Impact of Foreign Direct Investment on Employment in Zimbabwe

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Paper prepared for the Conference on Economic Integration, Entrepreneurship and Sustainable Development

Venue: Midlands State University, Zimbabwe

14-16th October, 2015

ABSTRACT

Despite the theoretical argument that FDI creates employment opportunities in the host country, empirical evidence provides mixed results. Against this background, the study has examined the impact of FDI on employment in Zimbabwe using annual time series data that spans from 1985 to 2012. The study employed a multivariate linear regression model which was estimated by the Stock and Watson Dynamic Ordinary Least Squares (DOLS) technique to control for endogeneity and simultaneity. To avoid spurious regression, time series data was subjected to unit root tests using the Augmented Dickey Fuller test. The results of this exercise revealed that majority of the variables follow a non-stationary process. The Engel Granger method was then used to test for cointegration to determine whether the non-stationary variables shared a common stochastic trend. Basing on the residual which was stationary, it was concluded that the variables moved together in the long run. The results from the dynamic model revealed that FDI has a positive and significant long run effect on employment in Zimbabwe. Other variables that affected employment are population growth and GDP. The results of this empirical test corroborate the fact that FDI stimulates economic performance in developing countries. Therefore, the government of Zimbabwe is advised to pursue policies that attract FDI into the country such as reviewing the indigenization policy to make attractive and to quicken the introduction of Special Economic Zones.

KEY WORDS: FDI, employment, Zimbabwe

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Introduction

Sub Saharan Africa is a poor continent and in the last decade, it has been getting poorer (Ghura and Greenes, 1993). Countries in this region face challenges that range from poor economic incentives, substantial balance of payments deficits, high unemployment rates, low economic growth, and depressed private investment to poor institutional support and poor infrastructure. In response, Mickiewicz, Radosevic and Varblane (2000) argue that policy-makers in this region rely mostly on foreign direct investment (FDI) as a policy option for stimulating economic activity. The rationale behind the reliance on FDI derives from the notion that foreign investors produce externalities in form of technology spillovers and capital that will in turn accelerate the much needed structural changes and increase local employment.

A recent report by the World Business Organization (WBO) (2013) for instance notes that during the last two decades, foreign direct investment started to play a vital role in employment creation particularly in low income countries. On the same note, United Nations Conference on Trade and Development (UNCTAD)(2012) world investment report indicates that global FDI flows of FDI to developing countries stood at $1.5 trillion dollars in 2012 in which Africa constituted $42.7 billion.

Experience in some African countries like Kenya and Zambia has shown that foreign investors are capable of transforming Africa into a better place with high employment and economic growth. According to WBO (2013), Kenya has been making frantic efforts to attract FDI and for the past decade, the country has been experiencing steady improvements in terms of employment creation. For instance, WBO (2013) indicated that a US$1 million of FDI in Kenya was estimated to have generated an increase in employment of more than 300 workers in 2012. Such empirical evidence clearly substantiates the theoretical arguments that FDI has a significant direct effect on domestic employment. Indirectly, FDI is believed to increase employment through movement of skilled labour from the foreign firms to other sectors of the economy.

Despite the potential positive effect of FDI on local employment and supportive empirical evidence from countries such as Kenya, it is noteworthy that the link between FDI and employment in host countries is far from clear. Empirical literature provides mixed findings and the leading factor of the contracting results is the difference in methodologies used by

researchers. An empirical review of FDI and employment studies by OECD (1995) found no general conclusion on how FDI relates to employment in terms of both the sign and the magnitude. OECD (1995) suggested that such a broad range of contradicting results reflected the complexities of empirical analysis as well as methodological shortcomings worsened by poor data availability in most of the developing countries.

In a similar vein, efforts have been sought to try and attract FDI in Zimbabwe but sadly speaking, the economic response from such policy changes have not been encouraging. Table 1 shows for instance how FDI and employment have evolved in Zimbabwe since 1980 when the country attained its independence from the British colony. The figures are five year average growth rates in exception of the last two years, 2011 and 2012 respectively.

Table 1 Foreign Direct Investment and Employment Average Growth Rates in Zimbabwe (1980-2012)

Period	1980-1985	1986-1990	1991-1995	1996-2000	2001-2005	2006-2010	2011-2012
Employment	0.03	0.04	0.02	0.01	-0.003	0.002	0.02
FDI	0.41	0.80	1.59	0.25	3.25	0.30	0.68

Source: UNCTAD

According to the figures in Table 1, growth in total employment in Zimbabwe has been sluggish throughout the study period with the least growth rate being experienced between 2001 and 2005. The highest growth rate in employment was experienced between 1986 and 1990, the period that was characterised by massive import substitution in order to boast domestic industrialisation and create employment. The least growth rate of -0.003 mirrors the time period in which the economy of Zimbabwe suffered its worst economic situation with a high unemployment that emanated from massive brain drain as the local labour force fled to other countries for greener pastures.

