

AN EMPIRICAL INVESTIGATION OF THE IMPACT OF INTEREST RATES ON PRIVATE INVESTMENT IN ZIMBABWE (1980 – 2015)

Mr. Takudzwa. C. MARADZE

Department of Economics, University of Zimbabwe, Harare, Zimbabwe

Mr. Thabani NYONI

Department of Economics, University of Zimbabwe, Harare, Zimbabwe

ABSTRACT

The main objective of this study was to analyze the role played by interest rates in determining private investment in Zimbabwe. Knowledge of the effect of interest rates on private investment helps policy makers in coming up with appropriate fiscal and monetary policies. Time series data was used for the period 1980 to 2015. More so the Ordinary Least squares (OLS) method was used. Interest rates were found to be significant in determining the level of private investment in Zimbabwe over the study period. Other variables found significant in determining private investment over the study period were GDP and FDI. Interest rates and FDI both had expected signs and were all together significant at 1% level of significance. GDP had an unexpected negative sign and was also significant at 5% level of significance. For the nation of Zimbabwe to increase the level of private investment it should implement policies that reduce the interest and reduce the crowding out effect. Also favourable private and foreign partnerships should be encouraged.

Keywords: - *Interest Rate, Private Investment, Zimbabwe*

1.0 INTRODUCTION

Private investment is a major driver of economic growth, this was concluded by (Herron and Nasri 2011). These two reached this close despite empirical growth models for developing nations typically making no distinction between private and public features of investment (Jecheche 2011). Private investment has positive impacts and hence requires special attention for a nation to benefit from it. The benefits of private investment include reduction of poverty, technological transfers and diffusion, efficiency spill overs which can lead to improvement in productivity and efficiency in a nation. In addition human capital development and generation of tax revenues in a nation are also some benefits that are experienced by a nation if it has the private sector investing. Hence it becomes more crucial to assess any condition conducive for more private investment. One of the core determinants of private investment is the nominal interest rate that is set by banks of a nation. In Zimbabwe private investment has helped in the mobilization of domestic resources to enable the championing of developmental goals of the country.

Since the inception of interest rates deregulation in 1986, the government of Zimbabwe has been pursuing a market determined interest rates regime, which does not permit a direct state intervention in the economy. The preferential interest rates were based on the assumption that the market rate, if universally applied, would exclude some of the priority sectors (Jecheche 2011). Interest rates were, therefore, adjusted periodically with ‘visible hands’ to promote an increase in the level of output in the different priority sectors of the economy. For example agriculture and manufacturing sectors were accorded priority, and the commercial banks were directed (by the central bank) to give concessionary loans and advances to agriculture and manufacturing industries. This research seeks to investigate the impact of interest rates on private investment in Zimbabwe, using yearly data for the period 1980 to 2015, it also seeks to determine other factors that determine private investment like debt financing, gross domestic product (GDP), foreign direct investment (FDI), trade terms, credit to the private sector and domestic savings.

According to Heron and Nasri (2011) private investment can be defined as the investment that is done by private individuals and not by the government. These private individuals are said to be investing in human capital thus their labour force or investing in fixed businesses thus machinery, vehicles, business offices or renovating dilapidated office areas. Investing in inventory like raw materials and working progress is also some investment that private individuals undertake. Interest rate can be defined as the cost of borrowing money, to the borrower by the lender (Nasri and Heron 2011). However, Parker (2010) notes that, Economists usually reserve the term investment for transactions that increase the magnitude of *real aggregate wealth* in the economy. This includes mainly the purchase (or production) of new real durable assets such as factories and machines. Under the International Centre for Settlement of Investment Disputes (ICSID) Convention, investment encompasses any plausible activity or asset, that is any form of investment which adds to the existing capital formation of a country, thus have a positive effect on the gross output of a country.

1.2 Relevance of the Study

Private investment has been a major economic powerhouse for developing countries (Seruvatu and Jayaraman 2001; Pablo and Andres n.d; Uttara n.d). Low economic growth over the years is an indication that private investment in Zimbabwe is not in tandem with the pre-established trends in most developing countries. The development disregards the conducive conditions (certainty in macro-economic variables and flexibility in financial markets) proffered by the introduction of the multi-currency regime (RBZ, 2011).

