Economic Growth and Unemployment in Albania. Evidence from Time Series 1994-2021

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Abstract: The economic objective of each economy is to establish economic growth which would be associated with less unemployment. On theoretical grounds the inverse relationship of growth and unemployment is captured by Okun's law. The objective of this paper is to examine the relationship between economic growth and unemployment in Albania, thereby revealing the GDP impact on unemployment, in line with the theoretical framework of Okun's law. Therefore, the study will estimate the Okun's coefficient over a quarterly time span 1994-2021, using Vector Auto Regression (VAR) and Granger Causality analysis, as well as impulse response functions. The econometric results of the VAR analysis reveal that there exists a short-term relationship between unemployment and GDP, implying that the improvement of unemployment patterns in Albania are associated with higher growth prospects. Hence, the Okun's elasticity coefficient is confirmed as negative and statistically significant, at both versions of the undertaken estimates of this coefficient, at difference and gap level. Moreover, the causality test shows unidirectional relationship between unemployment and GDP patterns, revealing that growth prospects of Albania's GDP, at both versions, difference and gap versions, causes a reduction of unemployment pattern as well as unemployment potentials in the country, whereas unemployment patterns and potentials does not cause the growth patterns of GDP and output gap.

Keywords: Albania, Causality analysis, economic growth, unemployment, Okun's law, VAR analysis.

1. INTRODUCTION

Okun's law is considered as a vital macroeconomic tool for explaining the relationship between growth and unemployment, which on the grounds of theoretical framework, a negative short-run relationship between cyclical unemployment and cyclical output is foreseen (Aguiar, et al, 2020). Having regard to the subtracting effect of unemployment on growth, growth enhancement activities are mainly focused on creating higher levels of gross domestic product (GDP) by engaging more inputs, a case which is evident for middle income countries, like Albania (O'Brien, et al, 2017). Modelling GDP versus unemployment relationship is grounded on difference and gap equations (Lin, 2008; Gordon, 2010). The validity of Okun's law has been examined widely in the literature of growth nexus unemployment models, through economic cycle component (Lin, 2008; Gordon, 2010; Cazes, 2011), time component (Zanin, 2014; Boda, 2019), macroeconomic shock components (Gelfer, 2020; Ziegenbein, 2021), or on the basis of different countries (Gil, 2019), (O'Brien, et al, 2017). Generally[1], the studies outline that the unemployment/GDP relationship is stable if there is higher participation of the labour force on the public sector employment scheme in relation to agricultural and informal sectors. However, as concern to specific individual countries, the Okun's law coefficient varies with respect to changes in the level of the country's economic development and the structure of the national economy (Ball, 2017; Boda, 2019). [2] In this paper, we will estimate the Okun's coefficient for Albania, by examining the relationship between GDP and unemployment in Albania, over a quarterly time series for a yearly period 1994-2021, by focusing the analysis on the economic difference and economic cycle component, on the grounds of the relationship between unemployment and economic growth. As concern to growth prospects, Albania is lagging well behind other EU countries, suffers considerably from weak income convergence with the EU standards,

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[1]The difference equations look at the differenced values of unemployment and GDP between two periods, in relation to the previous period. (Lin 2008; Gordon 2010; Cazes et al. 2011).

[2]Gap equations are associated with examining the relationship between potential and actual (realized) output, through a business cycle component as well as the gap between natural unemployment rate and actual unemployment.

based on World Bank estimates and is thirdly ranked among the Western Balkan countries (Dauti, 2020). Also, the country suffers from a deregulated labour market, faces youth unemployment, has significant problems with long term unemployment and lately is experiencing outflow of migration coupled with population aging (Dauti, 2020). Therefore, in this paper by trying to answer the research question related to quantifying the Okun's elasticity coefficient, we will see the validity of the inverse relationship between unemployment and GDP in Albania. For estimation purposes we will rely on VAR and Granger – Causality analysis and will try to see the behaviour of the Okun's coefficient for Albania in a short run. The coming section of the paper focuses on literature review. Section three outlines the theoretical framework for estimating Okun' coefficient. Section four describes the nature of the data employed on the empirical part of the study. Section five describes the methodology used, econometric techniques and estimation results. Section six presents the results from different estimation methodologies; section seven discusses the results and section eight concludes the study and gives policy recommendations.

