DYNAMICS OF OUTPUT AND FORMAL EMPLOYMENT IN ZIMBABWE

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Abstract

The study analyses the dynamics of output and formal employment in Zimbabwe at both aggregate and sectoral levels. The study uses a Markov Switching Error Correction Framework in order to take into account the relationship of output and employment in both the short and long run as well as taking into account the impact of business cycles. The study uses annual data from 1980 to 2016. The results suggest that on aggregate level the long run elasticity of employment is 0.44, while the short-run elasticity is around 0.25. This compares favourably with other developing countries which have elasticities of between 0.3 and 0.6, implying that sustained and robust GDP growth is important in stimulating formal employment in the country. On a sectoral basis, construction and manufacturing sectors have higher long-run elasticities of 0.72 and 0.66, respectively compared to elasticities of mining; 0.45 and distribution 0.31. Further, in the manufacturing sector there is a long-run equilibrium relationship between manufacturing GDP and formal employment, which implies that increasing manufacturing activities through value addition and beneficiation may provide a long lasting solution to creating formal jobs in the country.

Key words

Gross Domestic Product, Employment and employment elasticity

JEL Classification: E24, O17, O47

1. Introduction

Empirical evidence at both cross country and country case studies have shown that economic growth is the most important factor in reducing poverty in developing countries. Economic growth is, therefore important in meeting Sustainable Development Goals (SDGs) through creation of virtuous circles of prosperity and opportunity. As argued by Ajilore & Yinusa, (2011) economic growth reduces poverty through the creation of decent employment. This is because labour is the most abundant resource, which is available from the poor. Accordingly, sufficient growth is required to ensure sustainable creation of employment and poverty reduction. There are, however, instances where economic growth may not be able to generate a sizeable amount of employment and this is known as 'jobless' growth. Under 'jobless' growth economic growth alone is not adequate to reduce poverty. Hull (2009) argues that growth alone is necessary but not sufficient for a country to reduce poverty and improve incomes of the populace.

Although Zimbabwe experienced reasonably satisfactory growth rates during the multicurrency system[4], employment has not increased as much. The Zimbabwean economy rebounded strongly in 2009 after the adoption of the multicurrency system which entails the use of nine (9) foreign currencies, dominated by the US dollar and South Africa rand as legal tender. Economic growth rates averaged above 10% from 2009 to 2013, albeit from a low base but receded to 0.7% in 2016, due to drought induced effects. Growth rates of above 4% are expected in the medium term.

The concern is, however, the failure of the conversion of the country's economic growth performance into the creation of formal jobs, improved incomes and livelihoods in the country. Formal employment remains depressed, raising serious concerns about the possibility of a "jobless growth" in the country. The broad unemployment figure for Zimbabwe was 11% in 2014 (ZIMSTAT, 2015). Despite this seemingly low unemployment figure, it is important to highlight that most employment has been in the informal sector. Jobs in the informal sector are 'vulnerable jobs' as they are associated with low wages, safety and insecurity concerns.

[4] The nine foreign currencies include US Dollar, South Africa rand, Botswana Pula, Euro, British pound, Chinese Yuan, Indian rupee, Japanese yen and Australian dollar.

Pleic and Berry (2009) highlight that the two most important yardsticks for economic performance of any country from the perspective of workers are the creation of formal employment and growth in wages. In countries, such as Zimbabwe with ubiquitous employment in the informal sector and underemployment, it is important to create jobs faster than increase in wages. For these countries, the employment elasticity of growth or employment intensity of growth, which is the ratio of the percent growth in employment to the percent growth in GDP can be used as indicator of good growth. The employment elasticity of growth explains how growth in the economy and growth in employment evolve over time.

The employment elasticity of growth is an important determinant in ensuring that economic growth is poverty-alleviating. Pleic and Berry (2009) argue that for countries that are growing at around 7% per annum on a sustainable basis, growth alone can be sufficient to alleviate poverty. However, for countries recording moderate growth rates of around 4%, growth alone may not be adequate. In such a scenario, the employment elasticity of growth will be important to check whether adequate jobs are being created in the economy. Khan (2008), basing on evidence from East Asian countries, argues that an employment elasticity of around 0.7% for developing countries would be ideal. Kapsos (2005) finds an employment elasticity of growth of around 0.3 and 0.38% for the period 1991 and 2003 for both developed and developing countries.

The Government of Zimbabwe under its Interim Poverty Reduction Strategy Paper for Zimbabwe (IPRSP): 2016-2018, emphasised the need to create formal and decent jobs as a way of improving the quality of life for all Zimbabweans. In this light, there is need to understand the employment elasticity of growth for Zimbabwe. This is important to gauge the ability of the economy to create decent employment opportunities. Since job creation has become an important goal of government, it is also quite paramount to understand which sectors of the economy are more labour intensive, so that these can be prioritised in the quest to boost employment and reduce poverty. There are some sectors which are more employment-intensive than others and it is important that growth be concentrated in sectors that have the potential to absorb substantial labour to ensure sustained reduction in poverty.

Against this background, this study seeks to examine the employment elasticity of growth for Zimbabwe since 1980. The study also provides an analytical assessment of Zimbabwe's economic growth since 1980 and the implication on employment outcomes. Given the different

growth-employment sensitivities of the various sectors of the economy, the study also examines the sectoral employment elasticities of growth for the main sectors of the economy. The rest of the paper is arranged as follows, Section 2 focuses on stylised facts on GDP growth and employment nexus. Section 3 reviews both the theoretical and empirical literature. The methodology is covered in Section 4, while the analysis and discussion of results are done in Section 5. Section 6 provides a summary and conclusion, with some policy recommendations for the future.

