The Effect of Agricultural Exports on Economic Growth in South-Eastern Europe: An Empirical Investigation Using Panel Data.

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Abstract

The contribution of this paper is investigating the effect of agricultural exports on economic growth in South Eastern Europe Countries since it's never been treated before. To attempt this aim annual data was collected from the World Bank for the period 2006 – 2016 and was tested by using correlation analysis and the static gravity model. Empirical analyses show that agricultural exports have a positive strong correlation with gross domestic product and have a positive effect on economic growth. These results appear that agricultural exports are a provenance of economic growth in South Eastern Europe Countries. For this reason, it is very important to refine investment in agricultural sector, and create more effective agricultural trade openness policies.

Keywords: Agricultural Exports, Economic Growth, Correlation Analysis, Static Gravity Model, South Eastern Europe.

JEL classification: F11, F14, O47, O52, Q17, Q18

I. Introduction

Exports are defined as an economic and commercial activity that is considered to be very important in the economic growth and sustainable development of nations. This is in particular a crucial means of acquiring currencies, which are from a country the means of economic and financial intervention in the external markets. On the other hand, exports stimulate an economy by valuing the work of one country with others and by ensuring the sustainability of its companies which, in the context of globalization, is strongly linked to their positions in the world market. Also, Exports are seen as an engine for encouraging and stimulating the increase and widening of investments, which in turn leads to an increase in the employment rate and, as a result, the decrease in the number of unemployed and the elimination of Poverty by implementing effective and intelligent strategies and policies supported by a robust administration. In a way of reorganizing ideas and thoughts, the weight of the agricultural sector in the economies-both North and south-has been declining for two centuries.

Today, agriculture accounts for only 23% of GDP in low-income countries, 10% in intermediate countries and 2% in high-income countries. The share of farmers in the labor force is only 30% higher than in low-income countries. The overall movement is general: by transferring their resources (in labor and capital) to the industry and then to the tertiary, a virtuous cycle of growth could be generated. By increasing wealth, but also by ensuring its distribution among individuals, countries have therefore developed. Thus, agriculture was seen as a major element in changing and improving the structuring of economies.

The growth of agricultural trade has helped to provide more and more people with more abundant, higher quality, more varied and less expensive food. This trade is also directly and indirectly a source of well-being and income for millions of people. Many countries derive most of the foreign exchange they need to finance their imports and development; while for others, food security depends largely on the ability to finance food imports. Like any activity involving sellers and buyers, and perhaps more than any other, agricultural trade is a source of conflict of interest and international conflict. In part, this is because agricultural policies are often influenced by lobbying interests rather than just national, international or global considerations. Other factors are the emergence of ever more serious distortions in international agricultural markets, the role of agricultural trade in food security, which gives it a considerable political, socio-economic and strategic dimension, and for a number of years

time, differing views about the effects of agricultural trade on environmental problems of transnational or global interest.

In so far as, the matter of novelty of this study, a number of studies have been made to investigate the significance, nature of relationships, and intensity of the impact of agricultural exports for economic growth in South East Europe countries.

Furthermore, such an empirical exercise has never been done in the context of South East Europe Countries. In this paper, we try to bridge these gaps by using function production include many variables and which are estimated by applying the fixed effect model and the random effect model for the period 2006 to 2016.

The rest of the article is organized as follows. Section 2 instituted on a survey of literature. Section 3 elucidates the data characterization and methodological structure. Empirical results and analysis are taken into account in next coming Section 4. Section 5 terminates the study along with recommendations.

II. Literature survey

It is often argued that it is not only the level of expertise that leads to growth, but also the degree of diversification of these exports or the export base. Supporters from this point of view have highlighted the strong impact of diversification on growth. For example, Romer (1990) considered diversification to be a production factor, while Acemoglu and Zilibotti (1997) stated that diversification could increase revenues by allowing for the spread of investment-related risks on a wider portfolio. For this reason, we will discuss this section in two paragraphs. The first paragraph contains studies that describe the relationship between exports and economic growth. On the other hand, the second paragraph includes empirical studies that depict the link among agricultural exports and economic growth.

