nations' involvement in global value chains. Additionally, it examines important empirical models to gauge how these connections affect emerging nations' commerce.

Research Goals: The following are the primary goals of this investigation:

- to provide the most important theoretical works on global value chains.
- to determine the expected advantages of developing nations joining global value chains.
- to assess how trade freedom is affected by emerging nations' shared connections in global value networks.
- The study's ultimate goal is to evaluate developing nations' potential under these new trade agreements by examining their capacity to engage in global value chains and the elements that have contributed to their success.

II. Theoretical littérature on value chains

II-1Global Value Chains Concept:

The GVC framework was widely used by 2013. Companies have specialized on either core activities while outsourcing other operations, domestically or internationally, a result of the growing complexity and fragmentation of industrial processes. Significant trade barrier reductions as well as improvements in logistics, communication, and transportation networks made this transition possible**.**(IDE-JETRO, 2015, p. 20)

Businesses in developed economies frequently move some of their operations overseas, especially to developing nations. The worldwide division of production stages, which takes advantage of variations in the cost of production factors across nations, accounts for a sizable amount of their revenues.

A method of internationalizing corporate operations, the global value chain (GVC) is defined by separating industrial processes into discrete steps in different nations.(LiudmilaChikhun & Igor Romanov, 2023)

The process of combining technology with labor and material inputs, and then assembling the inputs for processing, marketing, and distribution known as a value chain. In this procedure, a single firm may be vertically integrated or comprise just one broad link **.**(HolstJ, 2015) "

According to a different definition, global value chains encompass all of the steps and operations that factories and institutions take to create the finished product and introduce it to the market, including the design, production, marketing, and distribution phases, culminating in the after-sales (maintenance) services**.**(Arab Monetary Fund, 2019)**.**

II-2Global Value Chain Drivers

Similar to the expansion of FDI flows, which are crucial to multinational businesses' establishment of global value chains, it is challenging to distinguish the factors that specifically contribute to the fragmentation of production from those that drive the growth of international trade. Given this, every decrease in transportation, information and communication, and technology costs—the primary forces behind global value chains during the past 20 years—acts as a roadblock to the growth of capital flows and commerce**.**(A João A & Sónia C, 2014)

II-2-1Technologicalprogress

Global value chains significantly shaped by technological advancement. Rapid advancements in technology have caused the production process to become fragmented. This is especially true of the growing role of intermediate goods in international trade, which essentially entails the division of the production process and permits the worldwide dispersion of different value-added activities. We call these "global value chains**".**(Bernhardt Thomas & Pollak Ruth, 2015, p. 50)

II-2-2Transportation and logistics services

Facilitating international travel, managing the supply chain, effectively satisfying customer needs within the logistics support system, substantially contributing to the producers' value-added chain, and creating hybrid product packages, transport, and logistics services play crucial roles in global value chains**.**(Choorikkad Veeramani & Garima Dhir, 2023).

II-2-3Foreign direct investment flows

Another important avenue for international technology transfer is foreign direct investment. According to the majority of research, multinational firms are mostly to blame for the technical advancements that they are able to introduce into their host nations, especially through supply chain connections. Multinational firms undoubtedly use supply chain operations to transfer their technology and methods to their operations in destination markets. I discovered that when Costa Rican businesses started sourcing from foreign enterprises, their performance significantly and consistently improved. Multinational firms can transmit worldwide technology to their suppliers in developing nations using foreign licensing**.**(Rigo, 2021)

II-2-4Forward Links to Participation in Global Value Chains

When a nation contributes inputs (exports of intermediate commodities) to exporting companies in other nations, this referred to as a forward connection in global value chains. It is typical of nations that participate downwardly in the industrial process by integrating into the raw material stages. It describes businesses as part of global production networks and providers of highly specialized intermediate commodities utilized by businesses overseas. Participation through forward linkages in the global value chain positively affects export survival rates, highlighting the significance of strengthening global value chain integration for sustainable exports. The percentage of domestic value added in the value of exports of goods and services from other nations that produced utilizing these goods and services is a measure of this involvement.(Mauro Boffa , Marion Jansen , & Olga Solleder, 2021)