2. Stylised Facts: GDP and Formal Employment Trends in Zimbabwe

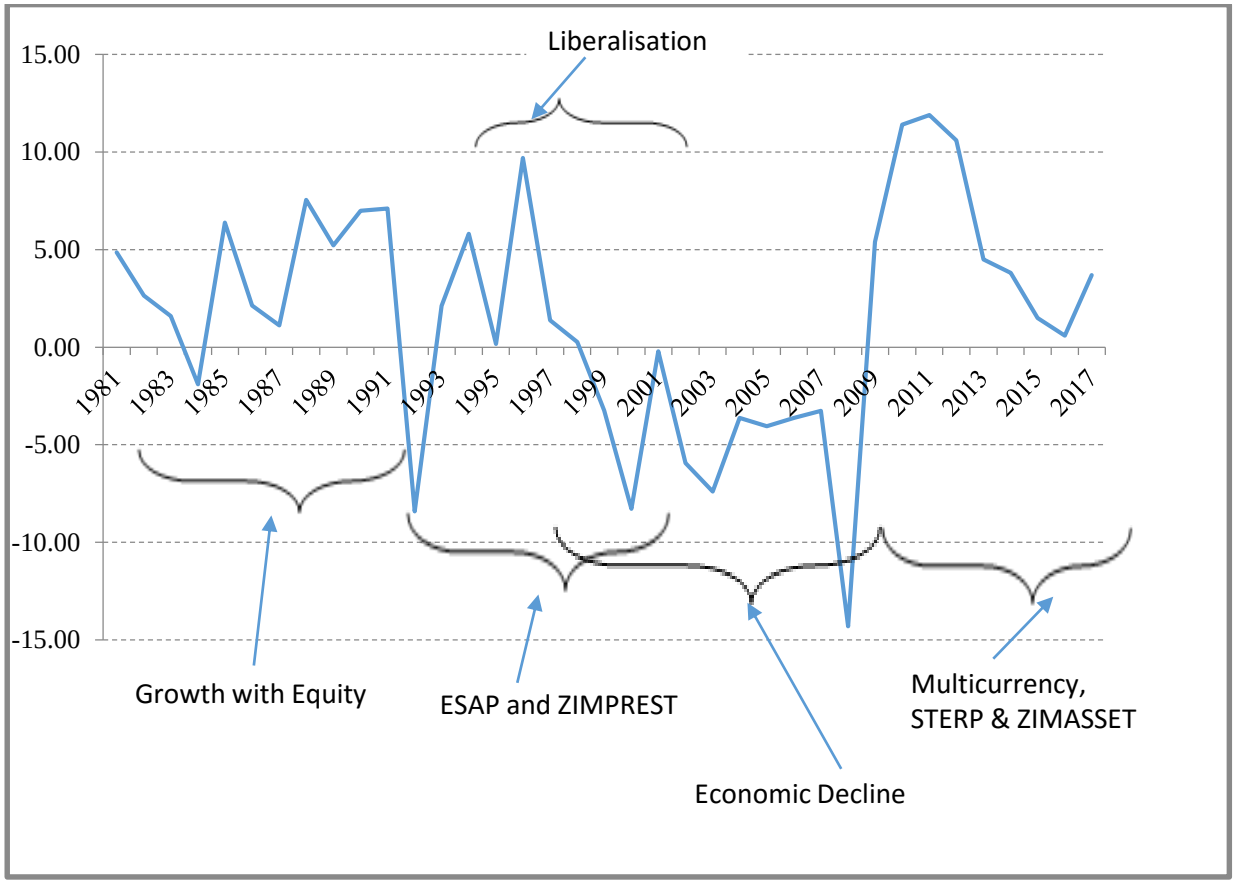
This section reviews the developments in economic growth in Zimbabwe since 1980. A review of the employment and unemployment situation including sectoral analysis in Zimbabwe is also done for the same period. Lastly, the section explores the casual relationship between GDP and employment growth.

GDP Growth Developments

The average GDP growth for the first decade (1980 - 1989) of independence for Zimbabwe was 5.2% (ZIMSTAT, 2005). During the second decade of independence (1990-1999), Zimbabwe economy grew at an average rate of 2.2% (ZIMSTAT, 2005). This was on the back of liberalisation of the economy and persistent fiscal slippages, reflected in high and often double digit budget deficits, which resulted in high money supply growth and inflation. The average growth rate for period 2000 to 2009 was weighed down by the crisis of the period from 1998 to 2008. The economy lost half of its GDP during the crisis period. As such average GDP growth was about -5.6%, from 2000 to 2008. The GDP growth rates, however, rebounded between 2009 and 2017, after the introduction of the multicurrency system, averaging 5.6% during this period.

Figure 1 shows developments in Zimbabwe's GDP during the different economic phases from 1980 to 2017.

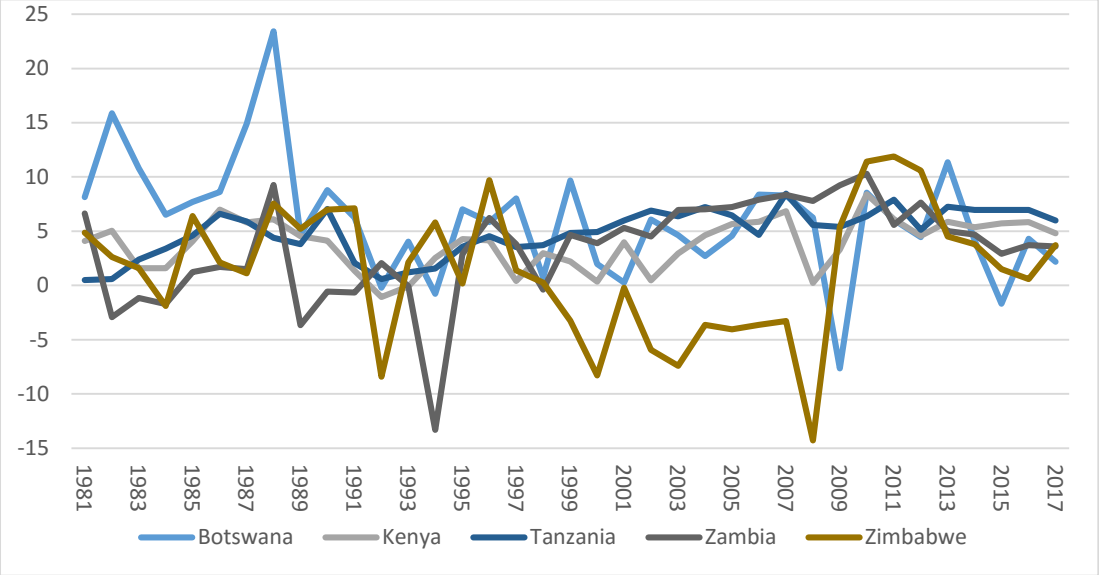
Figure 1: GDP Growth Developments from 1980 to 2017



Source: Zimstat, 2017

In addition to being low, the country's growth rate has been very volatile over the years, compared to its regional peers. Figure 2 shows developments in the GDP growth rate for Zimbabwe and selected African countries.

Figure 2: GDP Growth: Zimbabwe and Comparator Countries (1980 to 2017)



Source: World Economic Outlook, 2018

Figure 2 shows that the country experienced protracted negative growth from 1998 to 2008, when all other regional countries were experiencing robust growth rates.

Economic Structure

Zimbabwe's economy has experienced a significant structural shift since the late 1990s. By 1980, the Zimbabwean economy was already a structurally transformed and diversified economy, compared to its regional counterparts, with manufacturing contributing above 20% to GDP. The robust manufacturing industry emerged as a result of two broad industrialization strategies; namely resource industrialization and import substitution. The resource industrialization strategy entailed the beneficiation of agriculture and mining products. The contribution of the manufacturing sector, however, declined since 2000, while the mining sector contribution increased as shown in Table 1.

Table 1: Contribution of major sectors of the Economy

	1981-1990	1991-1997	1998-2008	2009-2017
Agriculture	14.8	14.1	16.5	10.4
Mining	5.8	3.9	3.4	7.6
Manufacturing	21.9	20.3	15.2	9.8
Distribution, Hotels and Restaurants	14.0	15.6	12.3	12.6
Finance and Insurance	6.3	6.9	8.5	7.1
Transport and Communication	6.8	6.8	6.7	9.9

Source: ZIMSTAT

The change in the economic structure also affected the country's ability to generate jobs. The manufacturing sector is normally associated with a higher employment elasticity of growth compared to other sectors, (Ali, et al., (2017). Mkhize (2016) found a long run relationship between employment and growth in the manufacturing sector in South Africa.