2. LITERATURE REVIEW

The relationship between cyclical components of unemployment and output gap have been widely used on empirical grounds, to discourse the Oku's coefficient, for the purpose of addressing the macroeconomic objectives of reducing unemployment and increasing economic growth [Ball],[Lim],[Garcia],. For instance, Ball et al. (2017), found a stable relationship between cyclical unemployment and output gap, even in the crisis periods. Furthermore, in the recession periods Lim et al. (2019), argued that firms are better off if they fire workers rather than employ new workers in the growth expansion periods. They found an inverse relationship between unemployment and GDP, by outlining that 1 percent decrease (increase) of GDP is associated with increase (decrease) of unemployment by 0.61 (0.24) percent, respectively. Also, Aguiar-Conraria et al. (2019) showed that the Okun coefficient is not sensitive to recessions. On the grounds of the impact of macroeconomic shock, Gelfer (2020), found that the decrease of investment component of GDP increases unemployment by half the amount of investment increase, whereas productivity shocks increase unemployment at marginal level. Using the structural DSG model, he found that investment and finance shocks have larger effects on employment growth and the unemployment rate when compared to productivity and other supply-side shocks. On the grounds of group country level data, the empirical studies support the inverse relationship between output gap and unemployment gap (Kovacevic, 2022). Observing the Okun's coefficient, for the yearly time span 2000-2021, in the Eurozone region, Kovačević, et al, (2022), found higher elasticity of Okun's coefficient for more developed countries of the Eurozone in comparison to less developed countries, where the elasticity coefficient for these countries was found to be low. On country level data, Garcia-Ramos (2019), came to the conclusion that in the cases of higher output gap (when actual GDP is lower that its potential level), growth deteriorates the unemployment level by 0.43 percent, whereas in the cases of lower output gap (when actual GDP is higher than its potential level), the impact of GDP on unemployment approaches to zero. Likewise, Unevska Andonova & Petrovska (2019), when investigating Okun's law for North Macedonia, during a yearly period 2004-2016, found that GDP/unemployment relationship in North Macedonia, is not different from the growing and regional economies. They found the GDP/unemployment relationship in North Macedonia is significantly affected by labor intensive growth, as well as the financial crisis and the Eurozone debt crisis. Also, Januri (2022) found evidence of a shock on Okun's coefficient, provoked mainly by COVID-19 pandemic. Having regard to the summarized empirical studies, it is clearly evident the outlined inverse relationship between output gap and unemployment gap, referring to Okun's law. However, due to the heterogeneous nature of different countries in terms of macroeconomic performance, it is clearly indicative that such analysis, which involves the relationship between growth and unemployment, should be considered at country level. The main objective of this paper is to evaluate the relationship between GDP and unemployment, on the framework of Okun's law in Albania. The study will add value to the knowledge of the existing body of the literature. We use quarterly data over the yearly period: 1994-2021 and employ co-integration technique to estimate the long run relationship between the variables.

3. THEORY OVERVIEW OF OKUN'S LAW ON THE DIFFERENCE AND GAP VERSION

Okun's law, on the grounds of the gap version, is used to determine the connection between output and unemployment gaps. It can be taken by the following equation:

$$u_t - u_t^* = \beta(y_t - y_t^*) + \varepsilon_t \quad (1)$$

Where u_t is the unemployment rate, u_t^* is the natural unemployment, y_t is the real GDP and y_t^* is the potential GDP. u_t^* and y_t^* are calculated using Hodrick Prescot filter. The β coefficient is known as Okun's coefficient. The basic assumption which relates to equation (1), the aggregate demand shifts lead to output fluctuations, which via second round effect impacts labor market conditions with respect to changes on unemployment cycle. The error term captures other specific related factors to labour productivity or labour force participation rate. The difference version of Okun's law deals with the relationship between changes in the unemployment rate and changes in real GDP, between two time periods, as outlined in the following equation (2).

$$u_t - u_{t-1} = \alpha + \beta(y_t - y_{t-1}) + \omega_t$$

$$\Delta u_t = \alpha + \beta \Delta y_t + \omega_t \quad (2)$$

Where u_t and y_t are GDP and unemployment rate at current period, and u_{t-1} and y_{t-1} are the unemployment rate and real GDP from the previous periods, respectively. However, assuming a steady increase of potential GDP, keeping unemployment rate at constant level, may be impractical for middle income countries, like it is the case with Albania, given