II-2-5Backlinks to participate in the global value chain

By improving communication and easing the flow of information between various entities, backward linkages—imports of intermediate goods—play a significant role in involvement in the global value chain. It is the so-called upward component, which means that to manufacture end goods, the nation imports intermediate goods. Manufacturers of finished goods are included in the global value chain in this instance (upward participation). The proportion of foreign value added to the value of local exports derived from these items is one measure of this involvement**.**(Tomasz Białow, as, & Anna Budzy ´nska, 2022)

III. Literature Review :

III-1-The first study (Hiroyuki Taguchi ,2014)

By using UNCTAD data for 2013 to analyze value-added trade and a quadratic equation for the relationship between values added as a dependent variable, the share of exports, and the growth rate of per capita GDP, the study sought to determine the economic effects of participation in global value chains. The findings demonstrated that when value chain participation with the upgrading of local productive capacity, though this improvement took longer in high-value sectors like transportation, machinery, and electrical equipment.(Hiroyuki Taguchi, 2014)**.**

III-2-The second study (Roman Stollinger,2017)

This study looks at the relationship between structural upgrading in 53 nations and involvement in global value chains. This is because emerging and transitional economies place a greater emphasis on structural upgrading.

As the dependent variable, the researchers employed econometric techniques and represented structural upgrading in terms of labor productivity growth. Additionally, the dependent variable was membership in global value chains.

The researcher employed several explanatory factors, such as participation in actual value chains, foreign direct investment flows, and forward and backward linkages.

Additionally, some explanatory factors were included, such as population, labor productivity, and real GDP per capita.

The study comes to the following conclusion:

Though forecasts indicate that global value networks are a useful instrument for industrial policy, they also have an impact on the strengthening effect of growing value chain commerce on structural development in emerging and transition economies alone, earning little support from policymakers in poor nations. It is impossible to separate the structural effects of trade in general from the effects of GVC trade expansion on structural development. It is impossible to separate the structural effects of trade in general from the effects of GVC trade expansion on structural development. The acceleration of structural development intimately linked to the growth of global trade markets. Whether this trade integration takes place through GVC trade or another type of trade is irrelevant.(Stöllinger, 2017)

IV. Methods and Tools

Measuring the impact of global value chain participation linkages on developing countries' trade freedom : A benchmark study of seven developing countries over the period 2000-2020 :

The impact of forward and backward links of global value chain involvement on developing countries' trade freedom will our main focus. Panel data analysis models will then used to determine the amount of developing countries' engagement in global value chains. To accomplish this, the study variables that were used are first described, followed by the tests and models that were carried out to accomplish the study's goal.

A-Definition of study variables:

Explanatory indications for the phenomenon under investigation were derived from prior research and are shown in the following:

-Dependent variable : The study's dependent variable is the freedom of global trade, which was measured by commodity trade as a percentage of GDP (that is, the value of commodity imports and exports divided by GDP) and all data in the current US dollar. The symbol Y isused to represent it.

-Two in dicators were used in the study to express the common ties for developing nations' participation in global value chains. These indicators were the forward links of global value chains, which are represented by the total exports of intermediate products, denoted by the symbol XPO.

Additionally, the total imports of intermediate items, denoted by the sign IMP, show the backward connections of global value chains. It is anticipated that the global value chain-related variable XPO will positively affect the dependent variable, whilst the variable IMP will negatively affect it

Also, foreign direct investment flows, represented by the symbol FDI, are a variable that has been linked to participation in global value chains in past research. The World

Bank data base provided the data for the dependent variable and the explanatory variable, which are the foreign direct investment flows for the seven chosen nations from 2000 to 2020. The Organization for Economic Co-operation and Development (OECD) provided the data for the other two explanatory variables.

