

Macroeconomic Determinants of Economic Growth in Zimbabwe

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Abstract

The study used time series data for Zimbabwe (1975-2012) to: (i) empirically determine the link between economic growth and four macroeconomic variables (Foreign Direct Investment, volume of trade, Inflation and capital accumulation) (ii) analyze the impact of these macroeconomic variables on economic growth (iii) test if innovations in macroeconomic variables influence on the rate of economic growth and vice versa and (iv) establish the major drivers of economic growth. Using the Vector error correction approach findings showed that inflation and openness had a significant negative and positive impact on economic growth respectively. Inflation converged to long run equilibrium with growth and causal relationships were found among other variables in the short term. The response of economic growth to shocks in gross fixed capital formation, trade openness and foreign direct investment was effective even beyond the 30 year period while shocks from inflation were ineffective. The major driver of growth was its previous performance and the rate of inflation in the long term. Overall our findings are consistent with theory. Policy makers should focus on increasing the degree of openness, incentivizing export oriented firms and maintaining low levels of inflation to enhance growth.

Keywords: Economic growth, Trade Openness, Inflation, Gross fixed capital formation, Vector error correction, Vector Autoregression, Impulse response function, Forecast error variance decomposition.

1. Introduction and Background

The debate on the key drivers of economic growth had been ongoing and it is still far from over. Research on economic growth had been undertaken in both theoretical and applied work. The main aim of macroeconomic policy is to have stable prices (low inflation), low levels of debt (whether foreign or domestic), free market economy, low levels of unemployment, having an economy based on a four sector model (open economy), and having a balanced budget. This in itself shows that to some extent these factors are somehow interlinked and hence there is need to take a closer look on their relationship. The determinants of economic growth had been analyzed by various researchers producing varying results. The neoclassical economists have been focusing on the growth model by Solow which assigns importance to investment and the theory of endogenous growth which assigns importance on human capital and innovation. There has been no agreement on these theories on the determinants of growth. Using the Bayesian model averaging and cross country approach Benito (2007) showed that the most robust growth determinants were investment price, air distance between big cities and political rights. However studies on growth have suffered from model uncertainty as theory fails to give a proper empirical model. The determinants of economic growth were found to be rather country specific, they are also dependent on regional factors affecting exports and domestic investments, Ledyeva and Linden (2008). Benito (2007) also showed that other determinants of growth include geographical dummies, measures of openness and civil liberties. The GDP per capita, a measure economic growth, for Sub Saharan Africa (SSA) is very low compared to other developing nations as such countries in SSA are considered to be the poorest. The average GDP per capita was USD130 in 1960 and by the end of 2012 is was standing at USD1629.25, World Bank Indicators (2014). South Africa's per capita GDP, in current prices, stood at USD7351,76, being one of the largest economies with Nigeria whose per capita GDP stood at USD2722.30. The real per capita GDP fell during period from 1960 to 2012.

Another determinant for growth is trade openness which explains the degree to which a country conducts business with the rest of the world. It is defined in literature as the ratio of the total value of a country's imports and exports to its level of gross domestic product (GDP) though this measure had been criticized of not being a perfect measure. Tan (2012) mentions factors like trade barriers and preferential trade agreements which affect the level of trade. Theory explains the relationship between growth and openness as being positive or negative which is dependent on several factors. When an economy opens up to international trade there is an upsurge in the varieties of products availed to consumers which increases welfare, technology flows, money flows into the economy and competition rises which improves efficiency, Alvarez and Lopez (2008). The efforts to liberalize international trade under the World Trade Organisation (WTO) has contributed to improved market access and increased growth in international current accounts transactions, Billmeier and Nannicini (2007). Most African countries are fostering for the advancement of international trade partnerships being supported by the state and regional blocs. Trade openness had been seen as one of the sources of economic growth in recent years as regional blocs are expediting for the reduction in trade barriers. This has seen a positive response from countries as they work towards establishing trading blocs and the removal of barriers among member states but

maintaining common barriers against non members, Dava (2012). Advocates of protectionist policies argue that trade openness divert the benefits from developing to developed nations. This, to a certain extent, makes African economies in particular to be skeptical on the reduction of trade barriers. African economies have, to a greater extent, suffered from dumping practices from developed nations, Mwaba (2000), and Zimbabwe is no exception. Causality can move from trade openness to growth which suggests that the neo classical approach which advocates for export led growth is valid and if causality flows from growth to openness then productivity becomes the driver of low production costs resulting in more exports, Zeren and Ari (2013).