Against a background of mixed results, this study examines how FDI relates to employment in Zimbabwe. As indicated earlier, majority of countries in Africa face numerous economic challenges and Zimbabwe shares similar experiences. The country has a long history of policy experiments in form of structural adjustment programmes to enhance domestic economic performance including employment creation but in most cases, the results of such policy measures have been disappointing. For instance, the government of Zimbabwe embarked on economic structural adjustment programmes in 1991 whose central goal was to liberalise market activities in order to promote economic efficiency and promote growth. The economy did not show significant responses to the policy package and this led to a rise of the Zimbabwe Political Restoration, Economic and Social Transformation (ZIMPREST) in 1996.

The study contributes to the existing board of literature by using an estimation technique (Stock and Watson DOLS) which controls for endogeneity and simultaneity. According to Carkovic and Levine (2002), a chief source of the contradictory literature is embedded in methodology flaws as majority of studies fail to control for endogeneity and reverse causality. This therefore necessitates a study which probes the effect of FDI on employment after controlling for all the bias that normally emanates from endogeneity. Stock and Watson has shown that by including leads and lags of first differenced regressors, the effect of the endogenous variables are purely evaluated. A study of this sort is imperatively important as it aids the policy formulation of tailor made policies unlike the blanket policies that are common in panel data analysis. In addition, the results of this empirical test will go a long way to inform policymakers on whether incentives to attract FDI are necessary in Zimbabwe.

Literature review

Theoretical literature shows that there is no unified theory which relates FDI to employment. Despite this shortcoming, there seems to be a growing consensus among scholars that FDI has a significant influence on employment creation especially in developing countries. According to United Nations Conference of Trade and Development (UNCTAD) (1994), FDI may have both direct and indirect effects on the employment rate.

Given that a foreign investor determines the demand for labour in short-term, through directly establishing new factories, plants or and expand the existing ones, therefore FDI is expected increase employment in the host country. This channel is theoretically supported by Rugman (1986) and Caves (1971) who predict that firms will invest in foreign markets in order to generate rents by exploiting firm-specific capabilities such as knowledge or human capital. As foreign investors strengthen their strategic position by gaining more favorable access to scarce resources like labour this will lead to a reduction in unemployment rate particularly for skilled unemployed labour (Chen and Chen, 1998).

Concerning the sector of investment, if FDI flows into labour-intensive industries, the prospect of creating new jobs is greater than in capital and or technology-intensive ones. On the other hand, the corresponding technological uptake that comes along with FDI may substitute manual labour for machinery. In this case, FDI will reduce the employment rate. As suggested by UNCTAD (1994), foreign direct investors normally come with the strategies to restructure the organizations in order to make them more effective and efficient and as a result, the workforce may only be retained or even partly cut down. This will result in a decrease in the employment rate.

Indirectly, FDI may increase the employment levels in local firms through forward and backward linkages in domestic production. In macroeconomic terms, the level of investment generally positively affects the employment rate and given that FDI promotes local investment, it follows that FDI may theoretically have a positive effect on employment. However, FDI may crowd out the inefficient domestic firms, which are not able to compete with the more efficient foreign investors. This displacement of existing local firms, may eventually translate into a reduction in overall employment levels.

Additionally, the spillover effect of FDI through technology transfers result in increased average labour productivity in developing countries. With the constant level of output, the number of required workers is expected to decline, and thus, making the employment level slide down.

The potential impact of FDI inflows on the employment level in host countries should not be expected to be consistently positive or negative as reflected by empirical literature.A recent related study by Brincikova and Darmo (2014)analyzed the impact of FDI inflow on employment of the Visegrad Group (the Slovak Republic, the Czech Republic, the Republic of Hungary and the Republic of Poland) using panel data techniques. The impact of FDI inflow on employment is confirmed to be positive in case of Greenfield investment and negative in case of privatization while the impact on economy as whole was so unclear.

While Goenka (2013) analysed FDI and employment in India and found FDI to positively affect employment. The study used a bivariate regression model which is fairly simple, that could have suffered from specification bias and endogeneity emanating from model under fitting or omission of relevant variables.Theory shows that employment is affected by a number of economic factors ignored in Goenka (2013). According to Maddala (1991), Gujarati (2004) and Cameron and Trivedi (2005), under fitting a model has the effect of inducing a bias on the slope parameter and in this regards, the reliability of effect of FDI on employment observed by Goenka (2013) is highly questionable.