1) The nexus between exports and economic growth

There are several studies that have shown that increased exports have positive and beneficial effects on economic growth. Among these studies, we can cite the work done by: Michaely, (1977); Balassa, (1978); Tyler, (1981); Savvides, (1995); Asmah, (1998); Edward, (1998); Ram, (1987).

Table 1: Studies related to the relationship between exports and economic growth

No	Authors	Countries	Periods	Empirical analysis	Results
1	Bakari (2017a)	Gabon	1980 - 2015	Cointegration Analysis	X => Y: LR (-)
				ECM	X => Y : SR
2	Bakari (2017b)	Malaysia	1960 – 2015	Correlation Analysis	X => Y: LR
				Cointegration Analysis	
				ECM	
3	Bakari (2017c)	Sudan	1976 – 2015	Cointegration Analysis	X # Y : SR
				VECM	X # Y : LR
4	Bakari and Mabrouki (2017)	Panama	1980 – 2015	Cointegration Analysis	X => Y
				VAR	
				Granger Causality Tests	
5	Cong and Hiep (2017)	Vietnam	1999 – 2014	Cointegration Analysis	X <=> Y: SR
				VECM	X <=> Y: LR
6	Keyo (2017)	Cote d'Ivoire	1965 – 2014	ARDL	X => Y : LR
				Granger Causality Tests	X => Y : SR
7	Goh and al (2017)	10 Asian Economies	1970 – 2012	ARDL	X # Y
8	Nguyen (2017)	Vietnam	1986 – 2015	ARDL	X => Y: LR (-)
					X # Y : SR
9	Pacific (2017)	Cameroon	1996 – 2014	Cointegration Analysis	X # Y
				VAR	X => Y :SR
				Granger Causality Tests	
10	Sunde (2017)	South Africa	1990 – 2014	Cointegration Analysis	X => Y: LR
				ARDL	X <=> Y: SR
				VECM	
				Granger Causality Tests	

Note: X means Exports, Y means Economic Growth, LR means Long Run, SR means Short Run and (-) means Negative Effect.

2) The nexus between agricultural exports and economic growth

It is very impressive that the contribution of exports in the agricultural sector for economic growth has been neglected in the literature and its role in the development process. Various economies like Johnston and Mellor (1961); Levin and Raut (1997); Ekanayake (1999), Karp and Perloff (2002); Ardeni and Freebairn (2002); Schiff and Valdes (2002); Lopez (2002) agrees that the boost in exports in the agricultural sector plays a pivotal role in economic growth.

Table 2: Studies related to the relationship between agricultural exports and economic growth

No	Authors	Countries	Periods	Empirical analysis	Results
1	Sanjuán-López and Dawson (2010)	42 Developing Countries	1970 - 2004	Cointegration Analysis FMOLS	AX => Y

2	Forgha and Aquilas (2015)	Cameroon	1980 - 2014	Cointegration Analysis
				VECM
				Granger Causality Tests
					AX # Y: SR
					AX => Y: LR

3	Alam and Myovella (2016)	Tanzanian	1980 - 2010	Cointegration Analysis Granger Causality Tests	AX => Y
4	Edeme et al (2016)	ECOWAS Countries	1980 - 2013	Fixed Effect Model Random Effect Model	AX => Y
5	Mehrara and Baghbanpour (2016)	34 Developing Countries	1970 - 2014	Fixed Effect Model Random Effect Model Hausman Test	AX # Y
6	Oluwatoyese et al (2016)	Nigeria	1981 - 2014	Cointegration Analysis VECM Granger Causality Tests	AX => Y: LR AX # Y: SR
7	Bakari (2017)	Tunisia	1970 - 2015	Cointegration Analysis VECM	AX => Y: LR AX => Y: SR
8	Kalaitzi and Cleeve (2017)	United Arab Emirates	1981 - 2012	Cointegration Analysis VECM Granger Causality Tests	AX # Y: SR, LR
9	Mahmood and Munir (2017)	Pakistan	1970 - 2014	Cointegration Analysis Granger Causality Tests	AX <= Y
10	Matandare (2017)	Zimbabwe	1980 - 2016	OLS	AX => Y