Another important determinant for growth had been foreign direct investment (FDI) in recent years which had been on the rise. The opening up of economies had seen a rise in FDI flows across nations. This has become a source of external funding especially for developing countries. Benito (2007) referred to FDI as a cross border investment being initiated by a resident of one country and then released into another country. Four types of motives for FDI are natural resource, market, efficiency and strategic asset seeking. While FDI is a source of financial resources which are vital for development it can also be detrimental to the economy as it crowds out domestic investment and wrong technology can be brought by foreign investment.

Background to the Zimbabwe situation

The new Zimbabwe government in 1980 adopted an economy which was focused on import substitution strategies. The government later shifted to the idea, by the International Monetary Fund (IMF), to adopt the economic structural adjustment policies (ESAP) beginning from 1990-1996 whose main focus was on liberalization. This saw the economy changing from a command to market based one, UNDP (2008). ESAP was successful but on the greater part it was termed a failure because most companies retrenched and others closed. During the same period in which the economy was liberalized the economic benefits were insignificant. The country later faced a period of hyperinflation, high unemployment and low value of the local currency against major trading partners. The relationship between economic growth and variables like trade liberalization, inflation, Foreign Direct Investment (FDI) and capital formation was not straight forward. There has been a decline in capacity utilization, exports and inflows of FDI have deteriorated which contradicted the expectations from our understanding of theory. Tekere (2001) looked at the impact of liberalization on livelihoods of poor and vulnerable groups, human development and economic growth in Zimbabwe. The conclusion was that trade liberalization lead to increased hardship and deterioration of human development where it is undertaken for the sake of it and being driven by market forces but when taken strategically it would be a source of stimulating growth. According to Bautista (1998) trade policy reforms alone increase aggregate disposable income but the overall equity impact is unfavorable. The outcome is different with complementary policies like changes in government expenditure and tax policies. Davies and Rattso (1997) showed that the GDP per capita levels in 1997 were below the pre liberalization levels and income distribution worsened due to inflationary effects and non growing levels of output and employment. The opening up of the market contributed to deindustrialization and contraction of output in the short run, Rattso and Torvik (1998).

Other note worthy considerations were that at the country's independence in 1980 the rate of inflation was between 5% and 6% per annum but it began to soar in the early 1990s in which the year-end rate reached 56.9% by end of 1999. By the end of 2006 the annual inflation rate was at 1282.11% and it continued to soar until it reached the 231 million percentage mark year on year by end of 2008. The authorities responded by instituting price controls mainly on food stuffs which gave birth to food shortages and sudden appearance of queues. Currently the inflation rate has gone down and it remains at single digit level, RBZ statistics (2013). Economic growth was at a rate of 10% immediately after independence but it had slowed down in recent years. The rate of growth of GDP remained positive between 1980 and 1997 on the greater part with many fluctuations being registered except in few instances in which the growth rate was negative. Beyond the year 2000 the rate of growth of GDP plummeted and remained negative until the end of 2008 after which a positive growth was registered with the introduction of multicurrency system in 2009. Overall the rate of growth of GDP declined during the period 1980-2008, RBZ statistics (2013). Gwenhamo (2009) showed that FDI was explained by property rights in Zimbabwe. GDP, capital intensity, the external debt to GDP ratio and political stability were important factors explaining FDI. Zimbabwe has adopted trade liberalization policies following views in literature which show that it results in positive economic growth, (Yanikkaya (2003), Billmeier and Nannicini (2007), Lopez (2005) and Karras (2003)).