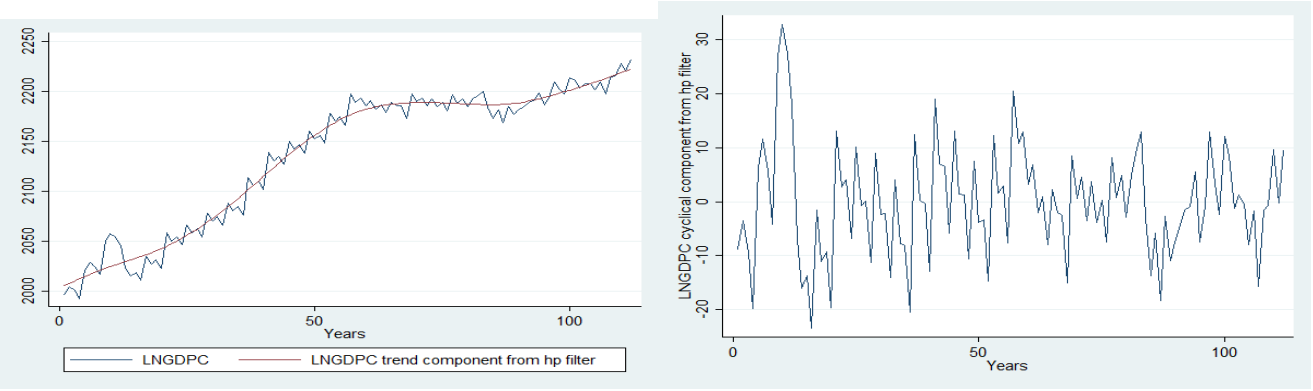

Fig. (1). Trend and cyclical component of GDP in Albania.
Source: Author's calculation using stata.

Table 2: Descriptive Statistics of the Data Used.

Variable	Observation	Mean	Std.Dev.	Min	Max
Unemployment gap	112	-5.85e-09	24.86225	-93.64	36.93
Output gap	112	-1.90e-08	10.24124	-23.46	32.86
Difference in unemployment	111	-.3449487	22.12414	-114.86	129.40
Difference in GDP	111	.0200955	.110731	-.1603	.3202

Source: Author's calculations using stata.

the structural economic changes these countries have undergone through, during the long transition period.

4. DATA AND STYLIZED FACTS

Observing the output gap in Albania as provided in figure 1, we notice the evidence of cyclical behavior of the output, recording actual value below and above its potential level, as depicted in Fig. (**1**).

The data used in our analysis consists of yearly seasonally adjusted figures for the unemployment rate and real GDP. We calculate the gaps using the Hodrick-Prescott (HP) filter, with λ=1600 for quarterly data. All values are in logarithm. Cointegration test and error correction model are applied to the time series data of unemployment and GDP of Albania, at both versions, difference and gap version. This study tests the relationship between unemployment and GDP in Albania. Summary statistics of the data are presented in the following table. The total of 112 observations for gap analysis and 111 observations for differenced analysis are summarized for better understanding of the descriptive nature of the data used on empirical context. The of unemployment and output gap as well as difference in unemployment are negative, indicating the persistence of these variables over a quarterly period 1994-2021. The source of the data is Institute of Statistics, INSTAT, Albania.

5. MATERIALS AND METHODOLOGY

5.1. Vector Autoregression Analysis

The econometric model of this research consists on a vector autoregressive (VAR) system, which is specified as following equation:

$$\begin{bmatrix} U \\ Y \end{bmatrix} = \begin{bmatrix} a_1 \\ a_2 \end{bmatrix} + \begin{bmatrix} \gamma_{11}(L)\ \gamma_{12}(L) \\ \gamma_{21}(L)\ \gamma_{22}(L) \end{bmatrix} \begin{bmatrix} U \\ Y \end{bmatrix} + \begin{bmatrix} \varepsilon_{11} \\ \varepsilon_{12} \end{bmatrix} \quad (3)$$

Where U and Y denote two potentially endogenous variables: unemployment gap and output gap, respectively, L is the lag operator, and $\varepsilon_{11}$and ε_{12} are white noise errors. The null hypothesis of no joint significance of the estimated parameters of lagged variables of unemployment gap and output gap, can be tested using the F test. Empirical analysis of the VAR models assumes stationary time series on levels (Sadiku, et al, 2018).