Note: Y means Economic Growth, AX means Agricultural Exports, LR means Long Run, SR means Short Run

III. Data, methodology and model specification

1) Data description

The selected countries respect the ranking and analysis of the World Bank. The sample includes the countries of Southeastern EUROPE depending on the availability of data. In total, our sample comprises 7 countries (Albania, Bosnia, Bulgaria, Croatia, Greece, Macedonia and Romania), and the estimation period is from 2006 to 2016.

2) Variables and sources of data

To study the impact of agricultural exports for economic growth, we will apply a linear estimation of panel data that has 7 variables whose reason to clarify and properly determine this effect. The following table defines the variables and the data source of each variable:

Table 3: Description of variables

No	Variable	Description	Source
1	Y	Gross domestic product (constant US$)	The World Bank
2	K	Gross fixed capital formation (constant US$)	The World Bank
3	L	Labor	The World Bank
4	AX	Agricultural Exports (Constant US$)	The World Bank
5	OX	Other Exports (Constant US$)	The World Bank
6	M	Imports (Constant US$)	The world Bank
7	FCE	Final consumption expenditure (constant US$)	The World Bank

3) Model specification and empirical methodology

To determine the direct impact of agricultural exports for economic growth in our case, we will apply an estimate based on a production function that describes the situation of countries characterized by an open economy includes exports and imports, adding the variable Final consumption expenditure. The basic model is written as follows:

$$\mathbf{Y = F\,[(K, L)\,;\,X, M, FCE]} \quad \mathbf{(1)}$$

The augmented production function including all these variables is expressed as:

$$\mathbf{Y_{it} = A\,K^{\beta_1}\;L^{\beta_2}\;M^{\beta_3}\;X^{\beta_4}\;FCE^{\beta_5}} \quad \mathbf{(2)}$$

In equation (2): A show the level of technology utilized in the country which is assumed to be constant. The returns to scale are associated with capital (K), labor (L), import (M), export (X) and final consumption expenditure (FCE), which are shown by $\boldsymbol{\beta_1}$,$\boldsymbol{\beta_2}$, $\boldsymbol{\beta_3}$, $\boldsymbol{\beta_4}$and $\boldsymbol{\beta_5}$ respectively.

All the variables are turned into logarithms in rhymester to invent linear the nonlinear form of Cobb-Douglas production. The Cobb-Douglas production function is given in the linear functional form as follows:

$$\mathbf{Log(Y_{it}) = Log(A) + \beta_1 Log(K_{it}) + \beta_2 Log(L_{it}) + \beta_3 Log(M_{it}) + \beta_4 Log(X_{it}) + \beta_5 Log(FCE_{it}) + \varepsilon_{it}} \quad \mathbf{(3)}$$

By keeping technology constant, the linear model can be written as follows:

$$\mathbf{Log(Y_{it}) = \beta_0 + \beta_1 Log(K_{it}) + \beta_2 Log(L_{it}) + \beta_3 Log(M_{it}) + \beta_4 Log(X_{it}) + \beta_5 Log(FCE_{it}) + \varepsilon_{it}} \quad \mathbf{(4)}$$

As we note that we will focus on Agricultural exports. In this case we will be separating exports (X) in two strips; the first strip symbolizes exports in the agricultural sector (AX) and the second strip symbolizes the residual part of the export in the other sectors (OX).

$$\mathbf{X = AX + OX} \quad \mathbf{(5)}$$

Equation (5) presents our export division (X) of which (AX) presents the Agricultural export and (OX) presents the export in the other sector. In equation (6), (AX) and (OX) are transmitted into logarithms in order to transfer out linear the nonlinear form of Cobb–Douglas production.

