

## Empirical Analysis of Relationship between Unemployment and Economic Growth in Botswana From 1980 – 2018: A Theoretical Review of Okun's Law

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### Abstract

*The objective of this paper is to investigate the empirical relationship between unemployment and economic growth from 1980 to 2018 on the Botswana economy as outlined in the Okun's law. The economy has been on a positive growth pattern backed by the mineral resource while unemployment has been fairly stable for first three decades up to 2010 before it rises. The ordinary least Squares (OLS) regression model has been used to test such a relation. The robustness of the model was improved by adding inflation and population growth as control variables. The negative relation between unemployment and economic growth was observed to follow OKUN's law over the study period. The paper suggests that the policy makers of the country should further stimulate the economy through diversification in addressing the problem of unemployment. Inflation and population growth revealed positive and negative relationships on unemployment respectively.*

**Keywords:** Unemployment and Economic Growth

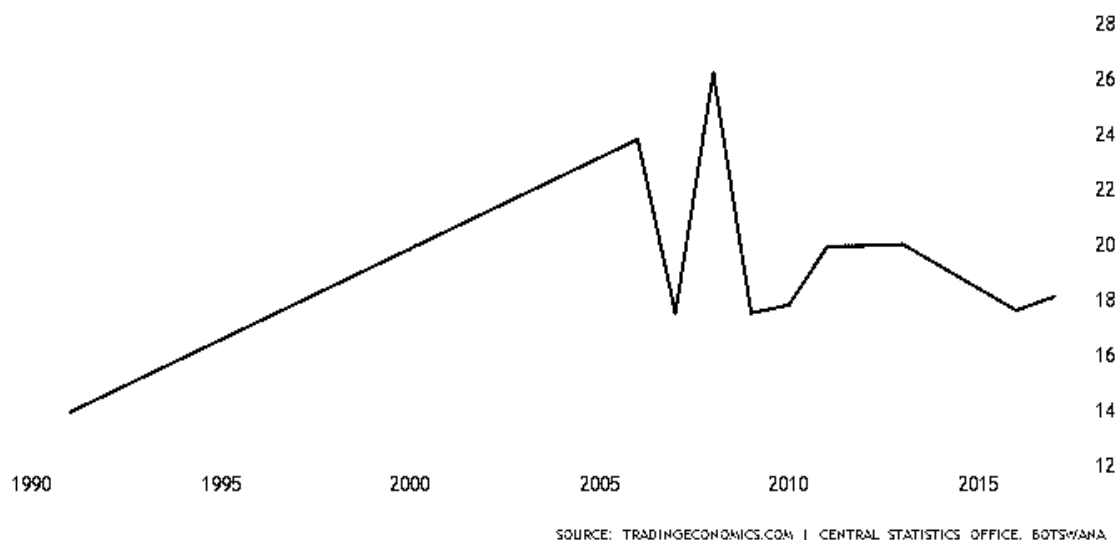
### 1. INTRODUCTION

The purpose of this paper is to find the relationship between the unemployment and economic growth for the economy of Botswana for a thirty eight year period from 1980 to 2018. It starts with analyzing the trends of economic growth and unemployment for a study period. Economic growth as measured by Gross Domestic Product has been on an average of 8.4 percent from 1965 to 1990. The increased revenues from the mineral resources have been the main driver of such a growth pattern in Botswana. In the early years of the 1990's Botswana has however experienced lower average annual growth rates of about 1.7 per cent reaching its lowest of 1.24% in 1994. This was followed by an increase in economic growth recording its highest level of 13.40% in the second quarter of 1997 (Freeman 1999). The deregulation of the financial sector in 1993 which saw the removal of capital controls contributed significantly contributed to an increase in capital flows from developed to developing countries with Botswana among the chief beneficiary because of its democratic institutions. In the late 2000s GDP averaged 1.8 % as the financial crisis and global recession took its toll. There was a huge decline in diamond revenues which contributed to almost a third of the economy Botswana. Currently the economic growth of Botswana is around 2.4% and is classified as a middle income economy.

