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# ON THE RELATIONSHIP BETWEEN DOMESTIC INVESTMENT, EXPORTS AND ECONOMIC GROWTH: EVIDENCE FROM GREECE

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**Abstract:** *The aim of this paper is to investigate the relationship between domestic investment, exports and economic growth in Greece. The empirical analysis uses annual data over the period 1970 – 2020 and Vector Error Correction Model. The results indicate that in the long run there is no causality relationship between exports, domestic investment, and economic growth. In the short run, we found that only exports cause domestic investment. These results demonstrate that domestic investment and exports are not seen as a source of economic growth in the case of Greece which partially explain the catastrophe situation of economic activity in Greece.*

**Keywords:** Domestic Investment, Exports, Economic Growth, VECM, Greece.

**JEL Classification :** C13, E22, F14, O47, O52.

## 1. Introduction

Domestic investment is one of the basic ingredients for the development of the economy. It is the cornerstone of any country's economy, and it cannot be dispensed with or excluded. It is one of the important indicators and indications of the success of the country and its economy. It is often known that domestic investment is mainly related to the economy, where it is one of the basic criteria on which to measure the success of the economy, which in turn is considered one of the most important things that strengthen the state and improve its reputation. Among the most important benefits that investment provides to the country’s economy are the

following: (1) Increasing the proportion of local products, which in turn increases the gross domestic product, which is considered one of the most important ratios and indicators that indicate the success of the country's economy; (2) Hiring as many workers as possible, this leads to a reduction in the unemployment rate and an improvement in the level of national income for individuals; (3) Developing and improving the country's economy as well as increasing all domestic products and exports, which serve to relieve the debt burden of the State; This leads to the equilibrium of the balance of payments; (4) Improving infrastructure and developing all public utilities existing in society; Thus, we have a developed country that contains serious services that help provide social welfare; (5) Providing self-sufficiency for the state and for the citizens living in it, as well as for exporting it abroad; Which leads to the state obtaining financial revenues; (6) Providing foreign currency through exports coming from domestic investments. (7) Improving the quality of the final output of local products.

Many theoretical studies have dealt with exports and their role in economic and social development for several reasons. They require companies to grow and improve to maintain market share to ensure export security and increase sales and profits. Similarly, exports can reduce the impact of market fluctuations through workers in global markets and changes in relationships with young firms. Otherwise, the increase in exports leads to an increase in the acquisition of foreign exchange, which increases the national income and leads to an improvement in the level of the share of the population. Finally, and regarding the benefits of exports, they enable and achieve the survival of domestic investments, which translates into increased economic growth and assurance of robust economic development.

According to Duval (2011), Greece is a country resistant to the single market and to competition and which has failed to combat corporatism and situational rents, in the private and public sectors. Inflation was high in the country and caused a loss of competitiveness which led to a large trade balance deficit. Similarly, membership of the euro zone does not allow it to regain competitiveness by devaluing and obliges it to practice a policy of rigor. The current account deficit exceeded 16% of GDP in 2008. In other words, the Greeks had begun to consume much more than they produced and had to find almost 40 billion euros abroad to finance this consumption. Some even consider that Greece would be a victim of the Dutch disease, for its inability to make the country benefit from the raw materials generating

currencies such as tourism or the chartering of ships. These elements make it possible to question the sustainability of the debt, the situation of domestic investments, the value of exports and the future of economic growth.

For these reasons, the aim of this research is to study the three-way linkage between domestic investment, exports and economic growth in the case of Greece. To attempt this goal, this paper is structed in other four sections. In the second section, we will present a review of the literature that exploits the various works that have examined the link between domestic investment, exports, and economic growth. In the third section, we will explain the choice of our empirical methodology. in the fourth section, we will present our empirical results. The last section is devoted to put the necessary conclusions and recommendations.

## 2. Literature Survey

The impact of domestic investment and exports on economic growth remains a very important and relevant economic topic for all economies around the world. In fact, as we have mentioned, investments and exports have the power to refine the state of economic activity by ensuring long-term sustainable economic growth. In this section, we will present a review of the literature which explains the various works related to the impact of these two macroeconomic aggregates on economic growth. We begin with work on the link between domestic investment and economic growth.

### 2.1.Domestic investment and economic growth

Ali (2015) analyzed the impact of domestic investment on Pakistan's economic growth during the period 1981 to 2014. Using cointegration analysis and Vector Error Correction Model (VECM) are applied. The empirical results indicate that domestic investments have a positive effect on long-term economic growth.