Previous studies point to the fact that the state of the economy determines the relationship among variables. For example high growth and low inflation is possible where output grow at the same level with demand. When the economy reaches full employment any output growth becomes inflationary which increases uncertainty and reduces capital accumulation. This shows that all the variables in this paper are interconnected. In view of the previous work on Zimbabwe and other economies it is worth taking a look at the drivers of economic growth and the relationship between growth and variables like FDI, inflation, capital accumulation and trade openness. The evidence on the relationship between trade openness and economic growth is rather country

specific and can be understood by considering country specific variables. The relationship among the variables in Zimbabwe needs to be established during the long and short term which will provide guidance to policy makers. This means the connection between the variables and their predictive power upon each other needs to be checked. This study is therefore unique in the Zimbabwean scenario as it combines all the key variables that affect growth in the same model. To this end there is a need to empirically determine the dynamic relationship between the variables by answering the following questions in the Zimbabwean context:

- Is there a link between growth in per capita GDP with FDI, volume of trade, Inflation and capital accumulation?
- What is the impact of FDI, openness, Inflation and capital accumulation on economic growth?
- Do changes in macroeconomic variables have an influence on the rate of growth of per capita GDP?
- What are the major drivers of growth in GDP per capita in the economy?

In an effort to provide answers to these questions this study employed different techniques which include: Johansen cointegration and Granger causality tests, Vector Error correction model, Impulse response function and Forecast error variance decomposition (FEVD) analysis. The remaining sections are organized as follows: section 2 reviews related literature, section 3 presents data and methodological issues, section 4 discusses the findings and the last section concludes the discussion and gives policy directions.

2. Literature Review

2.1: Theoretical review

The section explains the connection between the variables used in this research as was revealed in theory. International trade had been found to play an important role in driving economic development according to economists like Adam Smith and David Ricardo. The Ricardian model supported the idea of countries benefiting from comparative advantage in the absence of trade barriers. This is made possible as countries face different opportunity costs in their production choices, Ahmed and Sattar (2004). The short term positive impact of Trade openness on growth was supported by Ferrantino et al (1997) who also made the assertion that in the long term such a relationship ceases to exist. Trade had been found to drive the economy towards growth using different channels according to the endogenous growth theory by Lucas (1988). For example the opening up of a country's economy attracts the flow of capital which is vital for fulfilling investment needs which increases the production potential of the economy. This has spillover effects in the economy as it affects industry's capacity to absorb the unemployed and hence increase income generating capacity. As the economy opens up the expectation is that resources are shared with other countries for example human capital moves across boundaries. The generation of capital by a country in the long term creates a platform for long term growth, (Ferrantino (1997) and Chudhary and Muhammad (2010)). The same ideas are supported by the neoclassical theory which shows a maximization of consumers' welfare due to increased choices. The neo-classical model as developed by economists like Solow and Swan in 1956 shows the importance physical capital accumulation and that each economy follows a steady state growth path as a result of technological progress. Barriers to trade lead to inefficiency as they protect countries from competition and consumers suffer in the end but in the presence of competition in the globalised economy consumers benefit through increased output and reduced prices. The theories by Ricardo and neoclassical economists fail to show the direct connection between trade openness and growth, FDI and capital accumulation. The endogenous growth model supports the idea that trade has a positive effect on economic growth but it also shows that developed nations benefit at the expense of poor countries whenever liberalization exists. In an effort to further explain the relationship between these variables the study proceeds to review different studies focusing on this dynamic connection.

2.2: Empirical Review

This section reviews the relationship between economic growth and each of the four variables used in this paper. The aim is take a closer look of how they are related as outlined in literature and the results from other economies. First we review the relationship between growth and openness, followed by growth's relationship with FDI and capital accumulation and lastly the impact of inflation on growth.