Habib and Sarwar (2013) examined the impact of FDI on employment levels in Pakistan. The model considered employment level, foreign direct invest, gross domestic product per capita and exchange rate. The study using the Johansen maximum likelihood technique concluded that FDI and GDP per capita are positively related to employment level whereas there is a negative relationship between exchange rate and employment. The authors used the Johansen maximum likelihood technique criticized by authors such asMostafavi (2011) and Masunda (2012) for being associated with frequent outliers in finite samples. Monte Carlo studies have also shown in small sample sizes, the Johansen method tend to suffer from over rejecting true null hypotheses.

Interest in examining the impact of FDI on employment creation has been growing over the years. A dominant result in literature is that FDI positively impacts employment (Habib, 2013; Jayaraman, 2007; Craigwell, 2006; Lipsey and Sun, 2010; Balcerzak *et al*, 2011; Liu, 2011;Ayumu, 2012;Mickiewicz, Radosevic and Varblane, 2000). These studies seem to support the belief that if developing countries attract FDI, then job creation will be enhanced and this

will later translate into reduced poverty. Another strand of literature however, suggests a negative relationship between FDI and employment (Ying, 2013; Massoud, 2008).

Methodology

The paper adopted a model similar to the one used by Goenka (2013) who estimated a bivariate regression model in the case of India. However, given that employment is not only a function of foreign direct investment, estimating a bivariate regression as did Goenka (2013) would induce some specification bias on the FDI estimate due to endogeneity. In this regards, the model used by Goenka (2013) is improved in the present study by controlling for other factors which are presumed to affect employment. The model takes the following form:

$$EMP_t = \beta_0 + \beta_1 GDP_t + \beta_2 INF_t + \beta_3 POP_t + \beta_4 FDI_t + \mu_t \text{ for } t = 1, 2\ 3, \ldots, 28 \ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Given that the prime interest of this study is to examine how FDI relates to the employment rate, equation can be transformed from a linear model into a log-log model. Also, this transformation allows easier interpretation as coefficients will simply be interpreted as elasticities. The log-log model takes the following form:

$$ln\ EMP_t = \beta_0 + \beta_1 lnGDP_t + \beta_2 lnINF_t + \beta_3 POP_t + \beta_4 lnFDI_t + \mu_t \text{ for } t = 1, 2\ 3, \ldots, 28 \ldots\ldots (2)$$

Letting *ln*be denoted by * yields the following specification:

$$EMP_t^* = \beta_0 + \beta_1 GDP_t^* + \beta_2 INF_t^* + \beta_3 POP_t + \beta_4 FDI_t^* + \mu_t \text{ for } t = 1, 2\ 3, \ldots\ldots, 28 \ldots\ldots\ldots\ldots (3)$$

The next section discusses justification and measurement of explanatory variables in the employment log linear model.

Justification of variables

Employment(EMP) enters the linear regression model as the dependent variable in order to appreciate how it responds to changes in the explanatory variables. This specification rests on the major assumption of unidirectional causality that runs from the explanatory variables to

employment. It also treats employment as an endogenous variable whose variation is explained by a set of explanatory variables which abide to the weak exogeneity assumption.

Gross domestic product (GDP) is included in the model as one of the explanatory variables. The variable attempts to capture how a country's economic growth affects employment. Holding other factors constant, a higher rate of economic growth is expected to bring out a corresponding increase in the employment rate and therefore, the coefficient on GDP is expected to be positive.

Inflation(INF) attempts to capture the impact of price stability on employment in an economy. It also attempts to capture the fiscal stance of the government in relation to macroeconomic performance. In economic terms, a higher rate of inflation denotes an increase in the production costs that is born from wage price spiral and this later translates into retrenchment of workers and a decrease in the employment. Therefore, inflation is expected to bear a negative sign.

The effect of population growth(POP) on employment is not certain. On one hand, an increase in population growth is expected to bring out a decrease in total employment assuming the Malthusian ideology hold. On the other hand, an increase in total population may facilitate a drop in the wage rate due to excess labour supply on the labour market and hence labour demand is likely to rise. In this regards, either sign is a priori expected.

The relationship between FDI and employment is debatable. Literature provides mixed results on how FDI relates to employment. According to Habib and Sarwar (2013) foreign direct investment facilitates an increase in business opportunities and the expansion in business operations is expected to increase employment opportunities. On the other hand, some studies have shown that FDI generally increase employment for skilled labour force implying that total employment rate is likely to dwindle in countries with abundant unskilled labour. In this case, the coefficient of FDI is expected to be positive or negative.