Bakari (2016) Searched the impact of domestic investment and economic growth in the case of Canada. By using VAR model, he found that there is no relationship between domestic investment and economic growth during the period 1990 – 2015. Bakari (2017a) searched the impact of domestic investment on economic growth in the case of Japan for the period 1970 – 2015. In his empirical, he used ordinary least square since all variables includes in used model

are stationary at level. He found that domestic investment has a positive impact on economic growth. Bakari (2021a) Searched the impact of the interaction between internet use and domestic investment on economic growth during the period 1991 – 2018 in the case of G-7 Countries. In his empirical methodology, he used several models such as Pooled OLS, Pooled OLS Fixed Effect, Pooled OLS Random Effect, GMM, GMM Fixed Effect, GMM Random Effect, 2SLS, 2SLS Fixed Effect and 2SLS Random Effect. He found that domestic investment has a positive influence on economic growth. However, the interaction between domestic investment and internet use don't have any impact on economic growth.

In the case of Spain, Bakari (2021b) also searched the incidence of domestic investment on economic growth over the period 1970 – 2017 by using cointegration analysis and vector error correction model. Empirical results indicate that domestic investment has no effect on economic growth in the short run and in the long run. Also, Bakari et al (2020a) searched the impact of domestic investment on economic growth in Peru by using annual data for the period 1970 – 2017. To attempt their goal, they used cointegration analysis, error correction model and Wald test. They found that domestic investment has not any impact on economic growth in the short term and in the long term.

In the other hand, Bakari et al (2020b) searched the relationship among domestic investment, taxation, and economic growth in the case of Germany for the period 1972 – 2016. By applying VECM models, they found that domestic investment influence positively economic growth, however the impact of taxation is negative. However, in the case of France, Bakari (2019) investigated the relationship between domestic investment, taxation and economic growth during the period 1972 – 2016. He found that in the long run there is a negative relationship between all the three variables. He indicated and proved that the strategy of strategy tax policy is not safe for both economic growth and domestic investment in France.

Bakari and Tiba (2019) searched the determinants of economic growth in the case of United States American during the period 1970 – 2016. They found that domestic investment has positive influence on economic growth in the long run. However, they indicated that domestic investment has no effect on growth in the short run. In the case of Urugay, Bakari et al (2019a) found that domestic investment is not a determinant of economic growth in the long run and in the short run during the period 1960 – 2017.

In the case of Brazil, Bakari et al (2021) applied annual data for the period 1970 – 2017 and VECM model to detect the nexus between domestic investment and economic growth in the long run and in the short run. They found that domestic investment cause economic growth in both long and run terms. Fakraoui and Bakari (2019) searched the incidence of economic growth in the case of India during the period 1970 – 2019. By using VECM models, they indicated that there is no relationship between economic growth and domestic investment in the long run and in the short run.

Using an estimation based on Static Gravity Model, Bakari and Mabrouki (2018) found that domestic investment has a positive impact on economic growth in the case of North Africa for the period 1982 – 2016. In the case of Tunisia, Bouchoucha and Bakari (2019) searched the impact of domestic investment on economic growth in the long run using ARDL model and annual data for the period 1976 – 2017. They found that domestic investment affects negatively economic growth in the long run. These results are confirmed also by Bakari (2020) in the case of Tunisia. Recently, Bakari and El Weriemmi (2022) examined the nexus between domestic investment and economic growth in the case of Arab Countries during the period 1990 – 2020. By using VECM model, they found that there is no relationship between domestic investment and economic growth in the long run. Alfa and Garba (2012) examined the impact of domestic investment on economic growth in Nigeria using annual time series data from 1970 to 2013. The result of the analyzed data showed that private investment and productive public investment had a positive but insignificant impact on economic growth. This means that domestic investments have an adverse effect on economic growth.

In the context of Nigeria, Ogunjinmi (2022) found that there is no relationship between domestic investment and long-term economic growth over the period 1981-2019. They used the ARDL model. Aslan and Altinoz (2021) examined the link between domestic investment and economic growth in developing countries in the European, Asian, African, and American continents. They found that domestic investments negatively influence economic growth using the Panel VAR model. For the period 1990 to 2017, Ewubare and Worlu (2020) researched the effect of domestic investment on economic growth in Nigeria, and they also found that there is a negative relationship between domestic investment and growth. long-term economic growth. For the case of Indonesia, Anwar and Elfaki (2021) applied annual

data for the period 1965 - 2018 and the ARDL model. They found that domestic investment has a positive effect on economic growth.