5.2. Granger Causality Tests

According to (Granger, 1969) Y is said to "Granger-cause" X if and only if X is better predicted by using the past values of Y than by not doing so with the past values of X being used in either case. Essentially, Granger's definition of causality is motivated in terms of predictability. With the regression analysis, we want to estimate whether unemployment promotes GDP or GDP encourages unemployment. Namely, we want to find out if the changes in the level of Unemployment at difference and gap versions will respond with changes in the level of GDP, in difference and gap versions, or vice versa. The granger causality test applied for the relationship between unemployment and GDP is as follows:

$$un_{jt} = \varphi + \sum_{j=1}^{k} \beta_j\, un_{jt-1} + \sum_{j=1}^{k} \alpha_j\, gdp_{jt-1} + \varepsilon_t \quad (4)$$

$$gdp_{jt} = \gamma + \sum_{j=1}^{k} c_j\, GDP_{jt-1} + \sum_{j=1}^{k} \alpha_j\, un_{jt-1} + \mu_t \quad (5)$$

Where un_{jt} and gdp_{jt} are stationary time series sequences, φ and γ are the respective intercepts, ε_t and μ_t are white noise error terms and k is the maximum lag length used in each time series. The optimum lag length is based on Granger's definition of causality and Akaike's minimum final prediction error criterion, as outlined in table 3. If in equation (4), $\sum_{j=1}^{k} \alpha_j$ is significantly different from zero, then we may conclude that GDP granger causes unemployment. If in equation (5), $\sum_{j=1}^{k} \alpha_j$ is significantly different from zero, then we may conclude that unemployment granger causes GDP. The following table 4, gives the results from the Granger causality analysis, where equation (4) and (5) are estimated on difference and gap versions of unemployment and GDP.

5.3. Testing for Stationary - Unit Root Test

Testing for stationarity is the first step in time series analysis, which is applied for the purpose of avoiding the growth or declining trend of the data, thus making sure that the observed time series data is stationary. One of the most commonly used methods for the stationarity test, is the Dickey-Fuller test, at the augmented version (ADF). The ADF test has been the first statistical test designed to test the null hypothesis that a unit root is existing in an autoregressive model of a given time series and that the process is thus not stationary. For this purpose, we apply Augmented Dickey-Fuller test (ADF) to determine whether the various time series are integrated at the order of zero *I* (0). The starting point in unit root test is:

$$Y_{jt} = aY_{it-1} + \varepsilon_t; -1 \leq a \leq 1 \quad (6)$$

The null hypothesis in the Augmented Dickey - Fuller test is that the underlying process which generated the time series in non-stationary. This will be tested against the alternative hypothesis that the time-series information of interest is stationary. If the null hypothesis is rejected, it means that the series is stationary i.e., it is integrated to order zero. If, on the other hand, the series is non-stationary, it is integrated to a higher order and must be differenced until it becomes stationary (Dauti, 2009). When testing for unit root we want to find out whether a in the equation (6) is equal to one. If a is smaller than one, the series is stationary. If, on the other hand, α is greater than one, than it would be an explosive series. Subtracting Y_{it-1} from both sides in equation (6), we get equation (7), which is estimated by the Dickey – Fuller and Augmented Dickey – Fuller test.

$$\Delta Y_{jt} = \beta Y_{jt-1} + \varepsilon_t \; ; (7)$$

Since the null hypothesis in equation (6) is that α is equal to one, in equation (7) it must be that β is equal to zero. Hence, when β is zero, there is unit root, and we have insufficient evidence to reject the null hypothesis of non -stationary. The Augmented DF Test is performed on each variable separately, on the following regression.

$$\Delta X_{jt} = \delta_0 + \delta_1 + \delta_3 X_{t-1} + \sum_{i=1}^{k} a_i \Delta X_{jt-1} + u_t \, (8)$$

