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The impact of exports on economic growth in Kosovo: An empirical investigation

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Abstract---In this paper, analysis are carried with regard to exports and economic growth for the case of Kosovo. The analysis employ quarterly data over the period 2010 to 2021. Analysis are based on utilization of VAR, using 4 lags and the first difference (i.e. I(1) of integration of the variables. Finally, the analysis carry Granger Causality/Block exogeniety Wald tests. Results suggest there there is no long-run relationship between variables, given the fact that there is no cointegration of the variables. However, in the short-run results reveal bi-directional causal relationship, causality running from exports to GDP and vice versa, from GDP to exports.

Keywords---export, GDP, GNP, VAR.

Introduction

For many decades, the notion that exports lead to economic growth has been a subject of a debate among scholars. Exports are sought as an efficient approach at increasing production capacities by focusing on international markets. The importance of trade among scholars, is publicised within three main strains. The first strain, emphasizes the aspect of comparative advantage, which signifies that gains from international trade are certain and offset the costs among countries that have different capital-labour ratio. The second strain, is based on political economy benefits. The third strain emphasizes the growth benefits in the realm of technological diffusion and knowledge spillover (Ohlin 1933; Samuelson 1948). In addition, Marshall (1879) emphasizes that by increasing economies of scale a country may improve its terms of trade by expanding the demand for its imports.

Contrary, to the proponents of trade, there are a number of counter arguments that critique trade benefits. Graham (1923) argues that economies of scale may

cause a country to encounter losses from trade, therefore the introduction of tariff policy is necessary. According to Prasch 1996, trade openness may reduce the demand for domestic goods, which in retrospective may reduce output which leads to increased unemployment rates. In addition, exchange rates may be compromised since undervalued exchange rates impact demand by shifting the relative price of imports and exports. Countries, which focus on pushing outwards exports may harm neighbouring countries by plundering demand which in turn negatively impacts employment (Blecker 2000). Even though, there are disadvantages to be taken into consideration associated to trade, trade policies may positively impact economic growth in the long-run by accelerating technological enhancement, R&D and know-how (Grossman and Helpman 1990). In the past decades, economic development policies have been oriented towards the paradigm of export-led growth, understating that economic openness is crucial toward maintaining sustainable growth.

Kosovo in the past decade has been able to maintain a constant increase in both exports and GDP, with some declines; yet, the trend appears to be positive. In 2013, Kosovo real GDP has shown an increase of 3.4% compared to 2012 (CBK, 2014). According to CBK the main contributor of economic growth is considered to be consumption and exports. In 2016, Kosovo recorded negative export growth of -4.8%, only to rebound in 2018 with an increase in exports of 1.9% compared to 2017 (CBK, 2019). In 2020, Kosovo exports indicate an increase by 23.8% compared to annual figures of 2019. The highest increase in exports Kosovo has recorded in 2021 with over 34% compared to 2020 (CBK, 2022). The following analysis is comprised of the following sections: Sect. 2, the literature review, which focuses on the empirical analysis over a variety of studies that examine the relationship between exports and economic growth. Throughout the literature review different data and methodologies are observed. Section 3, focuses on the model and the methodology chosen for the analysis. Section 4, is the interpretation of results generated in the analysis. Finally, section 5 presents a brief summary and concluding remarks.

Literature Review

A large number of empirical studies have been conducted in order to find the relationship between economic growth and exports. Results of these studies reveal mixed outcome. On one hand, some studies reveal that exports contribute to economic growth, while other studies have shown that there is lack of evidence to a strong relationship between exports and growth. As it pertains to the data and methodologies, again there are different data and techniques employed in order to measure the impact of exports on growth. For instance there are a number of studies that base their analysis on cross-country correlation coefficients to test for ELG. Another set of studies employ Ordinary Least Square (OLS) technique. The third group of studies is based on time series techniques to examine ELG hypothesis, which is the most frequently used technique, ranging in different methodologies: OLS, VAR, VECM, and Granger causality. Empirical results reveal to be mixed as it pertains to the impact of exports on economic growth as well as the direction of the causal relationship among the two variables.