This study thus seeks to analyse the determinants of private investment in a bid to uncover why private investment has remained sluggish since independence. Zimbabwean nominal interest rates have been highly disappointing as they are high, this has led to many companies failing to invest as they do not have the borrowing power to borrow funds from banks and invest. The pricing model that is being used by the banks to come up with their interest structure has been ranging between 6% and 35% per annum as their lending rate (RBZ, 2011). The RBZ; since the introduction of the multicurrency regime in 2009 has had its ability to influence the interest rate undermined and has been only playing an administrative role (Dhliwayo, 2014). So with the free market independently influencing the loan prices, the prices have been highly exorbitant for most willing investors. They have over the years since relaxed their intentions to borrow money and invest; this is in turn distorting economic growth in Zimbabwe. Therefore, this research seeks to give an empirical evaluation of the role played by interest rates in private investment in

Zimbabwe and also add to the existing literature. This will greatly help current and future policy makers in devising sound economic policies.

2.0 LITERATURE REVIEW

2.1 Theoretical Literature Review

2.1.1 Simple accelerator theory

In the accelerator model, expectations, profitability and capital costs play no role in influencing private investment. The model postulates that investment is proportional to changes in output. There is also an assumption that there is a stable relationship between the desired level of capital and output. The assumption goes on further to say that firms invest without delay to keep the desired level of capital stock equal to the actual capital stock, the larger the gap between the existing capital stock and the desired capital stock, the greater a firm's rate of investment. In the theory desired stock of capital depends on the current level of income. The reasoning behind the assumption is that to produce a given level of output, certain amounts of inputs like capital, land and labour are needed (Wilton and Prescott, 1987). When the output is increasing, the requirement for more inputs increases thus desired level of capital will in turn be proportional to the level of output produced. However this theory is critiqued for assuming that the level of investment is at all times sufficient to keep the desired stock of capital equal to the actual stock of capital. The simple accelerator model also assumes that the ratio of desired stock of capital to the level of output is constant. This can only be correct if the cost of capital is fixed.

This model thus identifies GDP (output), interest (cost of external financing) and capital (internal funds) as the major determinants of investment. Most important is the availability of excess production capacity which would allow for the increase in production from the actual production level to the desired level.

2.1.2 The Flexible Accelerator theory

This theory can also be termed as the Neoclassical theory and it was developed due to the weaknesses of the simple accelerator model. This theory recognises that the desired stock of capital and the actual stock of capital are not always the same, this is because most firms need time to calculate their desired stock of capital. The theory further explains that the greater the gap between the actual capital stock and desired capital stock, the greater a firm's rate of investment (Donbusch and Fischer, 1981). Also any variable that increases the desired stock of capital is said to increase the rate of investment. Thus an increase in tax incentives, a low level of the real interest rate or an increase in output levels increases the rate of investment by individuals. Ajide and Lawson (2012) advocate that the Flexible accelerator model does not explain the rate of investment or investment movement towards the optimal capital stock.

2.1.3 The basic theory of investment

In this theory physical investment is seen as an alternate to savings. In this context, individuals will be using investment as a means of smoothening out their consumption over time. Investment is used as an alternative to savings so long its return is higher than the return of savings. In times when the interest rate is low individuals will in turn save less and in times when the interest is high they save more. This indicates that investment levels will be low in times when the interest rate is high and high in times when the interest rate is low. One can see that the basic theory of investment predicts a negative relationship between the level of investment and the interest rate.

2.1.4 Tobin's Q theory

James Tobin, a Nobel-prize winner, formulated this investment theory based on financial markets. Tobin claimed that firms' investment level must depend on the ratio of the present value of installed capital to the replacement cost of capital. This ratio is **Tobin's q** . The **q** theory of investment claims that firms will want to increase their capital when **q** is greater than 1 and decrease their capital stock when **q** is less than 1. A firm can buy one dollar's worth of capital (at replacement cost) and earn profits that have present value of more than one dollar. Under such conditions, firms increase profits by investing in more capital, so we expect investment to be high. If **q** is less than 1, then the present value of the profits earned by installing new capital is less than the cost of the capital, so more investment lowers profit. So according to this theory investment is a function of the cost of capital and profitability. This theory is ideal for describing investment decisions of firms in the formal sector of the nation and how they interact with financial markets in Zimbabwe.