B-Results of different models and tests:

Cross-sectional time series models were used in the study because of their higher prediction accuracy. The impact of time changes and changes in national differences are also taken in to consideration. The folloing procedures will used to construct cross-sectional time series models :

C-Analysis of cross-sectional time-series stationarity :

It is crucial to make sure the time series utilized in the model are stationary because if they are not, utilizing them for estimation can produce inaccurate and mis leading results. Two tests were employed : the (IPS) test suggested by in lm Pesaan Sh and the (LLC) test suggested by Chu dnaL in Levin. The absence of a unit root indicates that the time series isstationary, whereas the existence of a unit root indicates that the time series is not stationary, which is the null hypo thesis in these two tests. The alternative hypothesis is accepted and the null hypothesis is rejected if the P-valueis less than 0.05, indicating that the time series is stationary**.**

Table 1: Unit root test results according to LLC test

Source :Prepared by the researchers based on the outputs of the 10Eviews .program

According to the findings of the unit root test using the LLC test, which are displayed in Table No. 01, some of the research variables are stable at the level while others are not, and some are stable when taking the first difference. In order to investigate the station arity of the variables, we must test the joint integration as the model variables are not integrated.

Table 2: Unit root test results according to IPS test

Source :Prepared by the researchers based on the outputs of the 10Eviews program

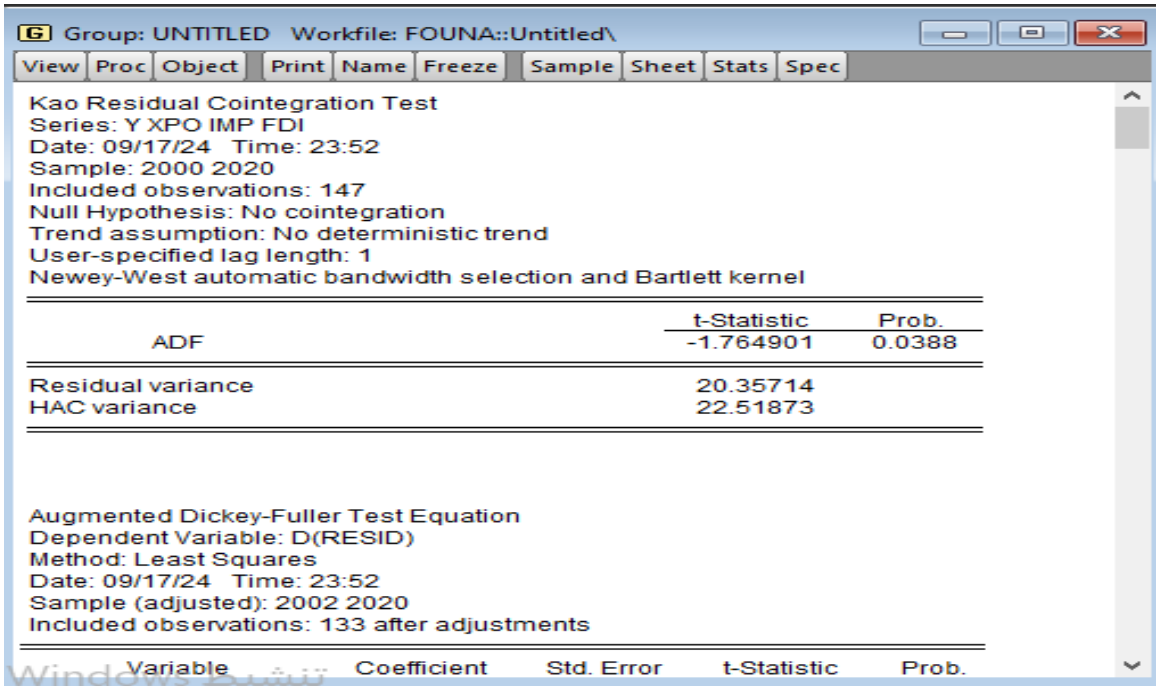
One variable is stable at the level, according to the findings of the unit root test using the IPS test, which are displayed in Table (02). The other research variables are not integrated because they are not stable at the level but are stable when taking the first difference. In this instance, we use the joint integration test to examine the time series' stability.