FINDINGS

Table 2.The Impact of Foreign Direct Investment on Employment in Zimbabwe

Dependent variable: log employment

Variable	Parameter	Coefficient	Standard error	t-Statistic	P-Value
CONSTANT	β_0	-287.679***	69.327	-4.149	0.0016
LNGDP	β_1	72.947***	17.275	4.223	0.0014
LNINFL	β_2	-0.087	0.077	-1.135	0.2804
POP	β_3	-0.059***	0.006	-10.393	0.0000
LNFDI	β_4	0.022**	0.008	2.670	0.0218
ΔLNGDP(-1)	δ_1	-36.426***	8.064	-4.517	0.0009
ΔLNGDP	δ_2	-60.775***	9.523	-6.381	0.0001
ΔLNGDP(1)	δ_3	3.165	4.946	0.640	0.5353
ΔLNINFL(-1)	δ_4	-0.094	0.103	-0.907	0.3837
ΔLNINFL	δ_5	0.050	0.096	0.521	0.6129
ΔLNINFL(1)	δ_6	0.015	0.066	0.221	0.8279
ΔLNFDI(-1)	δ_7	-0.011	0.009	-1.211	0.2512
ΔLNFDI	δ_8	-0.011	0.007	-1.392	0.1914
ΔLNFDI(1)	δ_9	0.008	0.009	0.850	0.4134
R-squared	0.983				
Adjusted R^2	0.963				
Log likelihood	77.211				
Durbin Watson	1.809				
F-statistic	49.499				
Prob(F-statistic)	0.0000				

*Note: **, *** denote p < 0.0.5 & p < 0.01 respectively: See appendix for a full set of results*

According to the results in Table 2, the Durbin Watson statistic is slightly less than 2 indicating presence of positive serial autocorrelation. This positive serial autocorrelation could possibly describe firms or employers who do not efficiently use all the information contained in the data perhaps because they could be better off including the variation left in the error term, hence improving the accuracy and precision of their future expectations. To relax this assumption, the

model was estimated with heteroscedasticity and autocorrelation consistent (HAC) standard errors to improve the efficiency of the model parameters. However, the DW statistic is greater than the coefficient of determination (R^2) and this means that the estimated model does not represent a spurious regression. The coefficient of determination measures the amount of variation in the dependent variable that is explained by the explanatory variables. Nonetheless, Gujarati (1991) warns against the use of the conventional R^2 as it is a non-decreasing function of the number of regressors included in the model. In this regards, it is customary to use the adjusted R^2 which accounts for degrees of freedom.

In this particular case, the adjusted R^2 is 0.96 indicating that the model explains 96% variation in employment while only 4% is captured in the stochastic error term. The model provides a good fit to the data making it capable of explaining and predicting employment variation in a developing country like Zimbabwe. The probability value of the F test is 0.000 signifying that the entire model is statistically significant at 1% level. Given that the model was estimated in log-log form, it follows that the results are interpreted as elasticities.

Before interpretation of results, it is worth mentioning that coefficients of the variables in level terms are what Stock and Watson(1991) refer to as long run elasticities while coefficients of variables in difference form with leads and lags are short run dynamics which are meant to eliminate endogeneity. By rule, their interpretation and analysis is not included (Masunda, 2012). Another point to drive home is that the dynamics of population growth were not included in the model and the reason is that they happened to be superfluous. Their inclusion increased the residual sum of squares and decreased the adjusted R^2. Also when the leads and lags of population growth were included, most of the variables took wrong signs.

As indicated in Table 2, GDP is positively related to employment and the coefficient is large and statistically significant at 1% level[p-value0.0014]. The coefficient of GDP of 72.9 indicates that there is an elastic relationship between GDP and employment holding inflation, population growth and FDI constant. A rise in economic growth is a result of a higher level of domestic investment and an increase in labour demand. If the economy is not performing well as was the case in Zimbabwe during the 2000-2008 time period, the financial position of local firms is likely to be compromised and a common adaptive strategy that most firms take to cope with a

harsh economic climate is to retrench their labour force. This explains why an increase in economic growth is positively associated with employment.

A much similar result was also confirmed by Hoang and Binh (2012), using a panel data set of 45 developing countries, that confirmed a positive relationship between GDP and employment. In explaining this positive relationship, Hoang and Binh (2012) argues that GDP has an obvious direct positive effect on employment by generating new jobs in the country. This is also in tandem with a result obtained by Massoud (2008) in the case of Egypt. For robustness sake, figure 1 shows a partial correlation analysis between employment and GDP.