One group of studies that focus on correlation coefficients and OLS regressions find that high levels of economic growth is related to the volume of exports of the country (Ram 1987; Heitger 1987; Lussier 1993). However, a study conducted by Colombatto (1990) for a sample of 70 countries rejects ELG hypothesis, while arguing that exports fail to cause growth. Another group of studies base their analysis on Vector Autoregressive (VAR) models to test for the ELG led growth hypothesis. For instance, a study conducted by Afxentiou and Serletis (1991) support ELG led growth hypothesis for USA and Norway (where, causality of the direction runs from exports to growth), whereas they fail to support the hypothesis for Western Europe, Asia and North America. A study conducted for the case of Sri Lanka, by Pryiankara (2018) takes a slightly different approach by focusing on service exports. Findings suggest that causality runs from services exports toward economic growth.

A study conducted for the case of Brazil between exports and growth for e period of over 57 years, from 1960-2017 found bi-directional causal relationship among variables in the long-run, while in the short-run causality running from exports to economic growth (Dinc and Gokman, 2019). Another study that's supports the ELG hypothesis is by Medina-Smith (2001). The study conclude that causality runs from exports to economic growth through the use of Granger causality tests, for the case of Costa Rica over the period 1950-1997. Contrary, a study conducted by Jung and Marshall (1985) reveal that there is lack of evidence of ELG hypothesis, in a study carried for 37 countries. There are a number of studies that employ VECM model in order to explain the Granger causality of exports and growth. A study conducted by Reza et al. (2019) examine the effects of trade on growth of Bangladesh from 1986 to 2016. Findings suggest that economic growth is explained by trade (exports) in the long-run. In addition, Rana and Ahammed (2019), found that exports Granger cause growth as well as imports for the case of Bangladesh over the period 1976-2018. In general, studies that focus on examining the impact of exports on growth, reveal mixed results and in some cases inconclusive results in terms of the causal relationship among variables.

Model and Methodology

For the purpose of examining the impact of exports and growth for the case of Kosovo over the period 2010 to 2021, quarterly data have been employed. Therefore the model accounts for 48 observations. Data were collected from the Central Bank of Kosovo (CBK, Time series statisctics).

$$GDP_i = \alpha + \beta_2 X_i \varepsilon_i \quad (1)$$

Where:
GDP= Gross Domestic Product data at constant price
X= exports data at constant price
β = coefficients of the independent variable.

Methodology

For the purpose of the analysis, the relationship between exports and economic growth is analysed through the utilisation of unrestricted VAR methodology. The following econometric steps are pursued: Unit Root, VAR, Granger causality/Block exogeniety Wald test. The analysis is based on Toda -Yamamoto Granger causality test procedure.

Unit Root tests

Prior to testing VAR and Granger causality test, analysis are carried for stationarity of the data. Given the fact that majority of time series data are not stationary (i.e. have unit root), Augmented Dickey Fuller (ADF) test is utilized. The aim is to achieve stationary of the data, integrated of the same order. The existence of unit root is identified through the utilization of the following regression (2) that accounts for intercept and time trend:

$$\Delta Y_t = \alpha_0 + \alpha_1 t + \alpha_2 Y_{t-1} + \sum_{j=1}^{p} \alpha_j \Delta Y_{t-j} + \varepsilon_t \qquad (2)$$

The hypothesis testing from the above regressions (2) and (3) is:

- Ho: The series is non-stationary ($a1 = 0$)
- Ha: The series are stationary ($a1 < 0$)

VAR tests

Examining the relationship between exports and growth, it is necessary that the model allows for variables to affect each other, therefore, both variables are treated symmetrically (i.e. treated as endogenous). For this purpose, a VAR model is utilized as a generalization of the univariate autoregressive model for forecasting a vector of time series for exports and growth. The starting point of the VAR model is given by the following equation:

$$Y_t = \mu + A_1 y_{t-1} + \cdots . + A_p y_{t-p} + \varepsilon_t \quad (3)$$

where Y_t is a nx1 vector with an integration order 1. In this case, the analysis employ order 1 integration, whereas the VAR framework is specified as:

$$\Delta y_t = \mu + \Pi y_{t-1} + \sum_{i=1}^{p-1} \Gamma \Delta y_{t-1} + \varepsilon_t \quad (4)$$