2.1.5 The multiplier investment model

This theory was developed by Keynes in his general theory. He presented the investment multiplier which he defined as a factor of proportionality that measures how much an endogenous variable changes in response to a change in some exogenous variable. The relationship between aggregate income and the rate of investment is shown by the investment multiplier, given the marginal propensity to consume. Simplifying assumptions like the absence of time lags, no persuaded investment, constant marginal propensity to consume, and a closed economy are assumed. Multiplier effects can be observed when new investment and jobs are attracted into a particular town. The final growth in output and employment can be far bigger than the primary injection of demand because of the inter-relationships inside the circular flow. This theory basically reinforces that aggregate income increases as the producers of new investment goods enjoy higher sales and income (Bayai and Nyangara, 2013). This means that the theory is built mainly on the reaction that output has on investment.

2.2 Interest rates and private investment

Real interest rate being a representative of the cost of capital is a likely determinant of private investment. Two distinctions stand, one being that the interest rate would have a negative impact on the level of private investment made by domestic firms if the investment is financed by the local credit market of a country. The second one is that, an increment in interest rate could have a positive effect on the capital flow from overseas, like it usually happens in emergent markets. Hence, the sign of the ultimate impact is not fully foreseeable, just as suggested by Agosin (1995). Shafik (1992) in his study of Egypt, found that it is difficult to obtain a significant coefficient for the cost of funds in most cases. He went further to say that this is Pablo et al, (nd) recognises that the rate of return of an investment as explained by theoretical s due to uncertainty about interest rates of return, unsophisticated investment decision procedures, the long time frame of investment decisions when compared to short run fluctuations in interest rates and the possibility that changes in borrowing cost are dominated by variations in demand. This was different with what was obtained by Jorgenson (1963) in a study undertaken in Tanzania in 1960 to 1973. He obtained a negative relationship between interest rates and private investment.

The neoclassical theory explains that private investment is negatively related to the real rate of interest, Yaw Asante (2000), quotes Galbis (1979) who states that private investment is positively related to the real rate of interest. The logic for this is, an increase in interest rates increases the volume of financial savings through financial intermediaries. This will in turn raise investible funds, a phenomenon that McKinnon (1973) named the "conduit effect". Though one can see the demand for investment declining with an increase in the real rate of interest, *realized*

investment will actually increase due to the greater availability of funds by people saving more. This close applies only when the capital market is in disequilibrium and the demand for funds being seen to exceed its supply. Until the 1970s interest rate policy was mainly guided by the Keynesian view, which states that interest rates must be kept low in order to encourage investment. In line with this analysis, the relationship between savings and interest rates could be unclear, in light of the opposing influences of the income and substitution effects. Low interest rates would promote investment spending in developing countries this is in accordance with the Keynesian and neoclassical theories.

Since the cited debate seems to have no visible conclusion, the case with Zimbabwe is that it has limited capital flows from abroad henceforth investments are financed locally indicating a negative relationship between private investment and interest rates. Seruvatu and Jayaraman (2001) wrote that high interest rates are a disincentive to investment as they raise the user's cost of capital. Private investment is seen to be negatively related to the interest rate. In Zimbabwe the interest rate only became positive recently (post the formulation of the GNU in 2009). Mckinnon-Shaw (1973) hypothesised that interest rates can have a negative effect only on investment through the saving channel. Negative interest rates act as a disincentive to savers to save, this reduces the amount of savings available for investment.

The Loanable funds theory explains that the main source of the demand of loanable funds is that of investment. In the theory investment is defined as the expenditure on new capital goods including inventories. The price of such funds is seen to depend on the rate of interest. Local firms when deciding on whether to invest or not compare the expected return from an investment and the rate of interest. A low rate of investment means the demand for loanable funds for investment purposes will be high and vice-versa. This will in turn further confirm that there is an inverse relationship between the demand for loanable funds for investment and the rate of interest. The Loanable funds theory is an improvement of the classical theory since it links quantity of money, savings and investment. It also takes into account the importance of bank credit as an important source of loanable funds.

2.3 Empirical Literature Review

Bayai and Nyangara (2013) investigated the determinants of private investment in Zimbabwe from 2009-2011. They used monthly data so as to use the regression method. A linear model was used as the functional form which suited the data set. Political risk, interest rate, GDP, debt financing and trade terms were seen as the key determinants of private investment over the study period. As expected by theory interest rates and inflation had a negative influence on private investment and they were significant at 0.001 level. National savings had a positive relationship with private investment; this is expected according to theory. GDP, trade terms and public investment had a negative impact on private investment; this is not in line with the expectations of theory. Debt financing and political risk came up with unexpected coefficients, thus they had a positive influence on private investment.