For the case of Pakistan, Javid (2019) examined the impact of domestic investment on economic growth during the period from 1972 to 2015. He found that domestic investments have positive effects on economic growth. Similarly, Shabbir et al (2021) confirmed that domestic investment is a source of growth more than foreign direct investment in the case of Pakistan. For the case of Vietnam, Nguyen and Trinh (2018) examined the impact of domestic investment on short-term and long-term economic growth over the period 1990 – 2016. They found that domestic investment positively affects economic growth in the short and long term. Moreover, Tran and Hoang (2018) tested the influence of domestic investment on economic growth in 47 provinces of Vietnam during the period 2012 to 2015. They confirmed that domestic investment has a positive impact on economic growth. Kobilov (2020) found that there is a positive two-way relationship between domestic investment and economic growth in the case of Uzbekistan.

### 2.2.Exports and economic growth

In the case of 50 Africain countries, Abdullahi et al (2013) examined the impact of trade on economic growth during the period 1991 – 2011. Empirical results indicated that exports cause economic growth. However, imports don’t have any effect on economic growth. Bhatt (2013) investigated the nexus between exports and economic growth in the case of Vietnam during the period 1990 – 2008. Using VAR Model and Granger Causality Tests, he found that only economic growth cause exports. For the case of Pakistan, Farooq et al (2013) studied the impact of exports on economic growth over the period 1987 – 2009. In their empirical investigation, they applied cointegration analysis and ARDL Model. They found that exports contributed positively economic growth in the long run. However, there is no relationship between economic growth and exports in the short run. Also, Kibria and Hossain (2020) studied the relationship between exports and the economic growth of Bangladesh during the period 1980 to 2018. Using the Granger causality test, they confirmed the absence of a causal relationship between exports and economic growth.

Over the period 1995 – 2011, Gossel and Biekpe (2013) found that exports cause economic

growth in South Africa. Azeez et al (2014) investigated the incidence of exports on economic growth in the case of Nigeria. Using ordinary least square, they found that exports have a positive and significative impact on economic growth. Bakari (2016) searched the nexus between exports and economic growth in the case of Canada during the period 1990 – 2015. By using VAR Model and the Granger Causality Test, he found that exports and imports cause economic growth. In the case of Tunisia, Bakari (2017b) Searched the relationship among exports, imports, and economic growth. He found that in the long run exports have a negative effect on economic growth. However, he found that imports affect positively economic growth in the long run. In the short run, results indicated that imports and exports cause economic growth. These results are confirmed by other studies in the case of Tunisia such as Bakari et al (2018), Abdelhafidh and Bakari (2018).

Bakari and Mabrouki (2019) searched the causality between exports and economic growth in the case of Morocco. By using VAR model and the Granger Causality Test, they found exports have not any effect on economic growth. However, they found that economic growth cause exports. Bakari (2021c) investigated the impact of exports on economic growth in the case of 49 Africain Countries for the period 1960 – 2018. He used many empirical methods such as Panel FMOLS and DOLS Estimates; Panel VECM; Panel ARDL Model; Pooled OLS, Random Effect Model, Fixed Effect Model and Hausman Test; Panel Pairwise Granger Causality Tests; Panel Toda-Yamamoto Causality Test; and Panel GMM Model. All empirical technics proved that exports cause economic growth. Ofeh and Muandzevara (2017) searched the impact of exports and imports on economic growth in the case of Cameroon by using Ordinary Least Square and Cointegration analysis over the period 1980-2013. Empirical results indicated that exports have a positive impact on economic growth. However, the impact of imports is negative. By using cointegration analysis, ARDL model and Granger Causality Test, Keho (2017) found that trade has a positive effect on economic growth in both long and short terms in the case of Cote d'Ivoire over the period 1965 – 2014.

Kong et al (2020) looked for the impact of trade openness on economic growth in the case of China. Using the ARDL model, they found that trade openness has a positive effect on long-term and short-term economic growth. Nwadike et al. (2020) researched the impact of trade openness on economic growth in the case of Nigeria. They confirmed that trade openness is a

source of economic growth during the period 1970 - 2011. During the period 1984 - 2018, Duodu et al. (2020) showed that trade openness is a strong source of economic growth in the case of Ghana. In their empirical methodology, they applied an estimate based on the ARDL model. Malefane (2020) found that trade openness has a strong and positive impact on economic growth in South Africa. In the case of Madagascar, Rasoanomenjanahary et al (2022) used an estimate based on the vector error correction model. They found that trade openness has a negative effect on economic growth. Kim et a (2022) examined the causality between export expansion and economic growth in Myanmar during the period from 1981 to 2015. They applied the Johansen cointegration test and the Toda-Yamamoto Granger causality test. They found that there is unidirectional causality running from export expansion to economic growth in Myanmar. They indicated that exports are an important factor in promoting economic growth.