2.2.1: Economic Growth and Trade Openness

The relationship between economic growth and trade openness has been reviewed by various authors and it proved to be inconclusive until now. A study by Manni and Afzal (2012) assessed how the economy in Bangladesh was affected by trade liberalization. Employing ordinary least squares technique their findings showed that liberalization increased the growth in GDP. The policy on liberalization resulted in increased exports and subsequent higher levels of economic growth. The relationship between the variables was found to be significant and positive. The same sign on the relationship was found by Lopez (2005) who concluded that openness to trade results in increased productivity and economic growth for developing countries. Causality tests showed that the connection runs one way from trade openness to growth. The same results were found by Tan (2012) who employed cross country data and found that other factors important in explaining growth were

expenditure on education, technological progress and inflation. Ali et al (2013) examined the impact of trade liberalization on Pakistan's economic growth using openness as a proxy for liberalization and other explanatory variables included foreign direct investment, gross capital formation and inflation. Real GDP was used as a dependent variable and their results confirmed an earlier finding that trade liberalization had a significant and positive impact on economic growth. The same findings supporting a strong positive relationship was confirmed by Dava (2012) using a sample for SADC countries. Mwaba (2000) used a different approach and found that exports and growth increased as a result of removing restrictions on exports and imports. Less regulatory countries were found to benefit more from international trade liberalization than those with more regulations, Biwott et al (2013). Openness has a significant and robust role to play on economic growth. Zeren and Ari (2013) found bidirectional causality between growth and openness for G7 countries and that there was a positive relationship between the two variables using the same sample data, thus an increase in openness increases growth and vice versa. Yeboah et al (2012) used a cross country approach and Cobb-Douglas production function to estimate the impact of different variables on growth. Still their results confirm findings in literature that trade openness and growth have a positive relationship. The other studies showing a positive impact of openness of trade which are worthy taking a closer look include: (Billmeier and Nannicini (2007); Andersen and Babula (2008); Marelli and Signorelli (2009); Asiedu (2013); Karras (2003); Mercan et al (2013)).

The approach by Lutz and Ndikumana (2007) was different as they concluded that the cause of the limited effect of trade openness was the weaknesses of institutions. Their study controlled for export diversification. Using the Arellano Bond GMM estimation their study showed that the growth effects on trade openness are enhanced by institutions. The trade led engine of growth is harnessed by the institutions. Their findings suggest that a country should attain a certain level of openness for it to benefit from growth-enhancing joint effects of openness and institutions. Usually the quality of institutions in African economies is still questionable. Panel cointegration tests and panel error correction models together with Generalised Methods of moments (GMM) were used by Gries and Redlin (2010) to examine the dynamics of the relationship between GDP growth and trade openness. Findings confirmed a long run relationship between the variables as well as a short run adjustment to equilibrium. In the long term causality was found to be bidirectional moving from trade openness to growth and vice versa while a negative adjustment was found in the short term. The effects of trade on growth differed between low and high income countries. The approach by Wong (2006) focused on the impact of openness on manufacturing sectors. Results showed that openness to trade increased productivity of manufacturing firms in export oriented industries.

Studies by other scholars contradict the findings above by showing a diverse nature of the relationship between the variables. Simorangkir (2006) found that trade and financial openness had a negative effect on economic growth. Openness explained the fluctuations in growth. Impulse Response Function (IRF) showed that openness lead to less output in both short and long run. This result is supported by a similar study which was done by Bajona et al (2010) who found that there was no relationship between trade liberalization and economic growth when using a static model. According to their analysis the relationship is negative if ever it exists. Using dynamic model trade openness does not cause an increase in real GDP. Any increase in real GDP due to openness does not come from trade mechanisms but through mechanisms outside of those analyzed in standard models. Trade openness was also found to have a negative and significant effect on variability in output, Karras (2006). The effect of trade openness on growth volatility is negative in countries with diversified export baskets. In their study Haddad et al (2012) controlled for endogeneity using GMM procedure and they controlled for reverse causality in the openness variable by including predicted trade flows as an exogenous variable. Product diversification was found to reduce the supposed effect of openness on growth. According to Cavallo (2007) openness is not a destabilizing force where countries are exposed to capital flows that are volatile. Their assertion is that trade openness' effect on output volatility is rather stabilizing. The study dismisses the evidence in literature that exposure to trade raises output volatility through the terms of trade channel due to the quantitatively larger stabilizing effect which comes through the financial channel. Their result holds in countries that are more exposed to capital flows. In countries with less exposure to capital flows the contrary is true. Their study employed Ordinary least squares regression and variables used include output volatility (standard deviation of per capita GDP growth rate), trade openness and volatility of terms of trade shock. This result is supported by Down (2007) who showed that the level of domestic economic volatility in developing countries is driven by their size as well as the depth of their markets. Thus international trade integration eased domestic economic volatility. The effect of capital inflow, trade openness and economic growth was also examined by Muibi (2012) using Autoregressive distributed lag bound testing model. The effect of trade openness and capital inflows on growth was found to be significant but this would depend on the method used to measure the two dependent variables. Their study showed that trade liberalization policies increase the effectiveness of capital inflow and jointly promote increased economic growth. Trade openness, growth and globalization were found to be tied together in the long term using Vector Autoregression (VAR). In the short term openness had a positive effect on growth while globalization had a negative effect. Both variables were found not contributing to the long run