Cointegration Test :

The results of the 10EViews program indicate that there is cointegration, which leads us to conclude that all of the study variables are integrated to the first degree by Pantela's test, which states that the null hypothesis is the absence of cointegration and

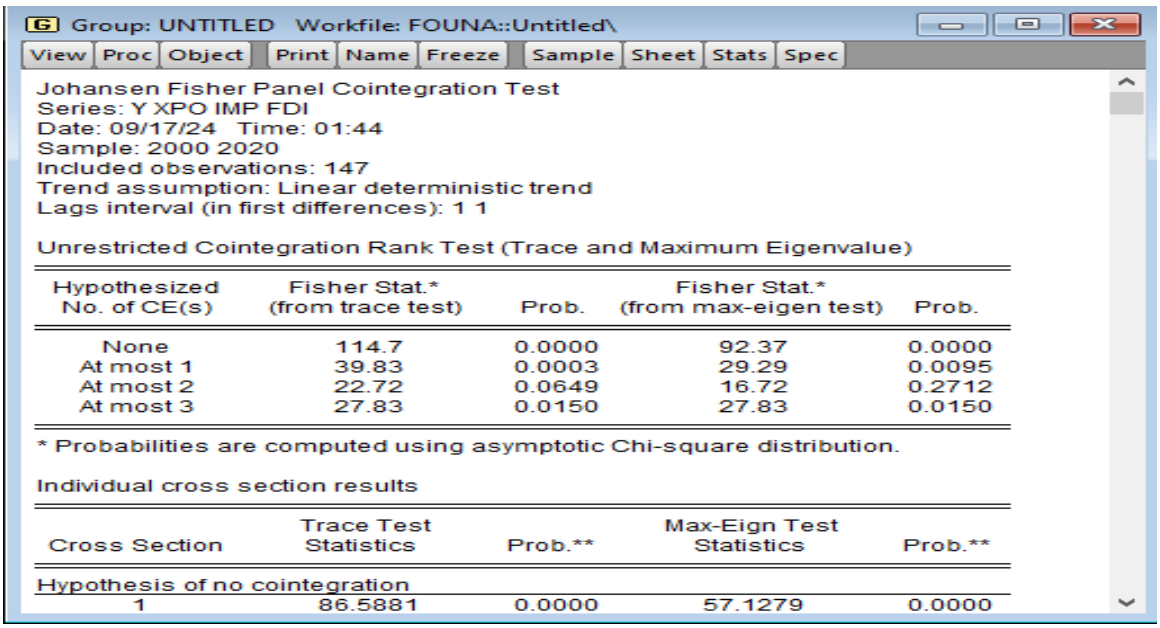
the alternative hypothesis is the presence of cointegration. Kao and Johansen are used for this, as seen in the figurN1:

Figure 1: Co-integration test for Kao



Source: 10EViews output

Figure 2:Johansson's cointegration test:



Source: 10EViews output

Panel Model Estimation :

The model was estimated using three panel data models, namely the pool edregression model (PRM), the fixed effects model (FEM), and the random effects model (REM). While the estimation model was formulated as follows :

$$y_{it} = \beta_0 i + \beta_1 xpO_{it} + \beta_2 IMP_{it} + \beta_3 FDI_{it}$$

$$i = 1 \ldots 7 \; ; \; t = 2000 \ldots 2020$$

Figure 3: Shows the estimation of the study model using the cumulative ::regression model method

Equation: UNTITLED Workfile: FOUNA::Untitled\

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: Y
Method: Panel Least Squares
Date: 09/18/24 Time: 00:29
Sample: 2000 2020
Periods included: 21
Cross-sections included: 7
Total panel (balanced) observations: 147

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	45.27541	3.562892	12.70749	0.0000
XPO	7.50E-05	2.93E-05	2.561485	0.0115
IMP	-6.65E-05	2.29E-05	-2.905850	0.0042
FDI	-0.053095	1.274353	-0.041664	0.9668