Jenkins (1998) used a two-step Engle-Granger method and estimated a model of private investment flows for Zimbabwe. She used annual data over the 1969-1990 period. The results showed that in the long-run, gross profits have positive effects, while foreign capital inflows and the external debt-to-GDP ratio negatively affect private investment. In the short run, the availability of foreign exchange and the relative price of industrial output have positive effects, while the change in the relative cost of capital is negatively related to the cost of capital.

In Pakistan using the ECM and co-integration methods, Khan and Khan (2007) analysed the determinant of private investment in that nation. The study used the data from 1972 to 2005. Co-

integration results concluded that public investment and GDP had a positive impact on private investment and interest rates, investment credit, foreign exchange rate and external debt had a negative impact. GDP had a positive effect while public investment, external debt, foreign exchange rate, interest rates and investment credit had an adverse effect, this was obtained when the ECM model was used. From this study one can see that the effect of public investment depended on the method used.

Marbuah and Frimpong (2010) analysed the determinants of private investment in Ghana using an ARDL model. They used time series data covering 1970- 2002. They further made use of the error correlation model which helped determine the long run and short run determinants of private investment using autoregressive distributed lag (ARDL) technique. The results proposed that private investment is determined in the short-run by public investment, real interest rates, inflation, trade openness, real exchange rate and a government of constitutional rule. Real output, inflation, external debt, real interest rate, openness and real exchange rate influenced private investment response in the long-run.

Consistently, Ouattara (2004) modelled the long run determinants of private investments in Senegal using data from 1970 to 2007. The Johansen co-integration technique and the ARDL testing bounds approaches were used to estimate the long run investment equation. Identical results were obtained from the two methods. Public investment, real GDP and foreign aid flows positively influenced private investment. Terms of trade and private sector influenced private investment negatively.

Similarly, Ajide and Bello (2013) examined the determinants of private investment placing more importance on the role of governance. Annual data over 1970 to 2010 periods was used and the study was undertaken in Nigeria. The log-log model was estimated in the research using the Auto-Regressive Distributed Lag (ARDL) bounds testing approach was used to ascertain the long and short run association of many variables. In both the long-run and short-run public investment had a negative influence on private investment. This however was not in line with what Marbuah and Frimpong (2010) results from their research in Ghana. In Ghana public investment influenced private investment positively in the short run but was not significant in the long run. The long run key determinants of private investment were seen to be real GDP, real interest rate, public investment, exchange rate, terms of trade, external debt, credit to the private sector and a reforms dummy. Public investment, real GDP and terms of trade were seen to be significant in the short run.

In Kenya Ronge and Kimuyu (1997) investigated the determinants of private sector investment using data over the period 1964-1996. The OLS model was used and a double-logarithmic form of the investment equation was employed. Availability of foreign exchange and credit exerted positive effects on private investment; this confirmed the results in most empirical studies. Adverse effects on Private investment were from the stock of debt. It was specified in the research, that is; 1% increase in the lagged debt to GDP ratio reduced the level of private investment by 0.3%.

Also in Ghana Akpalu (2002) did a study on the determinants of private investment using annual time series data for the period 1970-1994. He used the Engel-Granger Two Step method and the Johanesen multivariate test. In the study it was seen that in the short run private investment responds to credit availability, public investment and capital income growth. There was also the crowding out effect caused by public investment. In both the short run and long run there was found a significant negative relationship between the cost of capital and private investment. Real GDP had a positive relationship in both the short and long run, however in the short run GDP

was not significant. This confirmed the existence of the accelerator theory of investment in Ghana.

Lesotlho (2006) examined the determinants of private investment in Botswana. He used the co-integration and error correction modelling for data over the period of 1976-2003 for both the long run and short run. Positive and significant coefficients of private investment in the short run where interest rates and bank credit. In the long run GDP growth and exchange rates were significant. Inflation was seen to be insignificant in both time zones. Long run variations in private investment were supported by GDP growth, the real exchange rate and public investment. In the short run variations were underpinned by the real interest rate, public investment and the availability of credit to private sector.

In Nigeria Ayeni (2014) examined the macroeconomic determinants of private investment. He used data from 1979 to 2012 while employing a log-log model which was estimated by the ARDL co-integration approach. GDP had a positive impact on private investment which was contrary to the results found by Ajide and Lawson (2012) where real interest rates, availability of credit to the private sector and the exchange rate were insignificant.