For the context of the Malaysian economy, Albiman and Suleiman (2016) examined the link between exports and economic growth. They used annual data for the period 1967-2010 and an estimation based on the VAR model. The results show that there is no relationship between exports and economic growth. For sub-Saharan African countries, Ee (2016), found that exports have a favorable effect on economic growth during the period 1985 to 2014. Mao et al. (2019) found that increased productivity in the export sector leads to higher economic growth. In the case of a sample that includes 21 Asian economies during the period 2010 to 2016, Tang and Abosedra (2019) find that the performance of the logistics sector significantly affects exports which translates into improved economic growth. Zhu et al (2021) searched the nexus between exchange rates, exports, and economic growth in the case of Asian Countries over the period 1981 - 2016. They used the Wald test under Vector Error Correction Model (VECM) and the fixed effects model. The results indicated that export has a significant impact on economic growth. Subhan et al (2021) examined empirically the nexus between export and economic growth in India. They used VAR Model for the period 1961 to 2015 after verifying the stationarity of the variables through using Augmented Dickey-Fuller and Phillip-Perron tests. Empirical results indicated that exports have a positive incidence on economic growth. Sultanuzzaman et al (2019) examined the effect of exporting on the economic performance of emerging Asian countries, using the Generalized Method of Moments (GMM) model between the periods 2000-2016. They found that exports are

presented as a source of economic growth.

## 3. Data and methodology

### 3.1.Data

The analysis used in this study cover annual time series of 1970 to 2021 or 52 observations which should be sufficient to capture the short run and long run causality between domestic investment, exports, and economic growth in the model for the case of Greece. All data set are taken from World Development Indicators 2021.

### 3.2.Empirical methodology

In our investigation, we will apply an empirical analysis in the form of time series data. For this reason, it is first necessary to verify their stationarity by applying stationarity tests to determine the degree of integration of the Variables and verify their variation over time. In our case, we will apply the ADF and PP unit root tests. If the variables are all integrated in level, an estimate based on a linear regression is applied. Similarly, if the variables are stationary in level and in first difference, we will apply an estimate based on the ARDL model. On the other hand, if the variables are all integrated in first difference, our estimates are based on an estimate of the Sims model (1980). In fact, the latter includes two other models which will be selected using the cointegration analysis verified by the Johansen test. If the cointegration test indicates the absence of a cointegration relationship, we will use the VAR model. If the cointegration test indicates the presence of a cointegration relationship between the different variables studied, the VECM model will be used.

### 3.3.Model specification

The augmented production function including domestic investment, exports and economic growth is expressed as:

$$\mathbf{Y_t = f(DI_t, X_t)}$$

Y expresses the economic growth which is expressed by the gross domestic product at

constant price. DI expresses the domestic investments which are expressed by the gross fixed capital formation at constant prices. Finally, X expresses exports which are expressed by the values of exports of goods and services at constant prices. The function can also be figured in a log-linear econometric format thus:

$$\mathbf{Log\ (Y)_t = \beta_0 + \beta_1 Log(DI)_t + \beta_2 Log(X)_t + \varepsilon_t}$$

Where:

- ✓ $\boldsymbol{\beta_0}$**:** The constant term.
- ✓ $\boldsymbol{\beta_1}$: The coefficient of variable (Domestic Investment)
- ✓ $\boldsymbol{\beta_2}$**:** The coefficient of variables (Exports)
- ✓ $\boldsymbol{t}$**:** The time trend.
- ✓ $\boldsymbol{\varepsilon}$**:** The random error term assumed to be normally, identically and independently distributed.

## 4. Empirical results

We will test the stationarity of the variables used in our model, to check whether the stature of a unit root is the same or not, using the Augmented Dickey Fuller (ADF) test and the Phillipps-Perrons (PP) test. Table 1 denotes the results of the ADF and PP stationarity tests.