$$\mathbf{Log(X) = Log(AX) + Log(OX)} \quad \mathbf{(6)}$$

When we merge equation 4 and 6, we obtain the following equation which presents our final model for our estimation.

$$\mathbf{Log(Y_{it}) = \beta_0 + \beta_1 Log(K_{it}) + \beta_2 Log(L_{it}) + \beta_3 Log(M_{it}) + \beta_4 Log(AX_{it}) + \beta_5 Log(OX_{it}) + \beta_6 Log(FCE_{it}) + \varepsilon_{it}} \quad \mathbf{(7)}$$

In equation (7): Y, K, L, M, AX, OX and FCE present respectively economic growth, capital, import, agricultural export, other export and Final consumption expenditure. The returns to scale are associated with citrus export, other export and import which are shown by $\boldsymbol{\beta_1}$,$\boldsymbol{\beta_2}$, $\boldsymbol{\beta_3}$, $\boldsymbol{\beta_4}$, $\boldsymbol{\beta_5}$ **and** $\boldsymbol{\beta_6}$ respectively.

In panel data, there are several ways to model individual heterogeneity, including using the fixed effects model and the random effects model. The estimation of the first can be done by MCO on a model corresponding to the divisions to the individual means. For the second, the MCO estimator is not efficient, whereas the MCG estimator is good. To choose between the two models, we will use the Hausman test, which is a test for the lack of correlation of specific effects and regresses.

IV. Empirical Analysis

1) Descriptive statistics

Before the showing of empirical results and interpretations analysis, there are some pre tests of data which are generally considered very necessary. For this reason, the descriptive statistics table is one of the pre testing of data implement which furnishes the some prerequisites or information concerning the appropriateness of compressed variables. Table 4

contemplates the descriptive statistics of massed variables. According to Table 1 statistics mean and standard deviation of Y is 6.32E+10, 9.31E+10, respectively, with approximately 0.00% probability of refusal. All these statistics are exhibiting that Y is a considerable variable. In addition, the standard deviation of variables ponders the variation and volatility in statistics during the investigation period. Y is screening the highest volatility, which9.31E+10 and 8.55E+10 variations in FCE also perceivable during study time. Skewness individually evaluates deviation from symmetry, in other words, it gauges the potency of an outlier. All given variables are positively skewed. As far as the matter of catharsis it scales the peakedness or flatness of targeted variables relative to the normal distribution. Overall skewness and kurtosis coefficients proclaim the variables are following the normal distribution.

Table 4: Descriptive statistics individual sample

	Y	K	L	M	AX	OX	FCE
Mean	6.32E+10	1.22E+10	3332871	3.46E+10	3.92E+09	2.46E+10	7.41E+10
Median	1.73E+10	3.39E+09	1893632	2.41E+10	2.55E+09	2.04E+10	4.20E+10
Maximum	3.32E+11	8.16E+10	9735588	1.20E+11	1.68E+10	8.06E+10	2.94E+11
Minimum	8.13E+09	1.34E+09	893453	4.02E+09	1.10E+08	1.71E+09	7.83E+09
Std. Dev.	9.31E+10	1.74E+10	2788223	3.29E+10	4.67E+09	2.29E+10	8.55E+10
Skewness	1.954414	2.557154	1.238981	0.956602	1.365636	0.738531	1.348055
Kurtosis	5.298668	9.179049	3.240403	2.626560	3.686651	2.203828	3.503092
Jarque-Bera	65.97234	206.4139	19.88554	12.19104	25.44636	9.033384	24.13344
Probability	0.000000	0.000000	0.000048	0.002253	0.000003	0.010925	0.000006
Observations	77	77	77	77	77	77	77

2) Correlation analysis

The correlation coefficient (r) is primarily applied to differentiate a positive or a negative linear relationship. This is a proportional measure. The nearer it is to 1 (in absolute value), the stronger the relationship. r = 0 Indicates the absence of correlation; it is equivalent to an independent test if and only if the torque (X, Y) follows a normal bivariate law.