Employment Situation in Zimbabwe

According to ZIMSTAT Labour Force survey of 2014, broad unemployment[5] was estimated at 11.3% in 2014. Despite this low rate of unemployment, the majority of the people are employed in the agriculture and informal sectors of the economy. As shown in Table 2 a total of 52% of the economically active population was employed in the Communal and Resettlement Workers category in 2014.

Table 1: Composition of Economically active population 2011 vs 2014

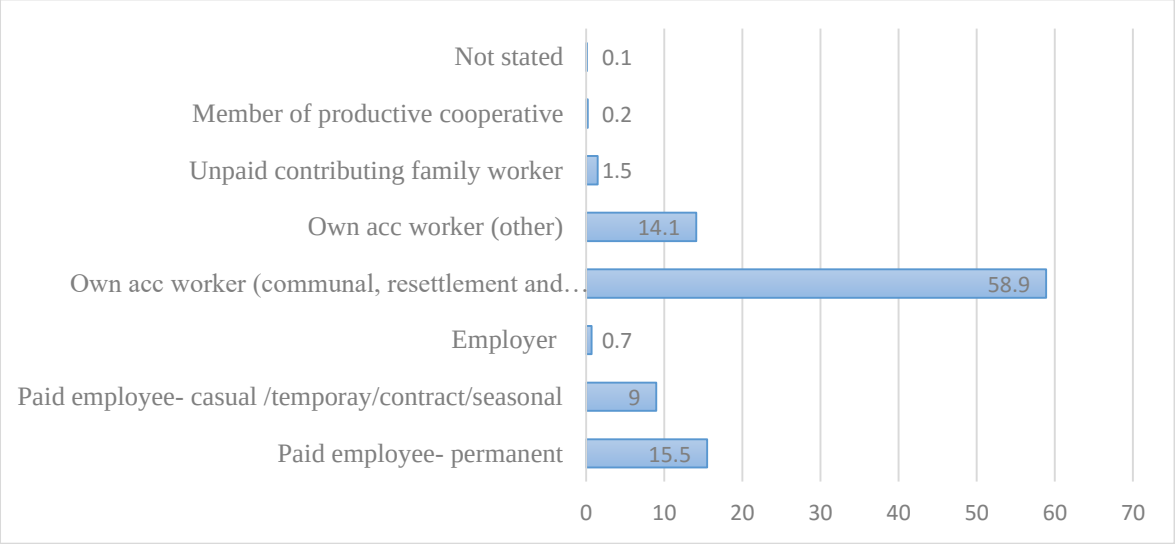
	Total (2011)	%	Total (2014)	%
Economically Active	**6 083 767**	**100**	**7 065 311**	**100**
Unemployed	652 741	**11**	799 442	**11**
Communal and Resettlement Workers	3 284 353	**54**	3 693 593	**52**
Other	2 146 673	**35**	2 572 276	**36**

Source: ZIMSTAT, 2015

[5] Unemployed persons by broad definition are persons aged 15 years and above who, during the reference period were without work and available for work,

The picture of the employment situation in Zimbabwe is much clearer when one considers further the breakdown of the employed population. The 2014 Labour Force Survey shows that 74% of the employed persons are under own account, of which own account worker communal, resettlement and peri-urban farmer accounted for 58.9% and own account other 14.1%. The paid employee on a permanent basis accounted for only 15.5% or 970 146 employees in 2014. Figure 3 shows the distribution of employment in 2014.

Figure 3: Distribution of Employment in 2014 Labour Force Survey



Source: ZIMSTAT, 2015

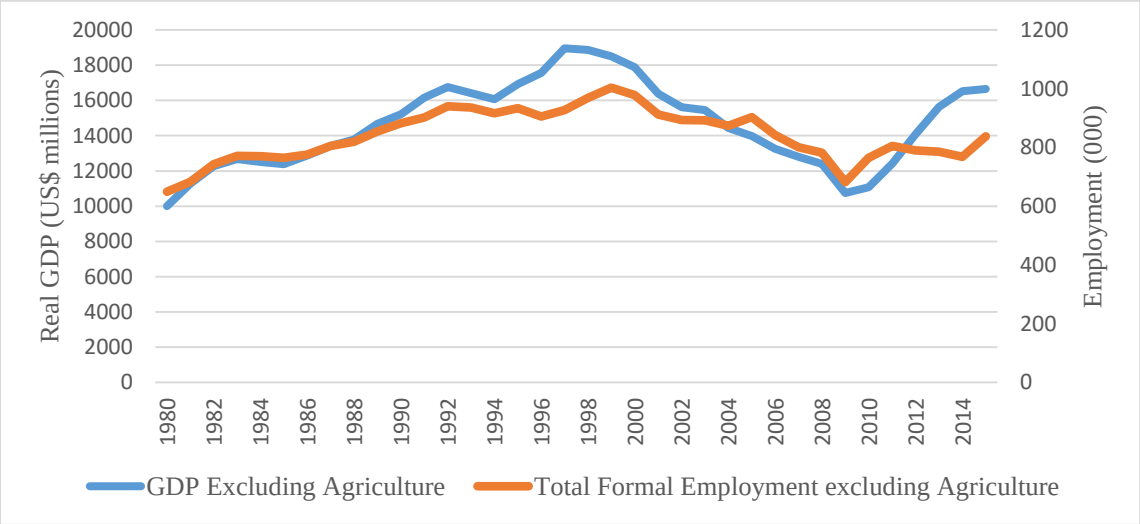
Formal Employment Developments

The relationship between GDP and employment on a theoretical basis is mainly explained through Okun's Law. The two main variants of Okun's Law either links GDP and unemployment or output gap and employment. In its simplicity, Okun's Law states that as GDP increases above potential output, unemployment falls and vice versa.

Empirically, however, owing to lack of data on unemployment on high frequency basis, particularly for developing countries, most studies have modelled the relationship between GDP and formal employment (Burger, 2017). Following Burger (2017), this paper analyses the link between GDP and formal employment. Formal employment statistics are available on a quarterly from the Quarterly employment survey by ZIMSTAT from 1964 to 2016. On the other hand, unemployment figures are available every 4 years through the Labour Force Survey.

Formal employment in Zimbabwe moved in tandem with changes in GDP developments (see Figure 4). Generally, formal employment levels picked in the 1980s to reach its peak around 1997 and decelerated significantly during the economic crisis period, from 1998 to 2008. Total formal employment rebounded since 2009, in line with the revival of the economy under multicurrency system.