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**Table n°1: Results of Unit Root Tests**

| **Unit Root Tests** | | **PP** | | | **ADF** | | |
|---|---|---|---|---|---|---|---|
| **At Level** | | | | | | | |
| **Models and variables** | | ***LOG(Y)*** | ***LOG(DI)*** | ***LOG(X)*** | ***LOG(Y)*** | ***LOG(DI)*** | ***LOG(X)*** |
| **With Constant** | *t-Statistic* | -2.5787 | -1.9716 | -2.5854 | -2.0891 | -2.1275 | -2.5972 |
| **With Constant & Trend** | *t-Statistic* | -1.6811 | -1.8336 | -3.1022 | -1.6640 | -2.0830 | -3.1022 |
| **Without Constant & Trend** | *t-Statistic* | 1.6651 | 0.0822 | 3.6635 | 1.4076 | -0.0063 | 3.8524 |
| **At First Difference** | | | | | | | |
| **Models and variables** | | ***d(LOG(Y))*** | ***d(LOG(DI))*** | ***d(LOG(X))*** | ***d(LOG(Y))*** | ***d(LOG(DI))*** | ***d(LOG(X))*** |
| **With Constant** | *t-Statistic* | -4.6557 | -5.1298 | -6.2082 | -4.6624 | -5.1349 | -6.2199 |
| **With Constant & Trend** | *t-Statistic* | -4.8958 | -5.0611 | -6.4136 | -4.8443 | -5.0611 | -6.4494 |
| **Without Constant & Trend** | *t-Statistic* | -4.4092 | -5.1836 | -5.0310 | -4.3924 | -5.1886 | -5.0683 |
| *Notes: (*)Significant at the 10%; (**)Significant at the 5%; (***) Significant at the 1%. and (no) Not Significant* | | | | | | | |
| **MacKinnon (1996) one-sided p-values.* | | | | | | | |

***Source: Authors' calculations using Eviews 12 software.***

From Table 1, we can see that for all the variables the statistics of the ADF test and the PP test are lower than the statistics of the criteria of the different thresholds only after a preliminary differentiation, they are therefore integrated into the orders (1), then we can conclude that the model of Sims (1980) will be retained. Before applying an estimate based on the Sims model, we must verify the nature of the existing cointegration between the variables of our model.

To check the cointegration between the studied variables, it is necessary to go through two steps. First, it is necessary to specify the number of optimal lags which must be appropriate for our model. Next, we will use Johanson's test to specify the number of cointegrating relationships between the variables.

**Table n°2: VAR Lag Order Selection Criteria**

| Lag | LogL | LR | FPE | AIC | SC | HQ |
|---|---|---|---|---|---|---|
| **0** | 195.6488 | NA | 5.52e-08 | -8.197820 | -8.079726* | -8.153380* |
| **1** | 205.0482 | 17.19887* | 5.44e-08* | -8.214815* | -7.742437 | -8.037056 |
| **2** | 210.7460 | 9.698515 | 6.29e-08 | -8.074299 | -7.247638 | -7.763221 |
| **3** | 215.1109 | 6.872367 | 7.77e-08 | -7.877060 | -6.696115 | -7.432663 |
| **4** | 224.1677 | 13.10349 | 7.94e-08 | -7.879478 | -6.344249 | -7.301761 |
| **** indicates lag order selected by the criterion*** | | | | | | |
| ***LR: sequential modified LR test statistic (each test at 5% level)*** | | | | | | |
| ***FPE: Final prediction error*** | | | | | | |
| ***AIC: Akaike information criterion*** | | | | | | |
| ***SC: Schwarz information criterion*** | | | | | | |
| ***HQ: Hannan-Quinn information criterion*** | | | | | | |

***Source: Authors' calculations using Eviews 12 software.***

The choice of the lag number has a very important role in the design of a VAR model. It is believed that most VAR models involve symmetric lags, the same lag length is exerted for all variables in all model equations. This lag length is often chosen using an explicit statistical criterion such as HQ, FPE, AIC or SIC. The results of Table 2 show us that the number of delays was equal to 1 since the criteria FPE, AIC and HQ select that the number of delays is equal to 1.

The study of cointegration makes it possible to test the existence of a stable long-term relationship between two non-stationary variables, by including lagging variables and exogenous variables. There are several tests of cointegration, the most general being that of Johansen. This method is profitable because it allows us to give the number of co-integration relationships that subsist between our long-term variables. The sequence of Johanson's test is to find out the number of cointegrating relationships. For this purpose, the maximum likelihood method is used, and the results are explained in Table 3.