The variable ΔX_{jt-1} in equation (8) expresses the first differences with k lags and final u_t is the variable that adjusts the errors of autocorrelation. The coefficients $\delta_0, \delta_1, \delta_3$ and a_i are estimated. In order to test for the stationary of time series, we have to lag the variables. When comparing the *t statistics* with their critical values as shown in table **3**, we notice that the variables of unemployment and GDP are stationary on levels, hence, need no differencing them to test for stationarity. This means that the null hypothesis that a given series (Unemployment or GDP), contain a unit root and is non-stationary, was rejected at the level version for the unemployment and GDP. Hence, in the levels the variables of unemployment and GDP are becoming stationary and we have sufficient evidence to reject Ho of unit root presence in our data. This means the variables of unemployment and GDP are integrated to order *I (0).* The analysis first starts with time series properties of the variables checked through Augmented Dickey-Fuller (ADF) unit root testing procedure. The results indicate that all series are stationary in their level, so there is no need for differencing them. When series are stationary, VAR system is an appropriate econometric examination for the analysed series. The test results are summarized in table **2**.

6. RESULTS

Due to the reason that the tested series for stationarity, using ADF test, as shown in table **2**, outline stationary data in levels, the series cannot be co-integrated, hence, co-integration test for the series being I (0), is not recommended (Sadiku, et al, 2019). The following section will present the VAR results, granger causality analysis and impulse response functions. According to Akaike Information Criterion (AIC), as outlined in table 3, the optimal number of lags for the variables of unemployment and GDP at gap version is 2, whereas at difference version is 1.

6.1. Results from VAR Analysis

In order to make a more formal analysis of the influence of GDP on unemployment and the influence of the lagged value of unemployment, on the unemployment pattern in Albania, we apply the methodology of Vector Autoregression (VAR), as shown in table 4. The following table presents the regression results of the VAR model and continuous with causality analysis and impulse response functions. According to Akaike Information Criterion (AIC), as suggested from table 3, the optimal number of lags for the variables being estimated at difference version is 2, whereas for the variables being estimated at gap version is 1. In the following table 4, we display the results from the VAR model, after estimating equation 3. From the results of the VAR model, in the equation of unemployment we can observe that the coefficients of GDP at first and second-time lag, are statistically significant and negative, at 5 percent level of significance, indicating the inverse relationship between unemployment and GDP at difference level, a finding which is consistent with theoretical framework of Okun's law. Hence, 1 percent increase in the GDP differences will decrease unemployment differ-

Table 3. Augmented Dickey Fuller test of the Selected Variables in Levels.

Decision	With no Constant	Test Statistic	1% Critical Value	5% Critical Value	10% Critical Value
Dickey Fuller; Unemployment at difference analysis (level)					
I (0)	With no constant	-11.842	-2.599	-1.950	-1.611
Dickey Fuller; GDP at difference analysis (Level)					
I (0)	With no constant	-20.126	-2.599	-1.950	-1.611
Dickey Fuller; unemployment at gap analysis (level)					
I (0)	With no constant	-5.155	-2.599	-1.950	-1.611
Dickey Fuller; GDP at gap analysis (Level)					
I (0)	With no constant	-8.004	-2.599	-1.950	-1.611

Source: Author's calculations using stata.

Table 4. Selection Order Criteria of the Optimal Number of Lags.

VARSOC UNEMPLOYMENT AND GDP (at Difference Version)								
Lag	**LL**	**LR**	**Df**	**P**	**FPE**	**AIC**	**HQIC**	**SBIC**
0	-1147.36				4.1e+0	20.89	20.91	20.94
1	-915.35	464.02	4	0.00	64612.7	16.7519	16.8116	16.8992
2	-901.074	28.561*	4	0.00	53602.4*	16.565*	16.6646*	16.8105*
VARSOC UNEMPLOYMENT AND GDP (at Gap Version)								
0	-921.127				66727.4	16.7841	16.804	16.8332
1	-886.723	68.808*	4	0.000	38391.7*	16.2313*	16.2911*	16.3786*
2	-882.779	7.887	4	0.096	38434.9	16.2324	16.3319	16.4778

Source: Author's calculations using stata.

ences, on average, by 3.9 and 3.8 percent in the first- and second-time lag, respectively.

Table 5. Results from the VAR Analysis.