Figure 4: Formal Employments developments (1980 to 2016)

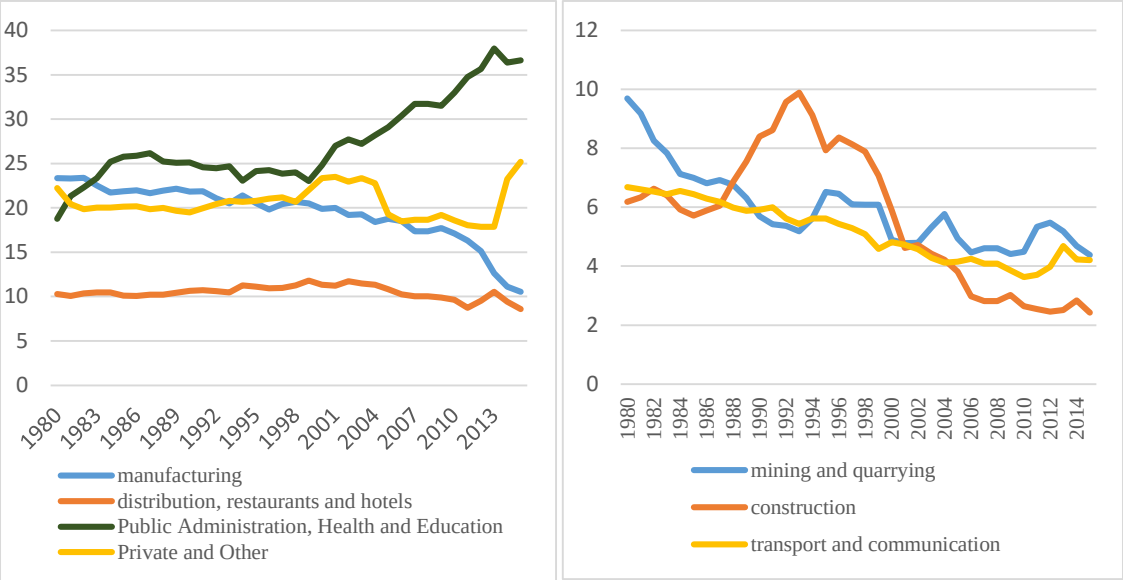


Source: ZIMSTAT, 2017.

The sectoral trends in the distribution of formal employment reveal interesting developments. Particularly, visible is the unparalleled increase in the contribution of government employment to total employment. Public sector employment, which averaged 24% for the period 1980 to 2000, increased to 29% during the economic crisis period and reached a peak of 37% in 2014. The increase in public sector employment contribution to total formal labour reflect both the increase in actual employment numbers in the public sector and the fall in employment for other sectors. Public sector employment rose from 226 000 in the year 2000 to 307 000 in 2015 (ZIMSTAT, 2016).

On the contrary, the manufacturing sector contribution to total formal employment fell from an average of 22% in the period 1980 to 2000 to reach its lowest in 2015 at 11%. Similarly, construction sector formal employment contributed an average of 8% in the period 1980 to 2000, fell to 2% in 2015. Though, there had been an increase in the construction of residential houses it appears most of the projects employed people from the informal sector. Figure 5 shows the distribution in formal sector employment from 1980 to 2016.

Figure 5: Distribution of Employment in the Formal Sector from 1980 to 2016 (% of Total Employment)

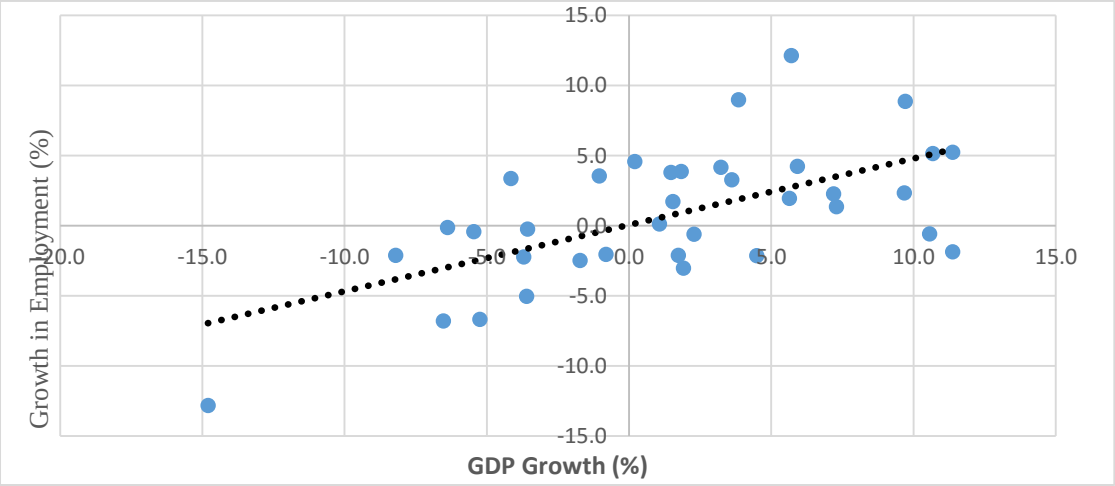


Source: ZIMSTAT, 2017

GDP Developments and Employment in the Formal Sector

This section provides a casual association between GDP growth and formal sector employment growth including sectoral developments. Figure 6 depicts the relationship between GDP growth and formal employment growth excluding employment in agriculture.

Figure 6: GDP Growth and Non –Agriculture Formal Employment Growth[6] (%) -1980 to 2016