growth of the country, Aka (2006). According to Yanikkaya (2002) the relationship between trade liberalization and growth is not straight forward. In their study trade barriers were found to have a positive and significant relationship with growth in developing nations. This study contains similar sentiments to those by Ulasan (2008) which empirically determined the relationship between growth and trade openness using a cross country approach. Their model uncertainty problem was controlled by employing model averaging technique. This study, just like Yanikkaya (2002), showed that openness did not have a direct relationship with growth over the long term as was professed by other studies. Growth in the long term is, however, explained by economic institutions and macroeconomic uncertainties which are related to inflation and government consumption. Growth is guaranteed where there are better institutions and stable demand management policies in the country just like views by Lutz and Ndikumana (2007).

2.2.2: Economic growth and inflation

In recent years concern has been raised over the issue of price stability. For example in Zimbabwe inflation has been termed the number one enemy until the adoption of multicurrency in 2009. The relationship between inflation and growth has been investigated by different scholars and results had been mixed. According to Barro (2013) the adverse effects of inflation on growth in the short term are small but they are severe on living standards. Barro (1995) asserts that an increase in inflation by 10% per year is estimated to lower the level of real GDP after 30 years by 4-7%. Inflation has a negative impact on growth and there is no long run relationship with growth, Kasidi and Mwakademela (2013). Bruno and Easterly (1998) also found that growth fall sharply during periods of high inflation but it does promote growth when it is at lower levels. This means that high inflation does not promote growth. It has a negative effect on growth after reaching a certain threshold level, Ayyoub et al (2011) but Pollin and Zhu (2005) contradicts with previous studies as they argue that there is a positive relationship between inflation and growth using cross country data for OECD. The effects in the short term are negative but in the long term inflation does not impact on real output, Faria and Carneiro (2001). When the rate of inflation exceeds 10% level it has a negative effect on economic growth for developing economies but no effect on growth for developed nations, Jha and Dang (2011).

2.2.3: Economic Growth, FDI and Capital Accumulation

The effect of FDI on growth can be both positive, (Hermes and Lensink (2003) and Campos and Kinoshita (2002)) and negative, for example as FDI flows into the country new technology is introduced which is key for growth but on the other hand FDI crowds out domestic investment. According to Benito (2007) the SSA region has failed to attract adequate investment from outside sources. The study shows that the impact of FDI on growth was mixed for SSA. Openness to FDI and technology helped to improve productivity growth. Work by Wang and Yao (2001) showed that human capital accumulation was significant in China and contributed to rapid economic growth. FDI is an important source of the transfer of technology, and it contributes more to growth than domestic investment subject to the presence of a minimum level of the capital, Borensztein et al (1998). This contradicts the assertion that FDI crowds out domestic investment. The views by Carkovic and Livine (2002) are that the exogenous component of FDI does not exert a robust, independent influence on growth. Physical capital formation, vibrant export sector and human capital formation significantly contribute to growth while government expenditure, nominal discount rate and foreign aid significantly and negatively affect growth, Ndambiri et al (2012). This is also supported by Tiwari and Mutascu (2011) who found that FDI and exports enhance growth in the Asian economies. Export and FDI led growth is possible in the short and long term respectively. Capital accumulation has a positive impact on growth which is consistent with the neoclassical theory, Holtz-Eakin (1993).