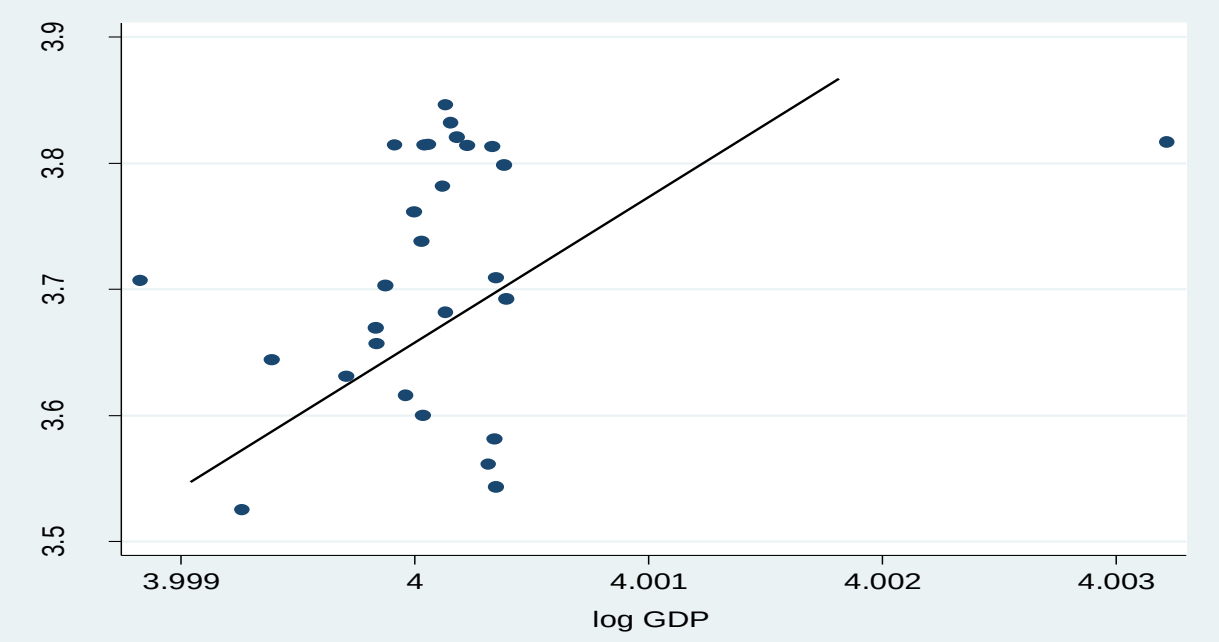

Figure 1: Scatter plot of GDP and Employment

As shown in Figure 1, GDP is positively correlated with employment. In macroeconomic terms, a more realistic channel through which an increase in economic growth may enhance employment in developing countries is that a rise in GDP facilitates an increase in a country's capital stock which resultantly increases labour demand assuming a low capital-labour ratio. For countries that have an abundant capital stock, an increase in GDP is likely to provide an otherwise result for instance Wei (2013) who obtained a negative relationship between GDP and employment in the case of China.

Inflation has a theoretically expected sign but the coefficient is not significantly different from zero. The insignificance of inflation amounts to saying inflation has no impact on employment in Zimbabwe. Notwithstanding the insignificance of the coefficient, the negative sign on inflation accords to the wage spiral phenomena. When inflation increases, workers tend to demand wage increments to cope with the loss in purchasing power and given that wages are a cost of production to the firms, it follows that the demand for labour will fall.

A priori population growth is inversely related to employment and the coefficient is highly significant(t-statistic of -10.39 and p-value 0.00). The result suggests that an increase in population growth translates into a decrease in employment holding all other factors constant. The relationship is inelastic (coefficient is -0.05). The result corroborates the Malthusian ideology that an increase in population growth facilitates immense competition over economic resources which resultantly compromises growth and investment prospects leading to a significant decrease in employment. A partial relationship between the population growth and log employment is shown in Figure 2.