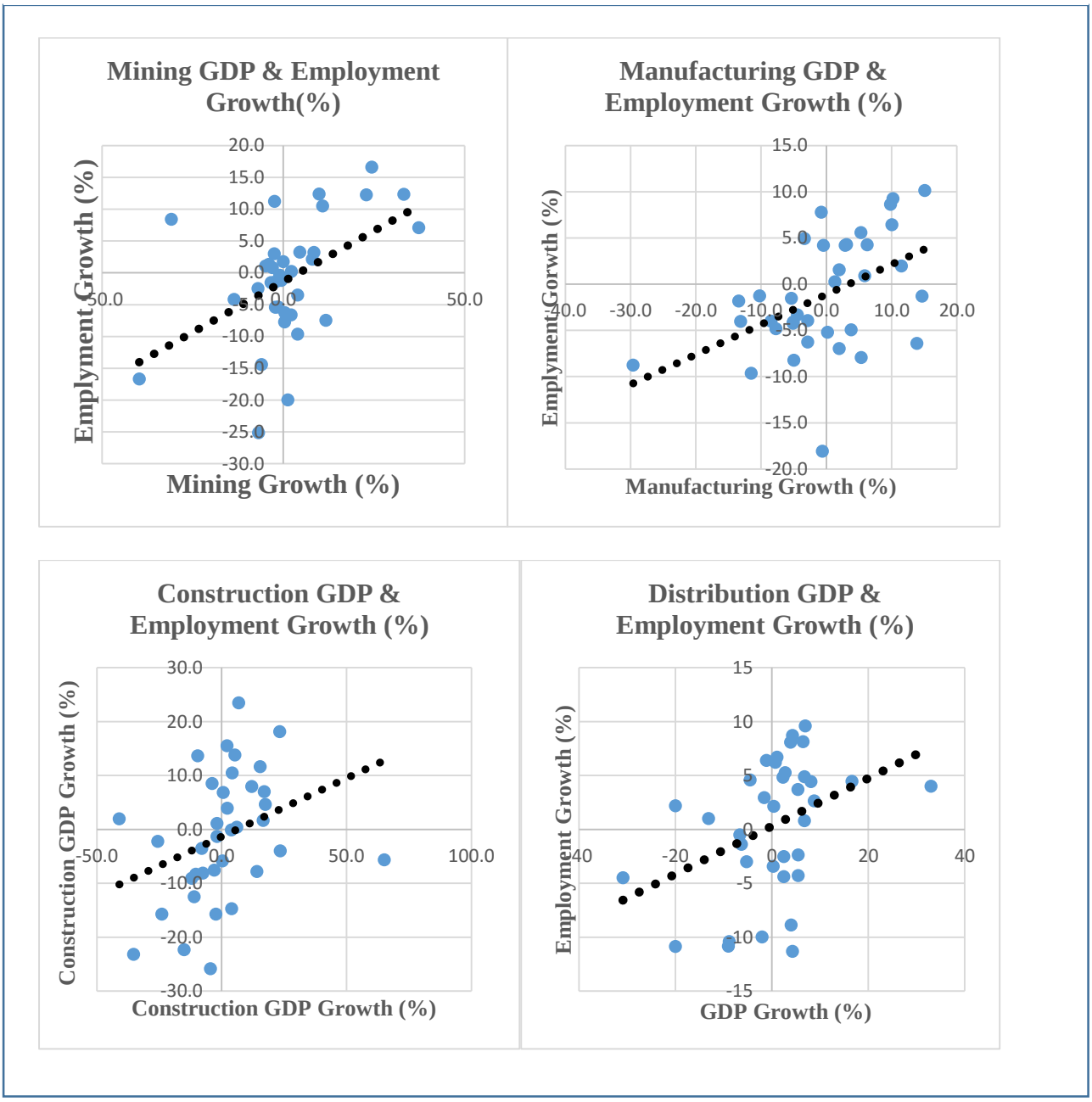


Source: ZIMTAT, 2016

Figure 6 shows that there is a positive relationship between GDP growth and employment in the formal sector. The positive relationship is also observed in the sectoral GDP –employment nexus. Figure 7 depicts sectoral developments in GDP and employment for selected sectors of the economy.

[6] Employment growth excludes agriculture employment since the data on employment in the agriculture sector is not available from 2002.

Figure 7: Sectoral GDP and Employment Growth Rates (%)



Source: ZIMSTAT, 2017

The GDP growth and employment growth graphical relationship at both overall and sectoral level show a reasonably high degree of association. In this regard, there is need to undertake an in-depth econometric analysis to quantify the degree of correlation between the GDP and formal employment.

3. LITERATURE REVIEW

This section reviews both theoretical and empirical studies on the nexus between output and employment growth. Firstly, a theoretical review is done leading to development of the conceptual framework to be adopted for this study. Secondly, an empirical review of studies that focus on relevant evidence mainly from developing countries is undertaken.

Theoretical Review

The theoretical basis for the relationship between output and employment is based on Okun law. According to Okun's (1962) there is an inverse relationship between unemployment and output. Alternatively, Okun argues that economic recovery creates employment, while recession leads to increases in unemployment. As output increases, unemployment falls and vice versa. In terms of long term analysis, Okun's law asserts that the deviation of unemployment from its natural level (non-accelerating inflation rate of unemployment) prompts a certain deviation of output from it is long-run equilibrium. Okun, et al., (1970) find a relatively stable relationship, which shows that a 1% fall in the unemployment rate induces an increase in GDP of 3%. The ratio is known as the Okun's coefficient or the output-unemployment elasticity.

There are several variants to derive or model Okun's law or the relationship between output and employment, and these include the production, gap and dynamic approaches. These approaches differ only in their alternative specification of output and employment variables in Okun's equation.

The production approach as argued by Prachowny (1993) posits that the nexus of output and employment is underpinned by a production function for the economy. This approach also takes into account the other ancillary dynamics in the labour market. The gap approach relates the unemployment level to the output gap, which is the difference between actual output and potential output. The implications of the gap version is that the economy should operate at its potential where unemployment is at its natural rate. A negative output gap implies underutilisation in the economy, while a positive output gap implies a heating economy. The latter case implies that further increases in output do not increase employment but push prices up.

Kontek (2007) proposes a dynamic approach to modelling Okun's law, which argues that both the past and current output can influence the current level of unemployment. The approach is dynamic in that unemployment is a function of the current and past GDP growth rates, as well as past changes in the unemployment rate.

This study uses the production function approach to analyse the relationship between output and employment. Following Burger (2017) and Upender (2006) the output employment nexus is derived using a constant elasticity of substitution (CES) production function.

Theoretically output and employment can be linked through a simple production function.

$$Y_t = A\ (\delta K_t^{-\rho} + (1-\delta)E_t^{-\rho})^{-\frac{\eta}{-\rho}} \qquad (1)$$

Where:

Y: output

K: Capital

E: Employment

Where ρ: Substitution parameter (between capital and employment), with ρ>-1. In this case, therefore $\boldsymbol{\epsilon} = 1/(\rho + 1)$ being the elasticity of substitution

In this regard, taking the partial derivative of labour gives:

$$\frac{dY_t}{dE_t} = \left(\frac{\eta(1-\delta)}{A^{\frac{\rho}{\eta}}}\right) Y_t^{\frac{1+\rho}{\eta}} / E_t^{\rho+1} \qquad (2)$$

Equation 2 is the marginal product of labour and if E_t is made the subject of formula it gives a labour demand function.

$$E_t = [\frac{\eta(1-\delta)}{A^{\frac{\rho}{\eta}}}]^{1/(\rho+1)} Y_t^{(1+\frac{P}{\eta})(\frac{1}{\rho+1})} \qquad (3)$$

This can also be illustrated as follows:

$$E_t = \alpha_0 Y_t^{\alpha_1} \qquad (4)$$

Where:

$$\alpha_0 = [\eta(1-\delta)/A^{\rho/\eta}]^{1/(\rho+1)}$$

$\alpha_1 = \left(1 + \frac{\rho}{\eta}\right)\left(\frac{1}{\rho+1}\right) = \left(1 + \frac{\rho}{\eta}\right)\epsilon$

$\epsilon = 1/(p+1)$

This can be further simplified by taking natural logs yielding the following linear function:

$$lnE_t = ln\alpha_0 + \alpha_1 lnY_t \qquad (5)$$

Where:

E: Employment

Y: output

α_1: employment intensity

Equation (4) provides the relationship between the levels of employment and GDP.

Empirical Literature Review

Burger (2017) uses a Markov regime switching model to understand the relationship between economic growth and employment for South Africa for the period 2008 to 2016. The Markov regime switching model takes into account the impact of business cycle. The author found the existence of a long run relationship between GDP developments and employment. The employment elasticity was estimated at 0.25%. This means that a 1% increase in GDP results in formal employment increasing by 0.25%. The results, however, suggest that the short run relationship between output and employment breaks down during recessions.