Unemployment rate in Botswana measures the number of people actively looking for a job as a percentage of the labour force. Unemployment Rate in Botswana was on a rise from 1990 reaching a higher level of 22 % in 2005. The reliance of imports as a nation contributed to such a rising unemployment level (Word Bank, 2018). The shift in policy framework towards citizen empowerment, educational policy, import substitution as well as the improvement in labour institution contributed to a decline in unemployment level 16.7 % by 2007. However, the 2008 global financial crisis resulted in a steep rise in unemployment. Reduction in diamond revenues resulted in decline of fiscal revenues which were used create employment through various economic activities. For instance, major construction activities were stalled during that period (World Bank, 2018). In fact, the government reduced its fiscal expenditure by almost 50% thus drastically reducing the levels of employment (World Bank, 2018). The end of the global financial crisis stimulated growth in in Botswana as the economy revives its economic activities. Major projects were funded including the construction of Kazungula Bridge and the construction of malls in various parts of the country. Citizen empowerment, subsidy policies,

import substitution as well as boosting the export sector further drove the unemployment rate as shown in Figure 1.1. Unemployment rate was fairly stable from 2015 to 2018 ranging between 16% and 19 % (World Bank, 2018).

**Figure1.1. Unemployment rates in Botswana from 1991 to 2018**



Source; *World Bank 2018*

OKUN, law express the relationship between economic growth and unemployment. The law states that improvements in economic growth has the effect of reducing the level of unemployment. In fact, for unemployment to decrease by a single percentage point, real gross domestic product must increase by more than double the proportion (Sinclair, 2004). Unemployment with its economic and social implications is one of the most pressing problems facing Botswana's policy makers, high rates of unemployment signal inadequacy in the labor market, deepening poverty incidence and spread in decent standards of living. This research analyses if the trends in unemployment follow the OKUN's law.

The OKUN's law has been tested in various economies but the results are inconclusive. For instance, OKUN's law was confirmed in many studies (Taylan, 2012 Petkov, 2008 Lee, 2000). On the other hand, no evidence of OKUN's law was reported in other studies (Madito and Khumalo 2014, Driouche 2013, Moosa, 2006). This research adds to the ongoing debate of whether the relationship between real gross domestic product and unemployment in Botswana follows the OKUN's law over a period from 1991 to 2018. Following is section 2 which provides empirical evidence between unemployment and economic growth from various researchers. Section 3 looks at the methodological framework used in testing the relationship while section 4 presents the results. Section 5 concludes the paper.

## 2. Literature Review

A wide array of literature investigated the relationship between output and unemployment and revealed the validity of OKUN's law though the estimates varied across countries and regions (Lee, 2000; and Sogner and Stiassny, 2002). Petkov (2008) applied the Hodrick-Prescott filter into an Autoregressive Distributed Lag (ARDL) model by combining both the economic and statistical approach. Petkov used the HP filter to capture the (NAIRU) which was furthered by error correction model (ECM) to estimate the Okun's coefficient. He discovered a relationship between output growth and unemployment.

Similarly, Taylan (2012) investigated the relationship between macroeconomic variables and economic growth in Turkey from 2000Q1 to 2010Q2 using Vector Auto- Regressive Model (VAR). From his findings, it was revealed that positive shocks to growth, growth in export and inflation reduced unemployment. Also, shocks to exchange rate, interbank interest rate and money supply increased unemployment. The conformity of the results is found to go in line with Phillips curve and Okun's Law. On the same note the World Bank report (2018) suggested need to address the problem of unemployment in developing countries through robust economic policies.

Sinclair (2004) used the gap version to examine the bivariate correlation between unemployment and output. He divided the two macroeconomic variables in a permanent and a transitory component and then he estimated correlation of these components. By applying this model to the US economy, he noted that the fluctuation between output and unemployment is largely permanent and there is a presence of negative relationship between these permanent components. Meyer and Tasci (2012) employed a rolling regression to test the validity Okun's law in America. The results indicated a significant reduction in unemployment as American improves thus confirming the relevance of Okun's law. Furthermore, Knotek (2007) found the negative relationship between economic growth and unemployment in Europe.

Another strand of literature found no-existence of the OKUN's law. A study by Madito and Khumalo (2014) showed non-applicability of the OKUN's law after failing to find the relationship between economic growth and unemployment in Algeria, Egypt, Morocco and Tunisia. Similar results were reported by Driouche (2013) who confirmed the absence of long term relationship between economic growth and unemployment after employing the Autoregressive Distributed Lag (ARDL) approach. Moreover, Moosa (2006) studied the validity of Okun's law in four Arab countries and found out that output growth does not translate into employment gains for the studied countries. On the same note, Onwanchukwu (2015) examined the impact of unemployment on the economic growth in Nigeria from 1985 to 2010, using ordinary least squares regression technique. His findings revealed that economic growth does not have a significant relationship with unemployment in Nigeria.