**Table n°3 : Johansen Test**

| Unrestricted Cointegration Rank Test (Trace) | | | | |
|---|---|---|---|---|
| **Hypothesized No. of CE(s)** | **Eigenvalue** | **Trace Statistic** | **0.05 Critical Value** | **Prob.**** |
| **None *** | 0.385425 | 57.05342 | 29.79707 | 0.0000 |
| **At most 1 *** | 0.348231 | 33.19905 | 15.49471 | 0.0000 |
| **At most 2 *** | 0.220784 | 12.22386 | 3.841466 | 0.0005 |
| ***Trace test indicates 3 cointegrating eqn(s) at the 0.05 level*** | | | | |
| **** denotes rejection of the hypothesis at the 0.05 level*** | | | | |
| *****MacKinnon-Haug-Michelis (1999) p-values*** | | | | |
| **Unrestricted Cointegration Rank Test (Maximum Eigenvalue)** | | | | |
| **Hypothesized No. of CE(s)** | **Eigenvalue** | **Max-Eigen Statistic** | **0.05 Critical Value** | **Prob.**** |
| **None *** | 0.385425 | 23.85437 | 21.13162 | 0.0202 |
| **At most 1 *** | 0.348231 | 20.97519 | 14.26460 | 0.0038 |
| **At most 2 *** | 0.220784 | 12.22386 | 3.841466 | 0.0005 |
| ***Max-eigenvalue test indicates 3 cointegrating eqn(s) at the 0.05 level*** | | | | |
| **** denotes rejection of the hypothesis at the 0.05 level*** | | | | |
| *****MacKinnon-Haug-Michelis (1999) p-values*** | | | | |

***Source: Authors' calculations using Eviews 12 software.***

The application of Johansen's test in Table 3 shows the existence of 3 cointegrating relationships. So, in this case, we can say that the error correction model will be retained. Equilibrium cointegrating equations can be said to be meaningful and there is a long-term relationship between the variables when the error correction term (ECT) has a negative coefficient and a negative probability in each equation. Table 4 presents the results of the

significance of the 3 long-term equilibrium equations which study the relationship between domestic investment, exports and economic growth.

**Table n°4: Estimation of VECM Model in the long run**

| **Dependent Variable: LOG(Y)** | | | | |
|---|---|---|---|---|
| **Method: Least Squares (Gauss-Newton / Marquardt steps)** | | | | |
| | ***Coefficient*** | ***Std. Error*** | ***t-Statistic*** | ***Prob.*** |
| ***ECT*** | 0.002011 | 0.005999 | 0.335178 | 0.7391 |
| ***C(2)*** | -0.492689 | 0.246439 | -1.999232 | 0.0518 |
| ***C(3)*** | 0.066107 | 0.071421 | 0.925597 | 0.3597 |
| ***C(4)*** | -0.099147 | 0.072462 | -1.368256 | 0.1782 |
| ***C(5)*** | -0.002726 | 0.006144 | -0.443680 | 0.6594 |
| **Dependent Variable: LOG(DI)** | | | | |
| **Method: Least Squares (Gauss-Newton / Marquardt steps)** | | | | |
| | ***Coefficient*** | ***Std. Error*** | ***t-Statistic*** | ***Prob.*** |
| ***ECT*** | -0.021909 | 0.019066 | -1.149109 | 0.2567 |
| ***C(7)*** | 0.762842 | 0.783220 | 0.973982 | 0.3354 |
| ***C(8)*** | -0.310522 | 0.226987 | -1.368018 | 0.1783 |
| ***C(9)*** | -0.706447 | 0.230296 | -3.067555 | 0.0037 |
| ***C(10)*** | -0.004812 | 0.019527 | -0.246432 | 0.8065 |
| **Dependent Variable: LOG(X)** | | | | |
| **Method: Least Squares (Gauss-Newton / Marquardt steps)** | | | | |
| | ***Coefficient*** | ***Std. Error*** | ***t-Statistic*** | ***Prob.*** |
| ***ECT*** | 0.059885 | 0.013666 | 4.382126 | 0.0001 |
| ***C(12)*** | -0.770894 | 0.561365 | -1.373249 | 0.1766 |
| ***C(13)*** | 0.095663 | 0.162690 | 0.588009 | 0.5595 |
| ***C(14)*** | 0.028017 | 0.165063 | 0.169733 | 0.8660 |
| ***C(15)*** | -0.002451 | 0.013996 | -0.175118 | 0.8618 |
| ***ECT: Error Correction Term: the cointegration equation of long-term equilibrium*** | | | | |

***Source: Authors' calculations using Eviews 12 software.***

According to the results of table n°4, we notice that the three equilibrium equations are not significant because the error correction terms of each equation do not correspond to the econometric rule presented above of the significance of the long-term equilibrium equation in

terms of coefficients and in terms of probabilities. These results clearly prove that there is no long-term causal relationship between domestic investment, exports, and economic growth.