The model, initially was proposed by Granger (1969), for the purpose of answering the question whether x causes y and see how much of the current y could be explained by previous values of y. There is a disadvantage to be taken into consideration when employing VAR model, which is related to the theoretical structure of the equations. Every variable is presumed to influence every variable within the model and therefore it makes it difficult to interpret the estimated coefficients. However, on the flip side VAR models are efficient to forecast variables where no explicit interpretation is required. In addition, VAR models are

efficient to test whether one variable is useful in predicting another through the basis of Granger causality tests.

Granger causality/Block Exogeniety Wald test

The Granger causality/Block Exogeneity Wald test is employed to assess whether inclusion of the lagged value of exports is important in explaining the dynamics of economic growth in the short-run, within the multivariate frame work. In particular, to the explanatory power of lag of exports and GDP. In this regard the following equations are estimated:

$$\Delta X_t = \beta_0 + \sum_{i=1}^{n} \beta_1 \Delta X_{t-1} + \sum_{i=1}^{m} \beta_2 \Delta Y_{t-1} + \varepsilon_{1t} \quad (5)$$

$$\Delta Y_t = \delta_0 + \sum_{i=1}^{n} \delta_1 \Delta Y_{t-1} + \sum_{i=1}^{m} \delta_2 \Delta X_{t-1} + \varepsilon_{2t} \quad (6)$$

where B and δ are short-run parameters which will be tested using the Wald x2 test in the VAR model.

The null hypothesis for the test is that lagged values of exports do not explain the variation in GDP. In other words, the assumption is that exports doesn't Granger-cause GDP and vice versa.

Results
Unit Root

In order to proceed with unit root, initially lag length criteria is selected under the VAR procedure. Results suggest that the precursor is to proceed with 4 lags based on all of the tests, see table 1.

Table 1
Lag length criteria

VAR Lag Order Selection Criteria
Endogenous variables: GDP X
Exogenous variables: C
Date: 07/01/22 Time: 23:14
Sample: 2010Q1 2021Q4
Included observations: 44

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-510.5594	NA	45010879	23.29815	23.37925	23.32823
1	-456.4343	100.8694	4613107.	21.01974	21.26304	21.10997
2	-451.1104	9.437902	4350411.	20.95956	21.36506	21.10994
3	-428.0989	38.70114	1839680.	20.09540	20.66310	20.30593
4	-401.8934	41.69061*	674693.9*	19.08606*	19.81596*	19.35674*

* 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

After having established the number of lags, unit root tests were carried to establish the order of integration among the variables. At level, results reveal that the null hypothesis may not be rejected, meaning that data are not stationary at level and have unit root. However, when taking the first difference, data become stationary. The stationarity of the data is achieved when accounting for intercept and intercept and trend for both variables, see table:

Table 2
First difference, GDP (DGDP), results

Intercept				Intercept and trend	
		t-stat	Prob.	t-stat	Prob.
ADF-test		-6.094794	0.0001	-6.094794	0.0001
Test crit. values	1%	-4.295004		-4.205004	
	5%	-3.526609		-3.526609	
	10%	-3.194611		-3.194611	

Table 3
First difference, exports (DX), results

Intercept				Intercept and trend	
		t-stat	Prob.	t-stat	Prob.
ADF-test		-8.560729	0.0000	-9.352326	0.0000
Test crit. values	1%	-3.581152		-4.170583	
	5%	-2.926622		-3.185512	
	10%	-2.601424			

At first difference the null hypothesis is rejected, which means that data have become stationary and are integrated of order l(1). After having established the order of integration, tests were conducted for Johansen cointegration. However, we fail to establish any sort of relationship among variables in the long-run, which means that data are not cointegrated through the utilization of the Trace test. Therefore, analysis are carried using VAR.