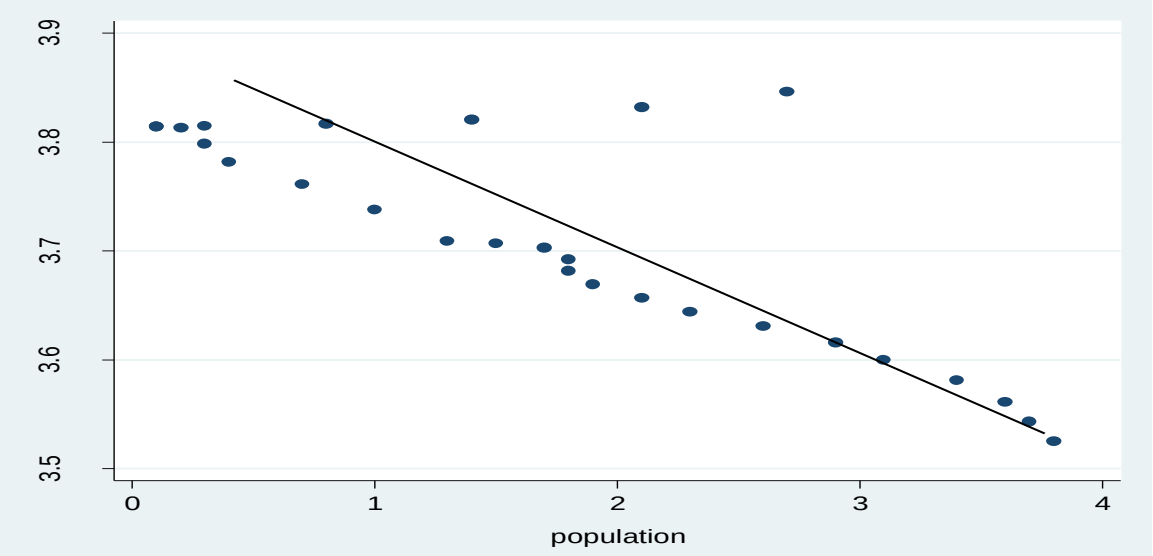

Figure 2: A scatter plot of Population Growth and log Employment

According to Figure 2, there is a clear negative relationship between population growth and employment. The result suggests that for population growth rates between 0% and 1%, the log employment is between 3.7 and 3.9 but when population growth is between 3% and 4%, log

employment falls between 3.5 and 3.6. This shows that a higher population growth coincides with low employment levels. Therefore, the scatter plot in Figure 2 provides a useful robustness check. The result substantiates regression results in Table 2.

Turning to the main variable of interest, foreign direct investment is found to be positively related to employment and the coefficient is statistically significant at 5%. The corresponding probability value is 0.0218, the standard error is relatively low (0.008) and the point estimate is 0.022. In this case, the partial effect of log FDI is less than 1 indicating that the responsiveness of employment in Zimbabwe is quite inelastic. This means that an increase in FDI brings in a less proportionate increase in employment. The inelasticity of employment to changes in FDI may also reflect the slow absorptive uptake of technology in Zimbabwe.

In terms of the size and magnitude of the coefficient, the result is highly comparable to the 0.064 obtained by Ding (2005).The result is also consistent to the findings of Cao (2003) who noted FDI creates work opportunities for primary sectors in an economy and it changes the employment structure. FDI has a technological spillover effect which stimulates local investment thereby creating employment for the local people. The result however tends to contradict with the results observed by Ernst (2005) in Latin America. The author observed a negative relationship between FDI and employment believed to emanate from the crowding out effect of domestic investment by foreign investment.

Conclusion and Policy Recommendations

The effect of foreign direct investment on economic performance in developing countries has been a matter of concern among policymakers. Against this background, the central objective of the paper was to examine the impact of foreign direct investment on employment in Zimbabwe. The study utilized annual time series data spanning from 1985 to 2012. Data was analyzed using a multivariate double log regression model estimated using the Stock and Watson dynamic ordinary least squares (DOLS) technique. Foreign direct investment was included in the model as one of the explanatory variables to appreciate how it relates to employment in Zimbabwe. The results of the study indicated that population growth has a significant negative effect on the employment rate in Zimbabwe. On the other hand, economic growth was found to positively and

significantly affect employment. FDI is confirmed to have a positive and significant impact on the employment although it is inelastic. The effect of FDI is likely to be felt in the long-run. Short term recommendations should focus on growing the labour intensive sectors of the economy such as agriculture and mining.

Since FDI has a significant positive effect on employment, the government of Zimbabwe is therefore advised to introduce policies and incentives that are geared at attracting foreign direct investment in the country. This could be in form of expansion of tax incentives, infrastructural subsidies and import duty exemptions. To promote employment, the government should implement macroeconomic policies that improve the investment climate in the country such as reviewing the indigenization policy to make it attractive and to quicken the introduction of Special Economic Zones as well as industrial parks. Such policies are imperative as they will attract foreign investors who are in turn, vital in improving the employment situation in the country as confirmed in this study.

To attract foreign direct investment, a core consideration here should be improvements in the rule of law and clarity regarding property rights. Foreign direct investment is driven by stable expectations of a sound economic environment, including the long-run path of tax rates and regulations only to mention a few and employment is akin to investment in that hiring decisions take into account the long-run economic climate. The government like most countries in Latin America, the likes of Brazil, establish foreign investment agencies and have enforce credible fiscal, and monetary policies and financial incentives to lure FDI. In this regards, it would be reasonable for the government of Zimbabwe to improve the regulatory environment by reducing corporate tax from the current 25, 75 percent, and the cost of doing business.