	(1)	(2)	(3)	(4)
Dependent Variables	Lnu_t	Lny_t	lnu_{gap}	lny_{gap}
$\Delta_1 lnu_t$	0.788***	-0.0784		
	(0.0963)	(0.0527)		
$\Delta_2 lnu_t$	-0.0879	0.0367		
	(0.0968)	(0.0530)		
$\Delta_1 lny_t$	-0.392**	0.542***		
	(0.161)	(0.0881)		
$\Delta_2 lny_t$	-0.380**	0.433***		
	(0.159)	(0.0869)		
$\Delta_1 lnu_{gap}$			0.622***	-0.0376
			(0.0739)	(0.0376)
$\Delta_1 lny_{gap}$			-0.374**	0.270***
			(0.180)	(0.0915)
Constant	347.8***	100.6*	-0.0883	0.0992
	(102.7)	(56.16)	(1.830)	(0.930)
Observations	110	110	111	111
R-square	0.54	0.97	0.397	0.0776
Chi2	130.502	4174.759	73.109	9.33
p-value (chi-2)	0.000	0.000	0.000	0.000

Note: lnu_t denote difference level in unemployment, lnu_{gap} denote the unemployment gap, lny_t is the estimated GDP in difference level, lny_{gap} is the estimated GDP in gap version. Δ_1 is the first-time lag and Δ_2 is the second time lag. Standard errors in parentheses indicate significance of coefficients at 1, 5 and 10 per cent, respectively.

In the same equation, the lagged value of unemployment is statistically significant at 1 percent level and positive, implying that the impact of lagged values of unemployment differences on itself is significant, revealing its persistence. Turning to the gap version of estimating the relationship between unemployment and GDP, we also find that the coefficient of output gap is negative in the first-time lag, as predicted by Okun's law and statistically significant at 1 percent level of significance. Hence, 1 percent increase in output gap will decrease forthcoming unemployment gap in Albania, by 0.37 percent, on average. In the equations of GDP, at both versions, difference version (column 2) and gap version (col-

Table 5. Granger Causality Results.

	(1)	(2)	(3)	(4)
VARIABLES	lnu_t	lny_t	lnu_{gap}	lny_{gap}
$\Delta_1 lnu_t$	0.788***	-0.0784		
	(0.0963)	(0.0527)		
$\Delta_2 lnu_t$	-0.0879	0.0367		
	(0.0968)	(0.0530)		
$\Delta_1 lny_t$	-0.392**	0.542***		
	(0.161)	(0.0881)		
$\Delta_2 lny_t$	-0.380**	0.433***		
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			(0.0739)	(0.0376)
$\Delta_1 lny_{gap}$			-0.374**	0.270***
			(0.180)	(0.0915)
Constant	347.8***	100.6*	-0.0883	0.0992
	(102.7)	(56.16)	(1.830)	(0.930)
Observations	110	110	111	111

Note: lnu_t denote difference level in unemployment, lnu_{gap} denote the unemployment gap, lny_t is the estimated GDP in difference level, lny_{gap} is the estimated GDP in gap version. Δ_1 is the first-time lag and Δ_2 is the second time lag. Standard errors in parentheses indicate significance of coefficients at 1, 5 and 10 per cent, respectively.

umn 4), we observe persistence effects of GDP outlined by the statistically significant and positive coefficient of GDP at the first-time lag, indicating the GDP in Albania is subject to agglomeration factors.

6.2. Results from Granger Causality Analysis

In order to define the influence of the GDP on unemployed, at difference and gap version, we employed a Granger causality analysis, which as depicted in equations 7 and 8, should point out which occurrence proceeds the other, and vice versa, i.e., whether the GDP follow the changes of unemployment, or vice versa, the unemployment pattern follows the changes in GDP. A Wald test is commonly used to test Granger Causality. For example, the coefficients on the lags at the first- and second-time lag of Gross Domestic Product, in the equation of Unemployment, in the first row is evidence that the coefficient of GDP is statistically different from zero in the equation for Unemployment. This result indicates that there is sufficient evidence to reject the null hypothesis of Granger Causality, that Gross Domestic Product does not granger cause Unemployment. Reflecting on the size of the coefficients of GDP in the equation of unemployment, 1 percent increase of unemployment, decreases GDP by 3.9 and 3.8 percent in the first- and second-time lag, respectively. This finding is consistent with theoretical considerations of Okun's law, which predict the inverse relationship between unemployment and GDP, at difference levels. Turning to the gap version of estimating the Okun's coefficient, the results are similar. Therefore, focusing on column (3; table **4**), negative association between unemployment gap and output gap is also outlined. The statistically significant coefficient of output gap in the equation of unemployment gap (column 3, table **4**), is an indication that the coefficient on the first lag of GDP is different from zero in the equation of unemployment, indicating a sufficiency of evidence for rejecting the null hypothesis of Granger Causality, that GDP does not granger cause unemployment. Hence, 1 percent increase in output gap, reduced unemployment gap by 3.7 percent. On the other hand, the insignificant coefficient of one-time lag of unemployment, in the equation of GDP in the second row, favours the conclusion that the coefficients on the lags of unemployment are jointly zero in the equation for GDP.