Nainggolan *et al* (2015) from Indonesia examined the determinants of private investment in the Northern Sumatra Province and he used data from 1980 to 2011. In his research he employed an ECM approach. Exchange rates, availability of credit for investment and GDP had a positive impact on private investment while public investment, inflation, economic crisis and interest rates had and negative effects.

3.0 METHODOLOGY

3.1 Theoretical Framework

Many investment theories were reviewed in chapter two, however; direct applicability of these models in developing countries like Zimbabwe was not observed. Misati (2007) explains the reason for this difficulty as to be emanating from the fact that these models were intended to analyse investment behaviour of firms in developed nations. Only the accelerator model can be seen applicable in developing nations like Zimbabwe. The simple accelerator theory assumes that's investment is proportional to changes in output, this means that Investment (**I**) is a function of output (**Q**) thus $I=f(Q)$. The simple accelerator model assumes that investment is always enough to keep the desired stock of capital equal to the actual stock of capital. Most economists have seen this assumption being unrealistic which leads to our model having a shortcoming. So when adopting this model and other models there should be some modifications. In empirical studies it is said that this problem can be resolved by empirical model specification by researchers.

3.2 Empirical Model Specification

In explaining private investment in Zimbabwe this study will adopt the linear functional form. Private investment (regressand) is expressed as a linear function of its explanatory variables (regressors). Specification of the econometric model will be as:

$$PVT = \beta_0 + \beta_1 TRD + \beta_2 CP + \beta_3 FDI_{t-1} + \beta_4 GDP + \beta_5 INT + \beta_6 DEBFIN_{t-1} + \beta_7 DS_t + \mu_t$$

In the model PVT is private investment, TRD is the terms of trade, CP is credit to the private sector as a percentage of GDP, FDI is foreign direct investment, GDP is Gross domestic product, DEBFIN is debt financing, DS is the percentage of savings as a percentage of GDP and INT is the interest rate. $\beta_1, \beta_2, \beta_3, \beta_5, \beta_6, \beta_7$ are coefficients of the parameters to be estimated and β_0

is the intercept. The error term is μ which is assumed to be normally distributed with zero mean disturbances and also a constant variance. Also the error term is assumed to be independent of the effect of the explanatory variables.

4.0 ESTIMATION, PRESENTATION AND INTERPRETATION OF RESULTS

4.1 Descriptive Statistics

The table 4.1 summarises the descriptive statistics for all variables included in the model.

| | DPI | CP | DDS | DFDI(-1) | DGDP_000_ | DINT | DNDS__1_ | DTRADE |
|--------------|-----------|----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Mean | 0.395000 | 254592.9 | -0.994310 | -0.055583 | -40666.67 | 5.211767 | 3.847486 | 2.505333 |
| Median | -0.170000 | 29.89165 | -1.774300 | 0.045150 | 63203.00 | 1.137400 | 5.030150 | 2.095000 |
| Maximum | 11.87000 | 3978768. | 10.06780 | 2.133500 | 780000.0 | 170.7932 | 16.54780 | 32.70000 |
| Minimum | -11.73000 | 0.000000 | -10.42420 | -6.079800 | -1330000. | -72.87590 | -15.26360 | -20.25000 |
| Std. Dev. | 3.930688 | 969546.0 | 5.353885 | 1.299740 | 451309.4 | 38.39537 | 7.451945 | 10.03957 |
| Skewness | -0.072671 | 3.485792 | 0.303549 | -3.229570 | -0.888536 | 2.470174 | -0.633201 | 0.714573 |
| Kurtosis | 6.445137 | 13.18102 | 2.755740 | 16.90039 | 4.028080 | 13.12640 | 2.919609 | 5.362415 |
| | | | | | | | | |
| Jarque-Bera | 14.86262 | 190.3201 | 0.535289 | 293.6767 | 5.268662 | 158.6888 | 2.012793 | 9.529330 |
| Probability | 0.000592 | 0.000000 | 0.765180 | 0.000000 | 0.071767 | 0.000000 | 0.365534 | 0.008526 |
| | | | | | | | | |
| Sum | 11.85000 | 7637786. | -29.82930 | -1.667500 | -1220000. | 156.3530 | 115.4246 | 75.16000 |
| Sum Sq. Dev. | 448.0590 | 2.73E+13 | 831.2584 | 48.99039 | 5.91E+12 | 42751.94 | 1610.413 | 2922.998 |
| | | | | | | | | |
| Observations | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 |

Table 4.1 Descriptive statistics

Half of the variations over the study period had lower variations from the mean and the other had large variations from the mean thus large standard deviations .The average size of the prime determinant in this case interest rates. The mean of interest rates over the course of the study is 5.211767 and a maximum value of 170.7932 .Interest rates are positively skewed meaning that the effect of interest was higher towards the end of the research.