The results which were found by Burger (2017) are in line with Kaseeram and Mahadea (2017) who find an employment elasticity of 0.28% for South Africa. The study employed a Vector Error Correction Methodology (VECM) framework from the period 1946 to 2015. Mkhize (2016), however, found a higher aggregate employment elasticity for South Africa of 0.45% for the period 2000 to 2012. The sectoral elasticities vary widely from as high as 1.56% for the finance sector, 0.9% for construction to as low as 0.3% for the utilities sector.

Leshoro (2014) examines the relationship between output and employment for Botswana for the period from 1980 to 2011, using an error correction model. The study also investigated the output –employment nexus at sectoral level. The overall employment elasticity of the total GDP was found to be negative. The sectoral employment elasticity of growth results suggested

positive but low elasticities. The results from Leshoro (2014) were also corroborated by Ajilore and Yinusa (2011). Ajilore and Yinusa (2011) find a low overall elasticity of employment growth of 0.01%. At the sectoral level, employment elasticities in banking, commerce, construction, manufacturing and mining were found to be positive but very low.

Ajakaiye, et al. (2016) analyses the relationship between output and employment applying a simple regression analysis for both aggregate and at sectoral levels for Nigeria for the period 1981 to 2014. On an aggregate level, the employment elasticity was estimated at 0.11%. The sectoral employment elasticities showed greater variability ranging from manufacturing (0.3%); agriculture, (0.48%), and services, (0.85%). This suggests that growth in GDP in Nigeria could have created more jobs, if it was driven by the services sector.

Islam and Nazara (2000) estimates the employment elasticity of growth for Indonesia using both econometric and non-econometric techniques for the period 1977 to 1996. They found employment elasticities ranging from 0.49% to 0.66%.

Misra and Suresh (2014) undertakes a study of the employment elasticity for India at both aggregate and sectoral level, using both econometric and non-econometric techniques. The aggregate employment elasticity for India obtained from the econometric procedure was estimated at 0.2 for the period 1993 to 2012. On a sectoral basis, agriculture elasticity was found to be negative, while the manufacturing sector employment elasticity was found to be 0.4 - 0.5. The construction sector was found to have a higher employment elasticity of 1.03.

The review of literature both theoretical and empirical show that the elasticity of employment varies across different sectors of the economy. Against this background, it is often difficult to determine which elasticity is high enough. International evidence shows that elasticities ranging between 0.3 - 0.5 are relatively adequate for a country whose labour force is growing at 1 to 2%. Empirical review of literature also shows that an elasticity of above 0.5 is high, whist elasticity below 0.2 is quite low and likely to trigger severe unemployment. Negative employment elasticity is generally regarded as bad and usually is associated with economies experiencing very low or declining economic growth rates. Sectorally, employment elasticities are normally negative in the agricultural sector, reflecting the movement of labour from agriculture to other sectors, as countries modernise.

Employment elasticities can also fluctuate quite widely for relatively small movements in growth rates of output and in this regard, it is prudent to look at it over a longer time horizon. It is against this background, that it is important to understand the employment elasticity overtime taking into account specific economic developments. On the other hand, there is need to complement studies on the relationship between output and employment with sectoral studies. Importantly, sectoral studies assist in the design of pro-poor development policies that aim to increase employment and reduce poverty. Employment elasticity results are also sensitive to the methodologies applied. Recent studies have tended to apply econometric approaches that distinguish between long run and short run results as well as taking into account business cycle induced asymmetries.

4. METHODOLOGY

Two major approaches have been utilized in empirical literature to estimate employment elasticity of output. The first is the simple arithmetic method of computing the arc elasticity by dividing the proportionate change in employment by the proportionate change in output during a given period, usually a year.

Thus:

$$\sigma_{E,Y} = \frac{[E_t - E_{t-1}]/E_t}{[Y_t - Y_{t-1}]/Y_t} = \frac{\frac{\Delta E_t}{E_t}}{\frac{\Delta Y_t}{Y_t}} = \frac{\sigma In E_t}{\sigma In Y_t} \quad (6)$$

Where *E* denotes employment, *Y* represents GDP, *t* and *t*-1 are current and previous periods respectively. While this methodology is computationally simple and easy to use, findings have demonstrated that it tends to exhibit a great deal of instability and may, therefore, be inappropriate for comparative purposes. The base year may, for example, be abnormal, so that the elasticity obtained may not reflect the 'normal' technological relationship between labour and output for a given sector (Ajilore and Yinusa, 2011).

The second method involves the specification of an econometric relationship between employment and output. Earlier studies involved running the relationship between employment and growth in levels or in growth form. Recent studies, however, tend to take into account both short-term and long-term relationships as well as the impact of the business cycle into

consideration (Burger, 2017). As argued by Burger (2017) the relationship between employment and output is affected by different episodes of the business cycle.

The role of the business cycle is important in determining whether or not the impact of GDP growth on employment growth plays a critical role in influencing the relationship between output growth and employment growth. This suggests asymmetry in the relationship between GDP and employment. In order to account for this non-linear relationship, a Markov Switching regime framework can be used (Valadkhani & Smyth, 2015). The Markov Switching allows for non-linear behaviour and to distinguish booms from busts, when estimating the relationship between economic growth and employment growth. The Markov- Switching approach draws from the works of Hamilton (1989; 1996; 2008).

As in Burger (2017) this study utilises the Markov-switching model which assumes the presence of two regimes. These regimes are unobservable at time t. However, the regimes are determined by an unobservable process, s_t. The Markov-Switching model is represented as follows:

$$y_t = \emptyset_{0,s_t} + \emptyset_{k,s_{t-i}} x_{k,t-i} + \varepsilon_t \qquad (7)$$

Where:

y_t: an endogenous variable

$x_{k,t-i}$: and exogenous variable *k* at lag *t-i*

$s_t = 0 = 0, 1$, which denote Regime 1 and Regime 2

$\emptyset_{0,s_t}$: a constant term, assumed to be different in Regimes 1 and 2

$\emptyset_{k,s_{t-i}}$: coefficient of exogenous variable k at lag t-i, assumed to be different in Regimes 1 and 2

ε_t: the error term, assumed to be IID with a zero mean and a constant variance σ. The analysis allows for the variance of the residual term to differ between Regimes 1 and 2.

Markov-Switching model assumes that process s_t is a first-order Markov-process (Hamilton, 1989). Thus, the current regime depends s_t on s_{t-1}, which implies the following transition probabilities (Burger, 2017):

$$P(s_t = 0|s_{t-1} = 0) = p_{00}$$

$$P(s_t = 1|s_{t-1} = 0) = p_{01}$$

$$P(s_t = 0|s_{t-1} = 1) = p_{10}$$

$$P(s_t = 1|s_{t-1} = 1) = p_{11} \quad (8)$$

Where:

$p_{00}, p_{01,}\ p_{10,} p_{11}$ are non-negative

$p_{00} + \ p_{01,} = 1$

$p_{10} + \ p_{11,} = 1$

The unconditional probabilities that the process is either in Regime 1 or Regime 2 are shown in Equations (3) and (4), and can be derived with ergodic Markov chain theory (see:

$$P(s_t \ = 0) = \frac{1-p_{11}}{2-p_{00}-p_{11}}$$

$$P(s_t \ = 1) = \frac{1-p_{00}}{2-p_{00}-p_{11}} \quad (9)$$

The relationship between growth and employment is then modelled as a two-step approach. Step one is to estimate the long-run relationship between the log-levels of employment and output which is reminiscent of the Engle-Granger method. In the second step the lag of the residual estimated in step one is used as error-correction terms to estimate Markov-switching Error Correction Model (MS-ECM).