This result indicates that there is insufficient evidence to reject the null hypothesis of Granger Causality, that unemployment does not granger cause GDP. In other words, the tests show that changes in Albania's past values of unemployment are not causing changes in GDP performance of Albania. In order to define the influence of explanatory variables on the dependent variable, we employed a Granger causality analysis, which should point out which occurrence precedes the other, i.e., whether the unemployment follows the changes of the explanatory variable of GDP, or vice versa, the explanatory variable follows up the changes in unemployment. A Wald test is commonly used to test Granger Causality. The Wald table, reports a Wald test that the coefficients on the lags of the variable in the "excluded"" column are zero for the variable in the "equation"" column. The results indicate that the coefficient of unemployment at difference level, in the first-time lag is statistically significant in the equation of unemployment, meaning that the increase of unemployment differences, in the second lag by 1 percent,

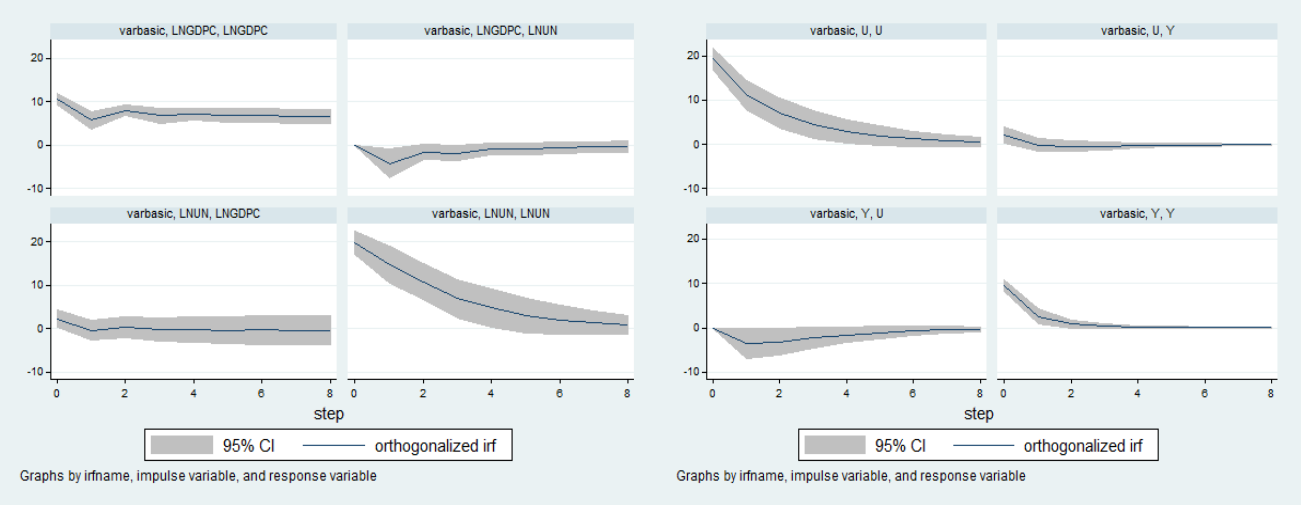

Fig. (2). Impulse Response functions.
Source: Author's calculation.

increases the current level of unemployment in the forthcoming period by 0.7 percent. Also, the coefficient of GDP is statistically significant in the second time lag in the equation of unemployment. Hence, 1 percent increase in the GDP differences in the second time lag, will increase unemployment level in the forthcoming period by 0.38 percent. Response of unemployment to a standard deviation shock to GDP is decreasing in the short run, reaching values close to zero in the first-time horizon, and increasing in the long run up to the eighth time horizon. Concerning the impulse response functions displayed in graph, one can observe that for one standard deviation shock given to GDP, the response of unemployment is very low in the short run with a decreasing tendency and then is becoming high in the long run, with increasing pattern, meaning that in the short run unemployment weakly reacts to changes in GDP.