R-squared	0.071125	Mean dependent var	45.78888
Adjusted R-squared	0.051638	S.D. dependent var	22.58539
S.E. of regression	21.99452	Akaike info criterion	9.046298
Sum squared resid	69177.54	Schwarz criterion	9.127670
Log likelihood	-660.9029	Hannan-Quinn criter.	9.079360
F-statistic	3.649910	Durbin-Watson stat	0.051760
Prob(F-statistic)	0.014180		

Source: 10EViews output

Figure 4: Shows the estimation of the study model using the fixed effects model method:

Equation: UNTITLED Workfile: FOUNA::Untitled\

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: Y
Method: Panel Least Squares
Date: 09/18/24 Time: 01:23
Sample: 2000 2020
Periods included: 21
Cross-sections included: 7
Total panel (balanced) observations: 147

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	42.87936	1.561493	27.46049	0.0000
XPO	4.79E-05	1.86E-05	2.575693	0.0111
IMP	-4.41E-05	1.50E-05	-2.940037	0.0039
FDI	1.391670	0.523962	2.656052	0.0088

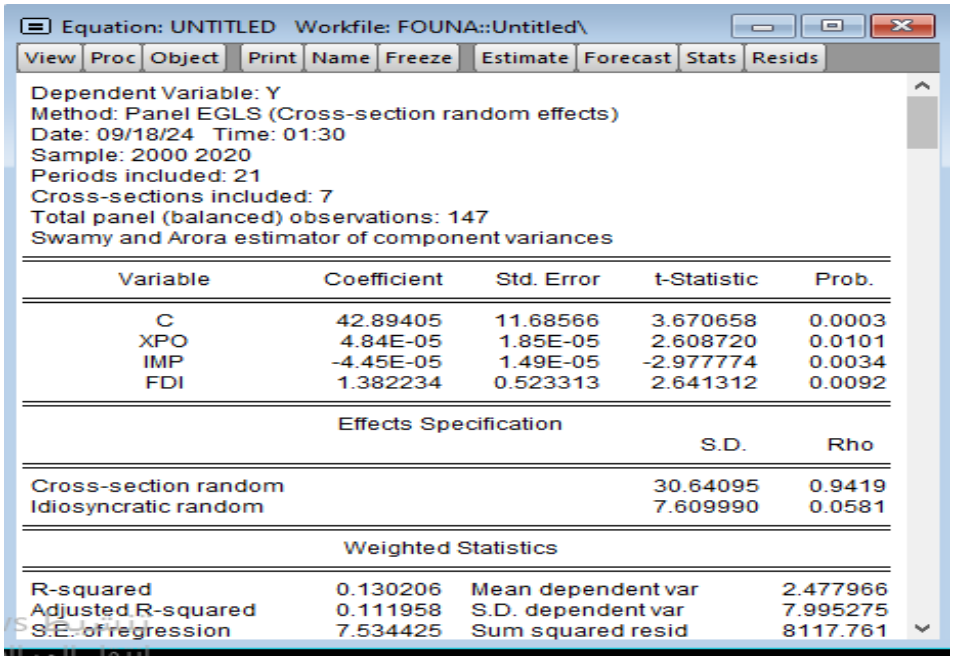
Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.893468	Mean dependent var	45.78888
Adjusted R-squared	0.886469	S.D. dependent var	22.58539
S.E. of regression	7.609990	Akaike info criterion	6.962404
Sum squared resid	7933.937	Schwarz criterion	7.165834
Log likelihood	-501.7367	Hannan-Quinn criter.	7.045060
F-statistic	127.6663	Durbin-Watson stat	0.440030
Prob(F-statistic)	0.000000		

Source: 10EViews output

Figure 5 shows the estimation of the study model using the random effects model:



Source: 10EViews output

Table 3: Study model parametersusing the threemodels

Random	Constant	The aggregate	Variable/Model
3.670658 (0.0003)	27.46049 (0.0000)	12.70749 (0.0000)	C
2.608720 (0.0101)	2.575693 (0.0111)	2.561485 (0.0115)	XPO
-2.977774 (0.0034)	-2.940037 (0.0039)	-2.905850 (-0.0042)	IMP
2.641312 (0.0092)	2.656052 (0.0088)	-0.041664 (0.9668)	FDI
0.130206	0.893468	0.071125	R^2
7.135557	127.6663	3.649910	F
0.000168	0.000000	0.014180	Prob (F)

Source :Prepared by the researchers based on the outputs of the 10Eviews program

In otherwords, among the elements influencing the degrees of trade freedom among the chosen developing nations in the study subject are the fixed individual differences

and the disparities between those nations for the indicators of common connections of global value chains.