The model estimated

The model estimated is a MS-ECM model. Its long-run component is:

$$lnE = \beta_0 + \beta_1 lnY_t + \varepsilon_{LR,t}$$

While the short-run component is:

$$\Delta E_t = \alpha_{1,s_t} + \alpha_{2,s_t}\varepsilon_{LR,t-1} + \alpha_{3,s_t}\Delta Y_{t-1} + \alpha_{4,s_t}\Delta E_{t-1} + \varepsilon_{SR1,t}$$

Where:

$\beta_{1:}$ the long-run parameters relating the log-levels of employment and GDP;

α_2: the error-correction parameters, with $-1 < \alpha_2 < 0$;

s_t: denotes either Regime 1 or Regime 2 in the Markov-Switching modelling.

5. RESULTS AND ANALYSIS

It is critical to first test for the order of integration of variables in order to check whether there is a long run equilibrium between growth and employment. The results of stationarity tests show that both levels of employment and GDP in logarithms are non-stationary. The first differences are, however, stationary.

Table 2: Stationarity Tests

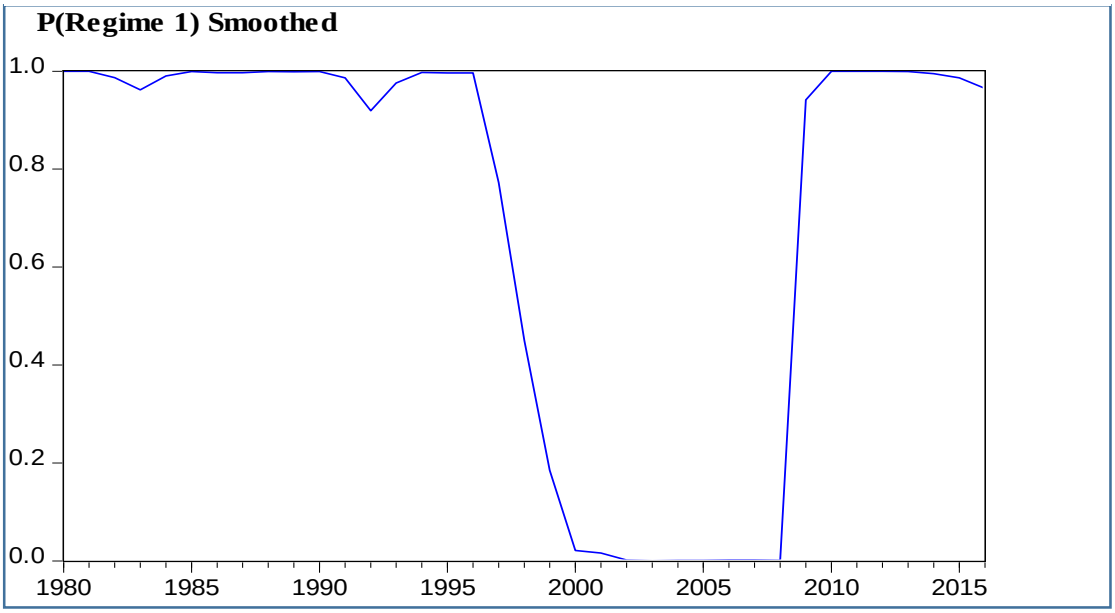
	Augmented Dickey Fuller test	
Variable	Level	1st Difference
LEMP_AG	-2.420 (0.364)	-5.384*** (0.000)
LGDP	-2.254 (0.447)	-3.392*** (0.001)

10% significance ** 5% significance * 1% significance*
Source: Own Estimation

Markov Regime-Switching Model for Economic Growth

The first undertaking is to estimate a Markov-switching model in order to find out if there is any need to distinguish between economic booms and recessions. This is important as the relationship between GDP growth and employment growth, may vary during economic booms and recessions. The boom period corresponds to regime 1 and recessions are marked by regime 2. The recessions were identified using a Markov- switching model with no autoregressive terms. The results of the Markov switching models, show that the country experienced minor recessions in 1983 and 1992; and a major one between 1997 and 2008. Given, the existence of two regimes, the study proceeds with the Markov Switching Error Correction Model that relates employment to output.

Figure 8: Markov Regime-Switching for Economic Growth



Source: Own Estimation

Given that the variables are non-stationary in levels, a long run equation is estimated and the results are as follows:

Table 3: Long Run Relationship between Employment and GDP

Dependent Variable: Employment	
Variable	**Coefficient**
C	2.420999*** (0.581547)
Log GDP	0.440638*** (0.059381)
R-squared	0.611387
Adjusted R-squared	0.600284

10% significance, **5% significance, * 1% significance, standard errors in parentheses*

Source: Own computations

The results show an elasticity of 0.44 between GDP and formal employment. Precisely, the results suggest that in the long run a 1% change in GDP results in a 0.44% change in formal employment in Zimbabwe. This shows that formal employment in Zimbabwe is moderately responsive to GDP growth and falls within the normal ranges of 0.3 to 0.6 found in most developing countries (Kapsos, 2005). The results also compare favourably with other studies for Sub-Sahara Africa (SSA) namely: South Africa, 0.25% (Burger, 2017), Ghana, 0.47% for

the period from 1984 to 2010 (Baah-Boateng, 2013), Mauritius, 0.3% and Senegal, 0.6% (Ali *et al*, 2017).

The study carried tests for cointegration using Engle Granger two stage procedure. The error term from the long run relationship above was tested for stationarity. The error term was found to be stationary at 5% level of significance, suggesting presence of cointegration. Following Burger (2017), the study proceeded to run an MS-ECM model. The results are shown in Table 4.

Table 4: Employment and GDP: Error Correction Markov Switching Results

Dependent Variable: Δ Employment	
Regime 1	
Variable*	**Coefficient**
C	0.006281*** (0.002479)
Δ Employment (-1)	0.334160*** (0.075522)
Δ GDP(-1)	0.251834*** (0.054539)
ECM (-1)	-0.444839*** (0.046699)
LOG(SIGMA)	-5.517238*** (0.390397)
Regime 2	
C	0.003819 (0.012387)
Δ Employment (-1)	0.025231 (0.344226)
Δ GDP(-1)	-0.104738 (0.215980)
ECM (-1)	-0.269653 (0.225079)
LOG(SIGMA)	-3.079085*** (0.177869)
Durbin Watson	2.065

10% significance, **5% significance * 1% significance, standard error in parenthesis*

Source: Researchers' Computation

Under regime 1, when economic growth is positive (boom), the error correction results suggest that in the short term, a 1% increase in economic growth results in increase in employment by

0.25%. The error correction term is also significant under regime 1 reflecting the existence of long run relationship between employment and growth during economic boom.