$$\boldsymbol{r = \frac{N\sum XY - (\sum X)(\sum Y)}{\sqrt{[N\sum X^2 - (\sum X)^2][N\sum Y^2 - (\sum Y)^2]}}} \quad \textbf{(8)}$$

Where: $\mathrm{N} = \text{Number of pairs of scores}$; $\sum \mathrm{XY} = \text{Sum of the products of paired scores}$; $\sum \mathrm{X} = \text{Sum of X scores}$; $\sum \mathrm{Y} = \text{Sum of Y scores}$; $\sum \mathrm{X}^2 = \text{Sum of squared X scores}$; $\sum \mathrm{Y}^2 = \text{Sum of squared Y scores}$.

Table 5: Test of Correlation

	Y	K	L	M	AX	OX	FCE
Y	1	0.94	0.20	0.70	0.88	0.56	0.84
K	0.94	1	0.18	0.68	0.80	0.50	0.79
L	0.20	0.18	1	0.81	0.53	0.87	0.67
M	0.70	0.68	0.81	1	0.89	0.96	0.95
AX	0.88	0.80	0.53	0.89	1	0.84	0.93
OX	0.56	0.50	0.87	0.96	0.84	1	0.87
FCE	0.84	0.79	0.67	0.95	0.93	0.87	1

Table 5 shows that all variables included in our empirical analysis are positively correlated, of which an increase in each variable increases the other variable. In addition, the table shows that there is a strong correlation between agricultural exports and economic growth (R = 0.88: more Porch 1). On the other hand, other exports and the labor force are characterized by a low correlation relationship with economic growth respectively (R = 0.56 and r = 0.20). Otherwise, the correlation analysis shows that agricultural exports are more correlated with economic growth than other exports, which shows their effectiveness and their strong impact on economic growth. Finally, it may be noted that the other variables (K, M, and FCE) are characterized by a strong correlation with economic growth.

3) Model estimation

As we stated in the previous section, we estimate goes through three steps. First, we have to make fixed effect model estimation, then we estimate the random effects model and finally we apply the Hausman test to choose the most suitable model.

a- Fixed Effect Model

Table 6: Estimation of Fixed Effect Model

Dependent Variable: LOG(Y)				
Method: Panel Least Squares: Fixed Effect				
Variable	***Coefficient***	***Std. Error***	***t-Statistic***	***Prob.***
C	1.521621	1.223603	1.243557	0.2182
LOG(K)	0.152608	0.017012	8.970825	0.0000
LOG(L)	0.167176	0.077061	2.169384	0.0338
LOG(M)	-0.096421	0.039284	-2.454474	0.0168
LOG(AX)	0.036490	0.008237	4.429891	0.0000
LOG(OX)	0.153884	0.025481	6.039195	0.0000
LOG(FCE)	0.598741	0.047017	12.73451	0.0000
F-statistic	***40563.65***	***R-squared***		***0.999869***
Prob(F-statistic)	***0.000000***	***Durbin-Watson stat***		***1.247364***

Table 6 shows that all explanatory variables are significant because they have probabilities of less than 5%.

Otherwise the results of the fixed-effect model estimate suggest that all variables have a positive effect on economic growth, except imports have a negative effect on economic growth as they include a Negative coefficient (-0.096421).