As soon as the relationship between the long-term variables is determined, we move on to the next step, which consists of examining the relationship between domestic investment, exports and short-term economic growth. To determine short-term causal relationships, we use Granger's causality tests (WALD test), and we retain a probability of error of less than 5%. Table 5 shows the results of the WALD test.

**Table n°5: Estimation of VECM Model in the short run**

| **VEC Granger Causality/Block Exogeneity Wald Tests** | | | |
|---|---|---|---|
| ***Dependent variable: D(DLOG(Y))*** | | | |
| *Excluded* | *Chi-sq* | *df* | *Prob.* |
| *D(DLOG(DI))* | 0.856730 | 1 | 0.3547 |
| *D(DLOG(X))* | 1.872125 | 1 | 0.1712 |
| *All* | 2.725394 | 2 | 0.2560 |
| ***Dependent variable: D(DLOG(DI))*** | | | |
| *Excluded* | *Chi-sq* | *df* | *Prob.* |
| *D(DLOG(Y))* | 0.948640 | 1 | 0.3301 |
| *D(DLOG(X))* | 9.409896 | 1 | 0.0022 |
| *All* | 9.531140 | 2 | 0.0085 |
| ***Dependent variable: D(DLOG(X))*** | | | |
| *Excluded* | *Chi-sq* | *df* | *Prob.* |
| *D(DLOG(Y))* | 1.885813 | 1 | 0.1697 |
| *D(DLOG(DI))* | 0.345755 | 1 | 0.5565 |
| *All* | 2.103206 | 2 | 0.3494 |

***Source: Authors' calculations using Eviews 12 software.***

Table 5 presents the results of the causality between the three variables included in our short-term model. We note that domestic investments and exports do not cause economic growth. Otherwise, we notice that economic growth and domestic investments do not cause exports. Similarly, we note that economic growth does not cause domestic investment. In contrast,

only exports that cause short-term domestic investment. Finally, we must check the robustness and credibility of our results. For this reason, we will apply a set of tests called diagnostic tests. Table 6 denote the results of diagnostic tests.