4.2 Stationarity Tests

The table below 4.2 summarises the stationarity test results

Table 4.2: Unit root test results

| Variable | ADF Statistic | Test Critical Value | 1% Critical Value | 5% Critical Value | 10% Critical Value | Order of integration |
|----------|---------------|---------------------|-------------------|-------------------|--------------------|----------------------|
| | | | | | | |

| | | | | | |
|--------------|--------------|-----------|-----------|-----------|------|
| PVT | -9.381322** | -2.641672 | -1.952066 | -1.610400 | I(1) |
| DGDP | -4.173145*** | -2.634731 | -1.951000 | -1.610907 | I(1) |
| DDS | -2.290697*** | -2.660720 | -1.955020 | -1.609070 | I(1) |
| CP | -4.183476 | -3.639407 | -2.951125 | -2.614300 | I(0) |
| DEBTFIN | -6.535775** | -2.634731 | -1.951000 | -1.610907 | I(1) |
| $DFDI_{t-1}$ | -8.437104** | -2.634731 | -1.951000 | -1.610907 | I(1) |
| DINT | -5.823970** | -2.636901 | -1.951332 | -1.610747 | I(1) |
| DTRADE | -9.746736** | -2.634731 | -1.951000 | -1.610907 | I(1) |

** means stationary at 1%, *** means stationary at 5%, **** means stationary at 10% and D means first difference

Trade, interest rates, lagged FDI and debt financing were all differenced at level one and also stationary at 1% level of significance. Credit to private sector was not differenced, hence stationary and was stationary at 5% level of significance. Domestic savings was differenced once to become stationary at 5% level of significance. GDP was differenced once and was stationary at 5% level of significance and private investment was stationary at 1% level of significance.

4.3 Multicollinearity Test

The table 4.3 below summarises the multicollinearity test results

| | DPI | CP | DDS | DFDI(-1) | DGDP_000_ | DINT | DNDS__1_ | DTRADE |
|-----------|-----------|-----------|-----------|-----------|-----------|----------|----------|----------|
| DPI | 1.000000 | | | | | | | |
| CP | 0.307537 | 1.000000 | | | | | | |
| DDS | 0.109376 | -0.102964 | 1.000000 | | | | | |
| DFDI(-1) | -0.573332 | -0.652695 | 0.201071 | 1.000000 | | | | |
| DGDP_000_ | -0.081882 | -0.012824 | 0.396854 | 0.089962 | 1.000000 | | | |
| DINT | -0.350732 | -0.064692 | -0.167704 | -0.183132 | -0.306046 | 1.000000 | | |
| DNDS__1_ | -0.138273 | -0.383317 | 0.203844 | 0.214294 | -0.146619 | 0.463275 | 1.000000 | |
| DTRADE | -0.104118 | -0.113939 | 0.037909 | 0.036349 | -0.191374 | 0.104439 | 0.202570 | 1.000000 |

The absolute value of all correlation coefficients is less than 0.8 which means there is no perfect multicollinearity.

4.4 Results of the OLS Model

The table 4.4 below presents the regression results

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|-----------|-------------|------------|-------------|--------|
| C | 0.636888 | 0.584074 | 1.090423 | 0.2873 |
| CP | -1.02E-06 | 6.46E-07 | -1.582688 | 0.1278 |
| DDS | 0.173929 | 0.097192 | 1.789533 | 0.0873 |
| DFDI(-1) | -2.785125 | 0.477115 | -5.837433 | 0.0000 |
| DGDP_000_ | -2.58E-06 | 1.14E-06 | -2.263840 | 0.0338 |
| DINT | -0.068488 | 0.014495 | -4.724965 | 0.0001 |
| DNDS__1_ | 0.109955 | 0.078301 | 1.404263 | 0.1742 |
| DTRADE | -0.053830 | 0.045936 | -1.171832 | 0.2538 |

| | | | |
|--------------------|-----------|-----------------------|----------|
| R-squared | 0.720846 | Mean dependent var | 0.395000 |
| Adjusted R-squared | 0.632025 | S.D. dependent var | 3.930688 |
| S.E. of regression | 2.384394 | Akaike info criterion | 4.798945 |
| Sum squared resid | 125.0774 | Schwarz criterion | 5.172598 |
| Log likelihood | -63.98418 | Hannan-Quinn criter. | 4.918480 |
| F-statistic | 8.115657 | Durbin-Watson stat | 1.607398 |
| Prob(F-statistic) | 0.000067 | | |

4.5 Diagnostic Tests

The coefficient of determination (R-squared) is 0.720846 which means that 72.0846% variation in private investment is explained by the variables in the model. Since more than half of the variations in private investment are explained by variables in the model we may conclude that the model is a good fit model. Also the F-probability is less than 0.01 which means that the entire model is significant.