The results of the estimation of this model are satisfied because the diagnostic tests indicate that the coefficient of determination R ² is greater than 60% with a value of 99.98% and that the probability of statistic of Fisher is less than 5% because it is equal to 0.00%.

b- Random Effect Model

Table 7: Estimation of Random Effect Model

Dependent Variable: LOG(Y)				
Method: Panel EGLS (Cross-section random effects)				
Variable	***Coefficient***	***Std. Error***	***t-Statistic***	***Prob.***
C	3.145975	0.074062	42.47766	0.0000
LOG(K)	0.893562	0.003200	279.2280	0.0000
LOG(L)	-0.262493	0.010435	-25.15432	0.0000
LOG(M)	-0.718373	0.022391	-32.08313	0.0000
LOG(AX)	0.128993	0.004566	28.25132	0.0000
LOG(OX)	0.105963	0.011970	8.852415	0.0000
LOG(FCE)	0.677517	0.009047	74.89255	0.0000
F-statistic	***496.4521***	***R-squared***		***0.977039***
Prob(F-statistic)	***0.000000***	***Durbin-Watson stat***		***0.186956***

Similarly, the results of the estimation of the random effect model are almost identical to the estimation of the fixed-effect model. All the explanatory variables are significant. Diagnostic tests indicate that the results of our estimate are acceptable because the R ² coefficient of determination is greater than 60% with to a value of 97.70% and Fisher's statistic probability is less than 5% because it is equal to 0.00%.

All explanatory variables have a positive effect on economic growth except imports and the labor force have a negative effect on economic growth because they have negative coefficients respectively (- 0.718373 and-0.262493).

c- Hausman Test

This technique is the most important in our empirical analysis. The purpose of the Hausman test is to specify and choose our most appropriate model, whether fixed or random.

Table 8: Hausman Test

Correlated Random Effects - Hausman Test				
Test cross-section random effects				
Test Summary		*Chi-Sq. Statistic*	*Chi-Sq. d.f.*	*Prob.*
Cross-section random		11113.802496	6	0.0000
Cross-section random effects test comparisons:				
Variable	*Fixed*	*Random*	*Var(Diff.)*	*Prob.*
LOG(K)	0.152608	0.893562	0.000279	0.0000
LOG(L)	0.167176	-0.262493	0.005830	0.0000
LOG(M)	-0.096421	-0.718373	0.001042	0.0000
LOG(AX)	0.036490	0.128993	0.000047	0.0000
LOG(OX)	0.153884	0.105963	0.000506	0.0331
LOG(FCE)	0.598741	0.677517	0.002129	0.0878

If the probability of the Hausman test is minimal than 5%, in this case the fixed-effect model is significant and will be keeped. However, if the probability of the Hausman test is major than 5%, in this case the random effect model is significant and will be possessed. In our case, we have the probability of the Hausman test is less than 5% to a value equal to 0.00%. This denotes that the fixed effect model is significant and will be retained.

V. Conclusion

In this study, we inspected the effect of agricultural exports on economic growth for South Eastern Europe Countries (Albania, Bosnia, Bulgaria, Croatia, Greece, Macedonia and Romania) in the period 2006 – 2016. To attempt this objective, we use correlation analysis and estimation based on gravity model which include fixed effect model, random effect model and the Hausman Test. Empirical results confirm that agricultural exports have a positive stronger correlation with economic growth than other exports. In addition the results of the estimation model prove that agricultural exports have a positive effect on economic growth in the South Eastern Europe Countries. Also, we can note that empirical results show that labor, other exports, investment and Finale consumption expenditure have a positive effect on economic growth. However imports have a negative influence on economic growth. The correlation analysis shows that labor and other exports characterized by a weak correlation with economic growth. These results provide on evidence that agricultural exports seen as

source of economic growth in the 7 South Eastern Europe Countries. From the results presented in this paper, it can be argued that (i) the economic situation of all these countries is very satisfactory, that is to say, these countries do not suffer from several problems. (ii) there is a need to better encourage and develop investment and exports in the agricultural sector to cover imports as agricultural products in recent years are characterized by high price volatility upwards against industrial products. (iii) creation of new strategies to develop agricultural trade. (iv) continue to privatize farmland for higher profitability. (v) make foreign direct investment in the agricultural sector in the fewer developing countries like North Africa, South Asia, and South America where there are several unemployed which makes the cost of labor factor very low and where there are several farmland that are not exploited with a very efficient climate to make agricultural investments.

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