7. DISCUSSION OF THE RESULTS

The negative relationship between unemployment and GDP, in both difference and gap versions, supports Okun's law related to the negative impact of unemployment on GDP, thereby confirming the theoretical predispositions of Okun's coefficients. The findings also outline that GDP is subject to persistence effects due to the significant coefficients of the lagged values of GDP on itself, thereby confirming the agglomeration effect of GDP. The finding from the impulse response functions outline that the impact of unemployment to GDP approaches zero in the short run, whereas in the long run (i.e., longer periods than 2 periods), this impact starts to increase. The findings from the Granger causality analysis points out that positive changes in GDP, for up to two-time lags, being estimated at difference level, are triggering negative changes on unemployment on the forthcoming period, a result which again in line with the theoretical framework of Okun's coefficient, which predicts negative association between GDP and unemployment. The results from the Granger – causality analysis is confirming that GDP is subject to persistence effects in both cases, difference and gap versions of the equations. The findings from the VAR analysis are reinforcing the results from Granger Causality analysis. Also, the results from the VAR analysis are suggesting that forthcoming increase in GDP is subject to the agglomeration factor of GDP, in the equation of GDP being estimated at both, difference and gap version. Also, when estimating the equation of GDP at gap version, the results outline that growth prospects of Albania are triggering unemployment, a finding which is consistent with Okun's law framework.

8. CONCLUSIONS AND RECOMMENDATIONS

In this paper, we have estimated the relationship between unemployment and GDP in Albania, in the framework of Okun's law, using yearly data for the yearly period 1994-2021, as well as causality analysis between the two macroeconomic indicators. i.e.; whether the changes of GDP performance are caused by the other macroeconomic factors associated with unemployment, and vice versa, considering a bivariate analysis, whether the changes on unemployment are caused by the changes on the GDP, respectively. The estimates on the grounds of the relationship between unemployment and GDP are executed in line with the theoretical framework of Okun's law, which predict negative association between these two macroeconomic variables. Okun's coefficient is estimated at difference and gap version. The VAR results confirm that Albania's unemployment differences and unemployment potentials deteriorated from the increase of GDP differences in one-time lag and two-time lag and output gap in one time lag, confirming the inverse association between unemployment and GDP. In both cases, difference and gap analysis, the VAR results also confirm a persistence effect of GDP, due to the positive impact of the first-time lag of GDP on the current level of GDP. The VAR results also outline the persistence effect of unemployment differences. This result indicates that variations in Albania's GDP are reinforced by the agglomeration factor of GDP. In addition, changes in the unemployment pattern in Albania are driven by changes in GDP. The results of this paper suggest that Albania's unemployment is largely dependent upon growth prospects of the country, therefore, unemployment reduction policies in Albania are expected to play a significant role in the long-term economic growth of Albania's economy. Therefore, the country should be focused on stimulating the growth driven factors of aggregate supply, that

would potentially lead to the reduction of unemployment in Albania. On the supply side conditions, the recommendation for Albania would be to concentrate its public investments on productive economic sectors, like tourism and agriculture, the most prominent sectors of the country, based on the World Bank estimates, which at the same time contain competitive advantages at national and regional level. Stimulating the sectors which contain competitive advantage, will expectedly result in higher output associated with lower inflation in the first cycle and hence, lower unemployment, via second round effect. However, having regard the persistence effect of GDP which was found to be subject to agglomeration factors, the outlined recommendation, with respect to stimulating supply side factors in the country, are beyond the scope of this paper, but could serve as a milestone for building a better perspective for the country, with the aim of reducing unemployment pattern in the long run. However, the objective of this study was to estimate the relationship between unemployment and GDP, in the framework of Okun's law, on the grounds of two separate analysis, difference and gap analysis.

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