### 3. Methodology.

#### 3.1 .Theoretical model

The study modified the model adopted by Ozturk and Aletar (2009) of unemployment as function of economic growth and Foreign Direct Investment in Turkey. The model specified that;

$$UR_t = f( GDP_t, EXP_t, FDI_t ) \dots\dots\dots(3.1)$$

Where  $t$  is time trend  
 $UR_t$  is Unemployment rate  
 $GDP_t$  is Gross Domestic Product  
 $EXP_t$  is exports  
 $FDI_t$  is Foreign Direct Investment

In modifying the model in equation (1) , this study adds two variables being inflation and population. The model of the study specified then is specified as;

$$UR_t = a_0 + a_1 GDP_t + a_2 Infla_t + a_3 POP_t \dots\dots\dots(3.2)$$

### 3.2 Empirical Model

All variables are converted to natural logarithms so as to minimize the impact of outliers.

$$\ln UR_t = \alpha_0 + \alpha_1 \ln GDP_t + \alpha_2 \ln Infla_t + \alpha_3 \ln POP_t + \varepsilon_t \dots \dots \dots (3.3)$$

Where

$UR_t$ - Unemployment rate

$GDP_t$  - Gross Domestic Product

$Infla_t$  - inflation rate

$POP_t$  - Population growth

$\alpha_0$  -Intercept term

$\alpha_1, \alpha_2, \alpha_3$  - parameters or coefficients of explanatory variables

$\varepsilon_t$  -Error term

### 4. Empirical results

The primary objective of this was to empirically analyse the relationship between Unemployment and economic growth. This chapter results, analyses and interpretation of Data

**Table 4.1. Empirical results**

Dependent Variable: UR

Method: Least Squares

Date: 05/19/19 Time: 17:08

Sample: 1980 2017

Included observations: 38

| Variable           | Coefficient | Std. Error            | t-Statistic | Prob.    |
|--------------------|-------------|-----------------------|-------------|----------|
| C                  | 25.87218    | 1.315070              | 19.67361    | 0.0000   |
| GDPGR              | -0.054292   | 0.067911              | -0.799464   | 0.0000   |
| INFLACPI           | 0.201080    | 0.138542              | 1.451399    | 0.0058   |
| POPGR              | -4.769516   | 0.653959              | -7.293298   | 0.0000   |
| R-squared          | 0.708051    | Mean dependent var    |             | 16.46711 |
| Adjusted R-squared | 0.682291    | S.D. dependent var    |             | 3.981286 |
| S.E. of regression | 2.244079    | Akaike info criterion |             | 4.553768 |
| Sum squared resid  | 171.2202    | Schwarz criterion     |             | 4.726145 |
| Log likelihood     | -82.52159   | Hannan-Quinn criter.  |             | 4.615098 |
| F-statistic        | 27.48627    | Durbin-Watson stat    |             | 1.897243 |
| Prob(F-statistic)  | 0.000000    |                       |             |          |

*Source: Author's compilation*

Coefficient determination measures the overall fitness of the model. A good estimated regression equation have coefficient Determination greater than 0.50. The estimated regression model of this study has coefficient determination of 0.708 hence we conclude that this estimated model fits the data

Serial correlation is detected by the value Durbin –Watson Stat and is 1.9872436 which means there was an insignificant serial correlation hence the variables in parameters won't be spurious subsequently the regression model won't be spurious

## Empirical Model of the Study

$$UR_t = 25.872 - 0.054 GDP_t + 0.201Infla_t - 4.770 POP_t + \varepsilon_t \quad (4.1)$$

The regression model results show a negative and significant relationship between Gdp and unemployment. The results suggest that improvement of in economic performance will reduce the problem of unemployment thus confirming Okun's law. Improvement in economic growth will have an effect of reducing unemployment as labour intensive industries absorb the unemployed labour force in to the mainstream economy. Similar results were reported by Taylan, 2012 in Turkey.

## 5. Conclusion

The primary objective of the study was to investigate the empirical analysis between unemployment and economic growth, using annual data for the period 1980 – 2018 in Botswana. The results demonstrated that economic growth (GDPGR) reduces Unemployment rate by -0.05 units which satisfy the study's null Hypothesis and also measures an inverse relation between unemployment and economic growth. Empirically, the results confirms the theory that Aggregate Demand reduces unemployment The empirical results of this study provide the policy makers with a better understanding of economic growth and unemployment link to draw investment policies in Botswana. The government can formulate macro-economic policies and improve the structure systems of governance for stabilizing economic growth and the same time creating jobs. Thus need to create conducive environment and flexible labour legislations that will attract foreign investors, private sector and small business which will in turn combine the existing entrepreneur's activity with new entrepreneurial entrants so as to create more employment subsequently reducing the unemployment rate.

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