2.2.4: Concluding remarks

The findings in literature are mixed and they fail to give conclusive evidence on the relationship between trade openness and growth. Both a positive and a negative relationship had been revealed in literature and in some cases no relationship was found. A review on some authors showed that the relationship was not straight forward. It is not only the relationship that matters but there are other factors that contribute to the strength of this relationship for example the different institutions in different countries to support the drive towards a liberalized economy. Monetary and fiscal policies are also important on the outcome of this relationship. The relationship exists in the short run and it was absent in the long term while in some economies the opposite was true. The relationship between growth and factors like FDI, capital accumulation and inflation is still not conclusive and this warrants a further look at an economy like Zimbabwe with special emphasis on understanding pertinent issues. In the Zimbabwean case there is a need to understand if at all a relationship exists between growth in per capita GDP and macroeconomic variables like trade openness, inflation, capital accumulation and FDI. This relationship is important for Zimbabwe considering the fact the rate of growth has been very low over the years; the drivers of growth need to be known by policy makers; the available literature fails to provide direction for Zimbabwe and the dynamic nature of the relationship is not clear. The next section looks at the methodological issues employed in this research.

3. Data and Methodology

3.1. Data

The study aims to establish the key determinants of growth for the Zimbabwean economy using annual time series data for the period 1975 – 2012. The data set used in this paper was retrieved on line from the World Bank indicators (2014) and they are denoted in current United States dollars. The variables used include per capita Gross domestic product (pGDP) as a dependent variable being a proxy for economic growth and independent variables include: Trade openness (TO) as measured by the sum of Export and Imports being divided by GDP. Gross fixed capital formation (GFCF) as a percentage for GDP, Foreign Direct Investment (FDI) as a % of GDP which is a measure of foreign capital net inflows from the country's Balance of Payments (BoP) and Inflation (IF) as an annual percentage. Our model is represented as follows:

$$pGDP = f(TO, GFCF, FDI, IF) \dots\dots\dots(1)$$

The specific econometric model appears as follows:

$$pGDP_t = \beta_0 + \beta_1 TO_t + \beta_2 GFCF_t + \beta_3 FDI_t + \beta_4 IF_t + \varepsilon_t \dots\dots\dots(2)$$

Where:

β_0 is a constant, and $\beta_1 \dots\dots\dots \beta_4$ are the sensitivity of each macroeconomic variable to economic growth and ε_t is the error correction term.

In an attempt to establish the relationship between the variables the study employs Vector error correction model (VECM) which had been used in literature to test the short and long run dynamics of variables. We performed all the preliminary tests for time series data: test for stationarity using the modified dickey fuller test, selection of optimal lag length using the Akaike Information criterion (AIC), Hannan-Quinn Information Criterion (HQIC) method and Schwarz Bayesian information criterion (SBIC), test for cointegration using the Johansen cointegration tests and lastly our model was fitted using Johansen normalization technique. We went on further to conduct causality tests so as to determine the direction of causality among the variables and we performed impulse response function (IRF) and Forecast error variance decomposition (FEVD) tests to understand the main drivers of growth during the review period.

In testing for the existence of unit root for each variable Modified Dickey fuller (DG-GLS) was used which provides better results than Augmented Dickey fuller tests. The regression that was used is of the following form:

$$\Delta Y_t = \alpha + \beta T + \mu Y_{t-1} + \sum_{i=1}^k \gamma_i \Delta Y_{t-i} + e_t \dots\dots\dots 3$$

Where:

Y_{t-i} represents the first differences with k lags and e_t is the variable that adjusts for autocorrelation. The null and alternative hypothesis for the existence of unit root in variable Y_t were stated as follows:

$$H_0: \mu = 0, H_1: \mu < 0,$$

The null hypothesis that Y_t is non-stationary time series is rejected if the value(s) of μ are less than the MacKinnon critical values. The results are presented and discussed in section 4.