VAR Granger Causality/Block exogeniety Wald test results

Vector Autoregression model results, under 4 lag structure obtained, in order to avoid the issue for autocorrelation. In this case, for each equation we have four lagged coefficients and the constant which in total accounts for 18 coefficients. Figure 4 represents the VAR model and the corresponding t-statistics for each coeffiecient.

Table 4
VAR model and the corresponding t-statistics

Vector Autoregression Estimates
Date: 07/01/22 Time: 23:20
Sample (adjusted): 2011Q1 2021Q4
Included observations: 44 after adjustments
Standard errors in ( ) & t-statistics in [ ]

	GDP1	X1
GDP1(-1)	0.179132	-0.055750
	(0.11101)	(0.01687)
	[1.61361]	[-3.30545]
GDP1(-2)	-0.313351	0.012906
	(0.12323)	(0.01872)
	[-2.54282]	[0.68935]
GDP1(-3)	0.219758	-0.011055
	(0.13250)	(0.02013)
	[1.65856]	[-0.54916]
GDP1(-4)	0.716276	0.053484
	(0.12588)	(0.01913)
	[5.69005]	[2.79653]
X1(-1)	0.573534	0.904242
	(1.12815)	(0.17140)
	[0.50839]	[5.27571]
X1(-2)	3.122168	0.308021
	(1.51068)	(0.22952)
	[2.06673]	[1.34205]
X1(-3)	-2.004521	0.075594
	(1.56353)	(0.23754)
	[-1.28205]	[0.31823]
X1(-4)	1.366232	-0.057929
	(1.44801)	(0.21999)
	[0.94352]	[-0.26332]
C	88.92320	-13.80317
	(74.9823)	(11.3919)
	[1.18592]	[-1.21166]
R-squared	0.957240	0.925400
Adj. R-squared	0.947467	0.908348
Sum sq. resids	162732.1	3756.219
S.E. equation	68.18717	10.35956
F-statistic	97.94114	54.27089
Log likelihood	-243.1781	-160.2668
Akaike AIC	11.46264	7.693946
Schwarz SC	11.82759	8.058894
Mean dependent	1503.041	95.50598
S.D. dependent	297.4990	34.21929
Determinant resid covariance (dof adj.)		465007.9
Determinant resid covariance		294232.8
Log likelihood		-401.8934
Akaike information criterion		19.08606
Schwarz criterion		19.81596
Number of coefficients		18

Finally, Granger Causality/Block exogeniety Wald test results reveal that there is bi-directional causality between exports and economic growth in Kosovo in the short-run. Based on chi-square figures and probability. Probablity <5% in both equations is obtained. See figure 5:

Dependent variable: GDP1

Excluded	Chi-sq	df	Prob.
X1	27.55066	4	0.0000
All	27.55066	4	0.0000

Dependent variable: X1

Excluded	Chi-sq	df	Prob.
GDP1	20.55456	4	0.0004
All	20.55456	4	0.0004

Figure 5. Granger causality/ Block exogeniety Wald test results

The null hypothesis in both cases is rejected, meaning that causality is running both directions (i.e. GDP granger cause exports and vice versa, exports Granger cause GDP).

Conclusion

In this paper, a study was carried regarding the impact of exports on economic growth in the case of Kosovo. Quarterly data were employed over the period 2010 to 2021. Analysis were carried based on Vector Autoregression (VAR) model, in order to capture the dynamics of causality of the two aforescpecified variables. The initial step was to identify the number of lags under the VAR model. All of the tests suggested that 4 lags be taken into considireation and proceeded with unit root test. The augmented Dickey Fuller test suggested that data are stationary at first difference. Using the fist difference we fail to find any cointegration of the variables through the utilisation of the Johansen Cointegration test (i.e. that there is no indication of long-run relationship among the variables). Given the circumstances VAR Granger causality/Block exogeniety Wald tests were performed. Results suggest that there is bi-directional causal relationship between the variables in the short-run, which means that causality is running both directions. The analysis support the ELG hypothesis as well as growth Granger causing exports. Such findings, where causality is running in bi-directions very common in the literature and is very well supported throughout.

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