The relationship between employment and growth, however, breaks down during recession cycles. The relationship in the short run is even negative, though insignificant. This suggests that a fall in GDP does not necessarily lead to immediate fall in formal employment. This may point to strong formal labour rigidities in the economy, where employers find it difficult to lay off employees in responds to negative shocks to GDP in the economy.

SECTORAL EMPLOYMENT ELASTICITIES OF GROWTH

To complement the effect of GDP growth on formal employment growth, the study analysed the employment sectoral effect of growth. This was done by examining the impact of specific sector GDP growth on the respective sector formal employment growth. The study first estimates the long run elasticities and checks for cointegration, where cointegration is found, the study proceeds to estimate the error correction model for the respective sector. Table 5 shows the sector specific long run employment elasticities for the period 1980 to 2016.

Table 5: Long-run Sector Specific Employment Elasticities

Dependent Variable: Sector Employment	
Variable*	**Coefficient**
Mining	0.448459*** (0.150122)
Manufacturing	0.664971*** (0.070019)
Construction	0.721039*** (0.110960)
Distribution	0.309135*** (0.050073)

10% significance, **5% significance * 1% significance, standard error in parenthesis*

Source: Researchers' Computation

Table 5 shows that construction and manufacturing sub-sectors have high long term employment elasticities. The results suggest that a 1% increase in construction GDP lead to a 0.72% rise in construction formal employment, while a 1% increase in manufacturing GDP

give rise to a 0.66% in formal manufacturing employment. The high elasticity of employment for construction is not surprising given that most studies have found even high elasticities for emerging countries, 0.9 for South Africa (Mkhize, 2016) and 1.03 for India (Misra & Suresh, 2014).

The mining and distribution employment elasticities are estimated lower at 0.45 and 0.31, respectively. Basing on long term employment elasticities, construction and manufacturing are found to be more labour intensive and employment supportive, compared to the other sectors of the economy.

The study tested for cointegration to determine the existence of equilibrium long term relationship between growth and employment on a sectoral basis using the two stage Engel Granger tests. The results showed that there is cointegration in the manufacturing and distribution subsectors at 10% and 1%, respectively. The study proceeded to run Markov switching error correction models for manufacturing and distribution, to account for asymmetrical elasticities between boom and recession periods.

Table 6: Manufacturing Employment and GDP: Error Correction Markov Switching Results

Dependent Variable: Δ Manufacturing Employment	
Regime 1	
Variable*	**Coefficient**
C	-0.019553*** (0.004204)
Δ Manufacturing Employment (-1)	0.527623*** (0.072229)
Δ Manufacturing GDP (-1)	0.356311*** (0.058604)
ECM (-1)	-0.384062*** (0.021824)
LOG(SIGMA)	-5.127054*** (0.470201)
Regime 2	
C	-0.022871 (0.015463)
Δ Manufacturing Employment (-1)	0.344155 (0.300625)
Δ Manufacturing GDP(-1)	-0.273532* (0.165896)
ECM (-1)	0.003789 (0.161818)
LOG(SIGMA)	-2.932894*** (0.176884)
Durbin Watson	1.8646

10% significance, **5% significance * 1% significance, standard error in parenthesis*

Source: Researchers' Computation

As shown in Table 6, the error correction term under boom cycles is negative and significant, while the short run elasticity of manufacturing employment is 0.36. Similar to Markov Switching error correction at aggregate level, the relationship between manufacturing growth and manufacturing employment breaks down during recession.

Table 7: Distribution Employment and GDP: Error Correction Markov Switching Results

Dependent Variable: Δ Distribution Employment	
Regime 1	
Variable*	**Coefficient**
C	-0.009400*** (0.000925)
Δ Distribution Employment (-1)	-0.038803*** (0.016539)
Δ Distribution GDP(-1)	0.147969*** (0.013076)
ECM (-1)	-0.350408*** (0.010005)
LOG(SIGMA)	-6.264428*** (0.297140)
Regime 2	
C	0.010647 (0.013231)
Δ Distribution Employment (-1)	-0.023514 (0.252572)
Δ Distribution GDP(-1)	-0.112179 (0.166950)
ECM (-1)	-0.443598** (0.187421)
LOG(SIGMA)	-2.878207*** (0.163516)
Durbin Watson	1.922638

10% significance, **5% significance * 1% significance, standard error in parenthesis*

Source: Researchers' Computation * All the variables are logged.

The Markov Switching error correction model for the employment elasticity for the distribution sector, shows short run elasticity of 0.15. Similarly, under the recession cycle, the short term relationship between distribution GDP and employment, turns negative though insignificant.

6. Conclusion and Policy Implications

The main objective of this paper was to understand the relationship between employment growth and economic growth in Zimbabwe. The employment elasticities were estimated at

both aggregate level and on sectoral basis. The results suggest that there is a long-run relationship between GDP and formal employment on an aggregate level. This implies that an increase in economic growth results in increased formal employment. The overall long run intensity at 0.44 falls with the normal range and compares favourably with other comparative countries that have managed to reduce unemployment and moved to middle income status such as Ghana and Kenya, through increased GDP growth.

Contextually, the results imply that the decrease in formal unemployment in Zimbabwe is mainly a result of low economic growth rates over the years rather than low employment intensities of growth. Precisely, it implies that economic policies aimed to grow the economy will most likely lead to a boost in formal employment in the country.

Importantly, on the short run basis, the results also show that increase in economic growth leads to increases in formal employment. The relationship, however, breaks down during economic down turns and even turn into negative. This may point to inherent formal labour rigidities in the country that make it difficult for businesses to lay off workers during economic recessions. This implies that there is need to ensure labour is more flexible in the economy.

The overall results were augmented with sectoral results on the employment and growth. In summary, the sectoral results suggest that employment elasticities of growth are high in construction and manufacturing sectors at 0.72 and 0.66, respectively. Long run equilibrium relationships were confirmed in manufacturing and distribution.

The policy implications of sectoral results are that government can quickly increase formal employment by investing in construction and manufacturing industries. As such, construction projects initiated by the need to close the infrastructure gap in the economy in sectors such as energy, transport and water will go a long way in supporting formal employment in the country. Given the high employment elasticity and existence of a long run equilibrium relationship in the manufacturing sector, it means a lasting solution to ending unemployment lies in increasing the manufacturing sector.

In this regard, government should put significant effort to revive the manufacturing sector, in a bid to increase formal employment on a permanent and long term basis. Thus, current efforts to diversify the economy, increase value addition and beneficiation should be vigorously pursued as they lead to increased formal employment. In tandem, government should put more emphasis in the promotion of FDI in the manufacturing sector in the medium term to support formal employment.

Employment plays an important role in the virtuous circle of links between growth, employment and poverty reduction. The increase in economic growth results in the fall in poverty levels via growth in formal employment. In Zimbabwe, pro-poor economic policies should thus aim at supporting high and sustained economic growth rates, with the growth anchored on sub-sectors that have high labour intensities such as construction and manufacturing.

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