Table 4.5 Diagnostic test results

| | p-value | Decision at 0.05 |
|------------------------------|---------|---------------------|
| Heteroscedasticity (ARCH LM) | 0.5844 | Homoscedastic |
| Autocorrelation (LM serial) | 0.1831 | No autocorrelation |
| Model specification (RESET) | 0.0976 | Correctly specified |

Results in the table above show that the model is correctly specified and does not suffer from problems caused by autocorrelation and heteroscedasticity.

4.6 Interpretation of Results

The explanatory variable that was of much interest in this model was the interest rate which was found to be significant in explaining private investment behaviour in Zimbabwe. Other variables seen to be significant were FDI and GDP.

The Real interest rate was significant at 1% level of significance and it also had an expected negative sign of (-0.068488). This means for every one unit increase in the real interest rate, private investment decreased by 0.068488. These results supports what was assumed found by Bayai and Nyangara (2013).

Lagged FDI's coefficient was (-2.785125) and it was significant at 1%. This value was the expected negative impact in the presence of the crowding out effect. The negative relationship indicates that for every one unit increase in FDI, private investment will decrease by 2.7851. These results are in accordance with the findings obtained by Nyoni (2013), that crowd out effects imposed by foreign direct investment impede private investment.

GDP had an unexpected positive coefficient (-2.58E-06), though significant at 5%. The results implied that for every unit increase in GDP, private investment decreased by 2.58 units. This is contrary to what Duncan (1999) found. He found that in line with the accelerator theory GDP contributes positively to the economy of Zimbabwe, as a rapidly growing economy is expected

to boost expectations and hence more investment. Trade terms, domestic savings, credit to the private sector and debt financing were seen to be insignificant in the model.

5.0 CONCLUSION AND POLICY RECOMMENDATIONS

5.1 CONCLUSION

The prime objective of this study was to determine the impact of interest rates on private investment from 1980-2015, using time series data. The OLS methodology was applied. The results showed that interest rates were significant in determining the level of private investment, to add on to that they had a negative co-efficient. Thus the hypothesis that interest rates have a negative impact on private investment may be accepted. Other variables that were found to influence private investment over the period were FDI and GDP. In the study there was evidence that interest rates from 1980 have had a positive value and are positively skewed thus influencing private investment positively; hence an upward trend of private investment.

5.2 POLICY RECOMMENDATIONS

The research resulted in interest rates having a negative impact on private investment. This can be due to the fact that higher interest rates discourage investors from undertaking low yielding investments which are rendered not profitable at the existing higher interest rate. McKinnon (1973) further supports this point by saying that focus will be on high yielding investments thus an increase in efficiency of aggregate investments. Government is advised to set interest rate price ceiling and put in place measures to encourage confidence in the local banking and financial sector, if so there can be growth in money supply through savings. With more money circulating in the economy the interest rate will fall.

Another variable that was seen to be significant in explaining private investment was FDI; it had a negative impact on private investment. To enable FDI to have positive effects there should be transparent and consistent policies which continuously attract FDI and make foreign players obliged to better the capital accumulation of a host nation. Investment laws must be flexible and encourage partnership between foreign and local private investors to reduce the crowding out effect, this is as far as the Indigenisation policy is concerned.

If GDP is high due to an expansionary fiscal policy, the local private sector are crowded out on the local open market operations, so for GDP to have a positive impact on private investment, the government should have a contractionary fiscal policy which does not allow the rising of the interest rates when the government is borrowing.