**Table n°6: Diagnostic Tests**

| | | | |
|---|---|---|---|
| **Dependent Variable: Log(Y)** | | | |
| ***Heteroskedasticity Test: Breusch-Pagan-Godfrey*** | | | |
| F-statistic | 1.570206 | Prob. F(9,39) | 0.1586 |
| Obs*R-squared | 13.03288 | Prob. Chi-Square(9) | 0.1611 |
| Scaled explained SS | 18.88413 | Prob. Chi-Square(9) | 0.0262 |
| ***Heteroskedasticity Test: Harvey*** | | | |
| F-statistic | 1.111285 | Prob. F(9,39) | 0.3779 |
| Obs*R-squared | 10.00125 | Prob. Chi-Square(9) | 0.3504 |
| Scaled explained SS | 9.199465 | Prob. Chi-Square(9) | 0.4191 |
| ***Heteroskedasticity Test: Glejser*** | | | |
| F-statistic | 1.543929 | Prob. F(9,39) | 0.1671 |
| Obs*R-squared | 12.87207 | Prob. Chi-Square(9) | 0.1685 |
| Scaled explained SS | 13.59262 | Prob. Chi-Square(9) | 0.1376 |
| ***Heteroskedasticity Test: ARCH*** | | | |
| F-statistic | 2.553724 | Prob. F(1,46) | 0.1169 |
| Obs*R-squared | 2.524600 | Prob. Chi-Square(1) | 0.1121 |
| ***Breusch-Godfrey Serial Correlation LM Test:*** | | | |
| F-statistic | 1.874422 | Prob. F(2,42) | 0.1661 |
| Obs*R-squared | 4.015257 | Prob. Chi-Square(2) | 0.1343 |
| **Dependent Variable: Log (DI)** | | | |
| ***Heteroskedasticity Test: Breusch-Pagan-Godfrey*** | | | |
| F-statistic | 1.641744 | Prob. F(9,39) | 0.1373 |
| Obs*R-squared | 13.46350 | Prob. Chi-Square(9) | 0.1427 |
| Scaled explained SS | 31.06356 | Prob. Chi-Square(9) | 0.0003 |
| ***Heteroskedasticity Test: Harvey*** | | | |
| F-statistic | 1.425673 | Prob. F(9,39) | 0.2109 |
| Obs*R-squared | 12.13022 | Prob. Chi-Square(9) | 0.2061 |
| Scaled explained SS | 14.55360 | Prob. Chi-Square(9) | 0.1040 |
| ***Heteroskedasticity Test: Glejser*** | | | |
| F-statistic | 2.169744 | Prob. F(9,39) | 0.0461 |
| Obs*R-squared | 16.34879 | Prob. Chi-Square(9) | 0.0599 |
| Scaled explained SS | 20.66119 | Prob. Chi-Square(9) | 0.0142 |
| ***Heteroskedasticity Test: ARCH*** | | | |
| F-statistic | 1.610499 | Prob. F(1,46) | 0.2108 |
| Obs*R-squared | 1.623675 | Prob. Chi-Square(1) | 0.2026 |
| ***Breusch-Godfrey Serial Correlation LM Test:*** | | | |
| F-statistic | 0.559826 | Prob. F(2,42) | 0.5755 |
| Obs*R-squared | 1.272342 | Prob. Chi-Square(2) | 0.5293 |
| **Dependent Variable: Log (X)** | | | |
| ***Heteroskedasticity Test: Breusch-Pagan-Godfrey*** | | | |
| F-statistic | 1.697729 | Prob. F(9,39) | 0.1226 |
| Obs*R-squared | 13.79338 | Prob. Chi-Square(9) | 0.1299 |
| Scaled explained SS | 15.40747 | Prob. Chi-Square(9) | 0.0803 |
| ***Heteroskedasticity Test: Harvey*** | | | |
| F-statistic | 0.965190 | Prob. F(9,39) | 0.4828 |
| Obs*R-squared | 8.925944 | Prob. Chi-Square(9) | 0.4441 |
| Scaled explained SS | 7.146066 | Prob. Chi-Square(9) | 0.6219 |
| ***Heteroskedasticity Test: Glejser*** | | | |
| F-statistic | 1.707127 | Prob. F(9,39) | 0.1202 |

| | | | |
|---|---|---|---|
| Obs*R-squared | 13.84816 | Prob. Chi-Square(9) | 0.1278 |
| Scaled explained SS | 12.99704 | Prob. Chi-Square(9) | 0.1627 |
| ***Heteroskedasticity Test: ARCH*** | | | |
| F-statistic | 0.010292 | Prob. F(1,46) | 0.9196 |
| Obs*R-squared | 0.010737 | Prob. Chi-Square(1) | 0.9175 |
| ***Breusch-Godfrey Serial Correlation LM Test:*** | | | |
| F-statistic | 2.791679 | Prob. F(2,42) | 0.0727 |
| Obs*R-squared | 5.749586 | Prob. Chi-Square(2) | 0.0564 |

***Source: Authors' calculations using Eviews 12 software.***

Diagnostic tests show that the estimation results are acceptable, credible, and robust. Indeed, the probabilities of the Heteroskedasticity tests are greater than 5%, which confirms the robustness of our empirical results and that our model is well processed.

## 5. Conclusion

Exports and domestic investment are an important driver of long-term growth and development. They are needed to build productive capacities, transform the structure of the economy, create jobs and reduce poverty. Investment is at the heart of the growth strategy of companies and national economies. All economic agents are called upon to modernize, renew and increase the capacity to produce national wealth, but it is indeed for companies that investment constitutes the main raison d'être and even a vital necessity in the face of competitive pressures. The objective of this survey is to examine the relationship between domestic investment, exports and economic growth in the case of Greece. To achieve this objective, we applied annual data over the period 1970 - 2020 and an estimation based on the vector error correction model. The empirical results indicate that in the long run, there is no causal relationship between exports, domestic investment and economic growth. In the short term, we have found that only exports stimulate domestic investment. These results proved that domestic investment and exports are not considered as a source of economic growth in the case of Greece. The results obtained command us to inspire the following recommendations in order to improve economic growth, domestic investments and exports in the case of Greece: (i) The government should propel more attention to the nature of trade and to the structure of domestic investments; (ii) The government should direct domestic investment towards more productive and smart projects to foster exports and economic growth; (iii) The government should improve their economic policies to reduce institutional inefficiencies; (iv) The government must create new strategies in terms of domestic

investments and in terms of exports to stimulate economic growth.

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