Estimating long-runparameters :

Afterfinding a long-runequilibriumrelationshipbetween the model variables, wewillestimate the long-runparametersusing the dynamicordinary least squares method for panel models:

Figure 6: Estimation of long-runparametersusing the dynamic least squares method for the panel

Equation: UNTITLED Workfile: FOUNA::Untitled\

View | Proc | Object | Print | Name | Freeze | Estimate | Forecast | Stats | Resids

Dependent Variable: Y
Method: Panel Least Squares
Date: 09/20/24 Time: 04:08
Sample: 2000 2020
Periods included: 21
Cross-sections included: 7
Total panel (balanced) observations: 147

Variable	Coefficient	Std. Error	t-Statistic	Prob.
XPO	4.79E-05	1.86E-05	2.575693	0.0111
IMP	-4.41E-05	1.50E-05	-2.940037	0.0039
FDI	1.391670	0.523962	2.656052	0.0088
C	42.87936	1.561493	27.46049	0.0000

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.893468	Mean dependent var	45.78888
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S.E. of regression	7.609990	Akaike info criterion	6.962404
Sum squared resid	7933.937	Schwarz criterion	7.165834
Log likelihood	-501.7367	Hannan-Quinn criter.	7.045060
F-statistic	127.6663	Durbin-Watson stat	0.440030
Prob(F-statistic)	0.000000		

Source: 10EViews output

The FUSE10 program's findings show that, as anticipated, there is a statistically significant positive correlation between the dependent variable of trade freedom in developing nations and both the foreign direct investment flows index and the forward linkages index of participation in global value chains, which is measured by total exports of intermediate products. As anticipated, there is a statistically significant negative correlation between the dependent variable and the backward linkages index of participation in global value chains, which is represented by imports of intermediate items. 89.34% of the changes in trade freedom for developing nations could explained by the independent variables ; the remaining percentage is the result of other factors that were not taken into account when creating the model. Overall, the model is reasonable and statistically significant.

V. Results and discussion :

Using cross-sectional time series models (panel) for the years 2000–2020, this study aimed to show how common links to global value chains affect trade freedom in developing nations and, consequently, their capacity to make significant contributions to global value chains. The Kao and Johanson tests,

which used the ordinary least squares method for panel models to evaluate the association between the independent factors and the dependent variable, trade freedom for developing nations, also relied on the joint integration approach. Through the static analysis of panel models, the research paper came to the following conclusions :

- The fixed effects model is appropriate and provides evidence of fixed individual differences between the developing countries chosen for the study model in the impact of common links to participate in global value chains on trade freedom;

- The differences between the chosen developing countries about common links to global value chains are among the issues affecting trade freedom between those countries; - It affects preparedness and the ability of countries to benefit from global value chains generally. According to the results of the joint integration test, the dependent and independent variables have a long-term equilibrium relationship. We were therefore able to assess the long-term characteristics of this association in our study.

-The index of foreign direct investment flows and the index of forward connections of global value chains both positively and statistically significantly affect trade freedom for developing nations, according to dynamic study.

-The freedom of commerce in developing nations is negatively and statistically significantly impacted by the index of backward connections of global value chains.

VI. Conclusion :

- To expand the flow of commodities and services and raise the degree of participation of emerging nations in global value chains, the governments of these nations must remove trade obstacles.
- -To improve the status of technology to ward advancement and development، new avenues for trade exchanges must developed، as well as the possibility of both domestic and foreign investment flows.
- The creation of a future strategy by developing nations to deal with businesses involved in global value chains.

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