REFERENCES

- [1] Acosta, P. and Loza, A (2005). Short run and long run determinants of private investment in Argentina. *Journal of Applied Economics*: Vol VIII, No.2 pp.389-406
- [2] Agosin, M. R. and R. Machado (2005): "Foreign Investment in Developing Countries: Does it Crowd in Domestic Investment?" *Oxford Development Studies*, 33 (2), pp. 149-162.
- [3] Ajide, K B and Lawson, O.(2012). Modelling the long run determinants of domestic private investment in Nigeria. *Asian Social Science*: Vol.8, No.13
- [4] Apkalu, W. (2002) "Modelling Investment in Ghana: An Empirical Time Series Econometrics Investigation". *The Oguaa Journal of Social Sciences*, Vol.4

- [5] Asante, Y. (2000). Determinants of Private Investment Behaviour. AERC Research Paper No.100, Nairobi: AERC.
- [6] Bayai, I and Nyangara, D. (2013).An analysis of determinants of private investment in Zimbabwe for the period 2009-2011 ,*International Journal of Economics and Management Sciences*:Vol.2, No6, pp.11-42.
- [7] Blejer M. and Khan M. (1984), Government policy and private investment in developing countries. *IMF Staff Papers*, vol 31, July, pg 379-403.
- [8] Frimpong, J.M and Marbuah, G (2010) .The determinants of private sector investment in Ghana: An ARDL Approach. *European Journal of Social Sciences*, Vol.15, No.2 pp250-261
- [9] Gujarati, D. (2004) Basic econometrics fourth edition ,McGraw-Hill companies
- [10] Greene J. and Villanueva D. (1991), Private investment in developing countries: an empirical Analysis, *IMF Staff Papers*, vol 38, May, pg 33-58.
- [11] Jecheche, P. (2011). Investment and growth relationship: an empirical assessment in Zimbabwe. *Journal of International Business and Cultural Studies*, pp.1-11.
- [12] Jorgenson, D.(1967) “The Theory of Investment Behaviour”, Determinants of Investment Behaviour ,129-188.NBER
- [13] Khan, S and Khan, M.A (2007) .What Determines Private Investment? The case of Pakistan .PIDFE Working Papers, 36.
- [14] King’wara, R (2014).The impact of domestic debt on private investment in Kenya .*Developing country Studies*:Vol.4 ,No.22,pp.88-726
- [15] Lesotlho, P. (2006). An Investigation of the Determinants of Private Investment: The Case of
- [16] Botswana. *Policy Research Working Paper No. 2123*
- [17] Malumisa, S .(2014) .Comparative analysis of the determinants and behaviour of investment demand between South Africa and Zimbabwe .*Journal of Economics and Behavioural Studies*: Vol 5,No. 6,pp. 385-397
- [18] McKinnon, R, (19783) .Money and Capital in Economic Development. The Brookings Institution, Washington.
- [19] Misati, Roseline Nyakerario (2010), “The Role of the Informal Sector in Investment in Sub-Saharan Africa”, *International Entrepreneurship and Management Journal* Volume 6, Number 2, pp 221-23
- [20] Nainggolan .P (2015) ,An analysis of the determinants of private investment in North Simatra Province ,Indonesia ,*Journal of Management and research* 2015, Vol. 7, No. 1
- [21] Ndikumana L. (2000), “Financial determinants of domestic investment in Sub-Saharan Africa: Evidence from Panel data”, *World Development*, vol 28, June, pg 381-400
- [22] Outtara, B (2004) .Modelling the Long run Determinants of Private Investment in Senegal. Center for Research in Economic Development and International Trade, University of Nottingham. *Credit Research Paper No.04/05*.
- [23] Parker, D. (1994): Privatization and the International Business Environment in Egal, the Challenge of International Business, London, Kegan, Page Ltd.
- [24] Wai T. U. and Wong C. H (1982), Determinants of Private Investment in Developing Countries. *Journal of Development Studies*, Vol 19, October, pg 19-36.

- [25] Prescott .D .M 1987 ,macroeconomics: Theory and Policy in Canada, Addison-Wesley Publishing Company, Don Mills, Ontario, 1987, 559-587
- [26] World Bank (2008), *African Development Indicators CD-ROM*, Washington D.C.: Republic of Zimbabwe (1981) *Growth with Equity. An Economic Policy Statement*
- [27] Reserve Bank of Zimbabwe (RBZ) (various years) *Quarterly Economic and Statistical Review*.
- [28] Seruvatu, E., & Jayaraman, T.K. (2001). Determinants of Private Investment in Fiji. *Working Paper 2001/02*.
- [29] Shafik N. (1992), “Modelling Private Investment in Egypt”, *Journal of Development Economics*, Vol.39,June, pg 263-27
- [30] Tobin, J.(1969), “A General Equilibrium Approach to Monetary Theory”, *Journal of Money, Credit and Banking*.