Although such policies may help attract foreign investment into the country, local investment conditions can however limit the benefits of FDI in increasing employment. The quality of institutions (academic institutions and financial institutions) and infrastructure (road networks, hospitals, prisons and so on) should also be taken into consideration. Therefore, policies to

attract FDI need to be accompanied and complemented by institutional and infrastructural development. Only then can we start to expect more FDI into the country. This will go a long way to increase employment in the country but to speed up the much needed economic recovery.

The paper has examined the relationship between FDI and employment using aggregate data which assumes homogeneity of the impact FDI on employment. Future studies can therefore benefit from conducting a micro econometric analysis which captures for heterogeneity of FDI effects on employment. Such a study is capable of providing a much clearer picture of how FDI affects employment at micro-level for instance, at firm level.

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APPENDIX A: UNIT ROOT TESTS

Null Hypothesis: D(LOGEMPL,2) has a unit root
Exogenous: None
Lag Length: 0 (Automatic - based on AIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.178281	0.0000
Test critical values:	1% level	-2.660720	
	5% level	-1.955020	
	10% level	-1.609070	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LOGFDI) has a unit root
Exogenous: None
Lag Length: 0 (Automatic - based on AIC, maxlag=6)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.413544	0.0000
Test critical values:	1% level	-2.656915	
	5% level	-1.954414	
	10% level	-1.609329	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: LOGGDP has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on AIC, maxlag=6)

		t-Statistic	Prob.*

Augmented Dickey-Fuller test statistic		-4.939027	0.0005
Test critical values:	1% level	-3.699871	
	5% level	-2.976263	
	10% level	-2.627420	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LOGINFL) has a unit root
Exogenous: None
Lag Length: 0 (Automatic - based on AIC, maxlag=6)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.299681	0.0019
Test critical values:	1% level	-2.656915	
	5% level	-1.954414	
	10% level	-1.609329	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(POP,2) has a unit root
Exogenous: None
Lag Length: 0 (Automatic - based on AIC, maxlag=6)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.530783	0.0011
Test critical values:	1% level	-2.660720	
	5% level	-1.955020	
	10% level	-1.609070	

*MacKinnon (1996) one-sided p-values.

APPENDIX B: COINTEGRATION TEST

Null Hypothesis: RESID01 has a unit root
Exogenous: Constant
Lag Length: 4 (Automatic - based on AIC, maxlag=5)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.372126	0.0248
Test critical values:	1% level	-3.808546	
	5% level	-3.020686	
	10% level	-2.650413	

*MacKinnon (1996) one-sided p-values.

APPENDIX C: DIAGNOSTIC TESTS

Heteroskedasticity Test: White

F-statistic	0.658955	Prob. F(13,11)	0.7651
Obs*R-squared	10.94530	Prob. Chi-Square(13)	0.6154
Scaled explained SS	1.570613	Prob. Chi-Square(13)	0.9999

Date: 05/29/15 Time: 17:13
Sample: 1985 2012
Included observations: 25

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
. | . |	. | . |	1	0.025	0.025	0.0179	0.893
. *| . |	. *| . |	2	-0.178	-0.179	0.9491	0.622
. | . |	. |* . |	3	0.067	0.080	1.0884	0.780
.**| . |	.**| . |	4	-0.256	-0.305	3.1887	0.527
.**| . |	.**| . |	5	-0.333	-0.316	6.9314	0.226
. | . |	. *| . |	6	0.017	-0.114	6.9412	0.326
. | . |	. *| . |	7	-0.005	-0.144	6.9422	0.435
. | . |	. | . |	8	0.053	-0.030	7.0533	0.531
. |**. |	. | . |	9	0.241	0.044	9.5080	0.392
. | . |	. *| . |	10	0.001	-0.136	9.5080	0.485
. | . |	. | . |	11	0.045	0.058	9.6065	0.566
. *| . |	. *| . |	12	-0.079	-0.179	9.9322	0.622

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.483920	Prob. F(2,9)	0.6315
Obs*R-squared	2.427406	Prob. Chi-Square(2)	0.2971

Ramsey RESET Test
Equation: UNTITLED
Omitted Variables: Squares of fitted values

	Value	df	Probability
t-statistic	0.968678	10	0.3556
F-statistic	0.938338	(1, 10)	0.3556
Likelihood ratio	2.242219	1	0.1343

F-test summary:

	Sum of Sq.	df	Mean Squares
Test SSR	0.000261	1	0.000261
Restricted SSR	0.003040	11	0.000276
Unrestricted SSR	0.002779	10	0.000278
Unrestricted SSR	0.002779	10	0.000278

LR test summary:

	Value	df
Restricted LogL	77.21138	11
Unrestricted LogL	78.33249	10

Dependent Variable: LOGFDI
Method: Least Squares
Date: 05/29/15 Time: 17:26
Sample (adjusted): 1987 2011
Included observations: 25 after adjustments
HAC standard errors & covariance (Bartlett kernel, Newey-West fixed bandwidth = 3.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOGGDP	181.5609	621.2850	0.292235	0.7741
LOGINFL	2.993194	3.125793	0.957579	0.3535
POP	-0.334090	0.198838	-1.680214	0.1136
D(LOGGDP(-1))	-227.9780	145.4916	-1.566950	0.1380
D(LOGGDP)	-272.0313	344.9729	-0.788558	0.4427
D(LOGGDP(1))	-98.21295	127.2679	-0.771703	0.4523
D(LOGINFL(-1))	1.523508	3.370197	0.452053	0.6577
D(LOGINFL)	-2.726711	4.383487	-0.622042	0.5433
D(LOGINFL(1))	6.616118	3.454233	1.915365	0.0747
C	-735.9227	2494.642	-0.295001	0.7720

R-squared	0.260900	Mean dependent var	1.566574
Adjusted R-squared	-0.182559	S.D. dependent var	0.586360
S.E. of regression	0.637640	Akaike info criterion	2.227090
Sum squared resid	6.098779	Schwarz criterion	2.714640
Log likelihood	-17.83862	Hannan-Quinn criter.	2.362316
F-statistic	0.588330	Durbin-Watson stat	1.017787
Prob(F-statistic)	0.787464	Wald F-statistic	1.972841
Prob(Wald F-statistic)	0.117583		

APPENDIX D: DOLS RESULTS

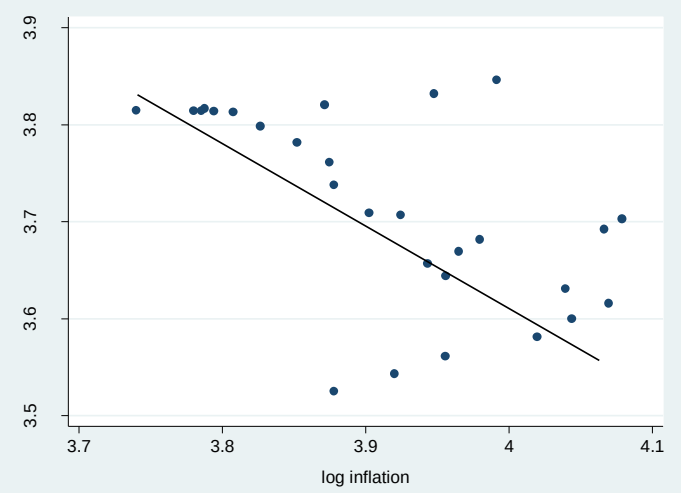
Dependent Variable: LOGEMPL
Method: Least Squares
Date: 05/31/15 Time: 11:56
Sample (adjusted): 1987 2011
Included observations: 25 after adjustments
HAC standard errors & covariance (Bartlett kernel, Newey-West fixed bandwidth = 3.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOGGDP	72.94698	17.27526	4.222627	0.0014
LOGINFL	-0.086821	0.076477	-1.135249	0.2804
POP	-0.059262	0.005702	-10.39276	0.0000
LOGFDI	0.022085	0.008271	2.670298	0.0218
D(LOGGDP(-1))	-36.42647	8.064126	-4.517101	0.0009
D(LOGGDP)	-60.77506	9.523725	-6.381438	0.0001

D(LOGGDP(1))	3.164939	4.945978	0.639902	0.5353
D(LOGINFL(-1))	-0.093566	0.103131	-0.907255	0.3837
D(LOGINFL)	0.049723	0.095490	0.520720	0.6129
D(LOGINFL(1))	0.014670	0.065897	0.222615	0.8279
D(LOGFDI(-1))	-0.011046	0.009120	-1.211169	0.2512
D(LOGFDI)	-0.010895	0.007826	-1.392147	0.1914
D(LOGFDI(1))	0.007632	0.008979	0.850053	0.4134
C	-287.6793	69.32744	-4.149573	0.0016

R-squared	0.983193	Mean dependent var	3.722911
Adjusted R-squared	0.963330	S.D. dependent var	0.086812
S.E. of regression	0.016624	Akaike info criterion	-5.056911
Sum squared resid	0.003040	Schwarz criterion	-4.374340
Log likelihood	77.21138	Hannan-Quinn criter.	-4.867595
F-statistic	49.49849	Durbin-Watson stat	1.809066
Prob(F-statistic)	0.000000	Wald F-statistic	242.6660
Prob(Wald F-statistic)	0.000000		

APPENDIX E: SCATTER PLOT OF INFLATION AND EMPLOYMENT



APPENDIX F: A SCATTER PLOT OF POPULATION GROWTH AND LOG EMPLOYMENT.