We also checked the predictive power of variables so as to understand if any of the variables was important in explaining the short run movements in other variables. The VAR model used is of the following form:

$$\Delta X_t = \Phi_i + \sum \alpha_i \Delta X_{t-i} + \sum \beta_j \Delta Y_{t-j} + e_{1t} \dots\dots\dots 4$$

$$\Delta Y_t = \gamma_i + \sum \omega \Delta Y_{t-1} + \sum v_j \Delta X_{t-j} + e_{2t} \dots\dots\dots 5$$

Where ΔX_t and ΔY_t are series being investigated in their first difference, constants are represented by Φ_i and γ_i , white noise error terms are represented by e_{it} . The number of lags used in our model is four and time is represented by t. If the coefficients β_j and v_j are zero then there is no causality between the two variables. Bi-directional causality exists if the both coefficients are significant. If only β_j is significant then there is unidirectional causality moving from Y to X and it moves from X to Y where only v_j is significant.

4. Empirical results and Discussion

The null hypothesis of unit root was rejected using the modified Dickey Fuller test. Results are in the appendix in table 1. All the variables were stationary at level form which suggests that they can be used in building a model which gives useful results. The optimal lag at different levels of significance was one (1) for all variables. Results in table 2 of the appendix showed that there are three optimal lags which were chosen using AIC, HQIC and SBIC as indicated by an asterisk. We present, using Johansen cointegrating, results on table 3 which shows that there are 2 cointegrating equations at 1% level of significance, as chosen by the Trace statistics. This shows

that our variables converge to long run equilibrium. This can be compared with Tan (2012) and Shaheen et al (2013). What follows now is our discussion of results using VECM model.

4.1: Results using VECM

Findings in table 4 and 5 shows that per capita GDP converges to long run equilibrium with inflation because their signs and the adjustment parameters are correct. This shows that our model fits very well. When inflation is below equilibrium it will be taken up towards the level of pGDP in the long term. When the level of pGDP is above equilibrium it will be pulled back to equilibrium because the adjustment parameter is negative. The model fits well because the coefficient and adjustment parameter for inflation is statistically significant. This result is inconsistent with findings by Kasidi and Mwakademela (2013). There was no adjustment towards equilibrium between per capita GDP and other variables and so their relationship was considered in the short run.

Our model showed that there was a negative and significant relationship between inflation and GDP per capita and the relationship between GDP per capita with trade openness was positive and significant which was consistent with results by Asiedu (2013), Dava (2012) and Manni and Afzal (2012). FDI (just like in Shaheen et al (2013)) and gross fixed capital formation had both a negative but insignificant effect on GDP per capita in the long term. We expected FDI to have a positive effect on growth according to theory. Our findings showed that in the Zimbabwean scenario there was a net capital outflow during the review period but the impact was not significant. The negative impact of FDI can be explained by the fact that the level of technology in the country was not advanced and the economy was unstable. The absence of a required threshold of human capital also contributed to the negative effect. FDI can have a positive effect only where there is an effective legal system and property rights which were absent in Zimbabwe during the greater part of the period under review. The human capital upon which FDI is dependent to have a positive effect on growth was flowing out during the period after 1995. This could be an explanation of the weak impact of FDI on capital growth. To a certain extent results on FDI contradict those by Asiedu (2013) in terms of significance though the signs were the same. Findings showed that a 1% rise in inflation would lead to a fall in GDP per capita of less than 1% while a 1% rise in the level of trade would result in 11.74% increase in the rate of growth. Inflation, just like in Andres and Hernando (1999), can hinder the progress of the country since it retards growth of per capita GDP. Our results showed that economic growth in Zimbabwe can increase as a result of diversifying and opening up the economy to international trade which is in line with views by other researchers on the role of trade on economic growth (Yanikkaya (2003), Shaheen et al (2013)). Our findings showed that a rise in the stock of capital would have a negative but insignificant effect on growth and this disagrees with our expectation and findings in other previous work which showed a positive relationship, (Asiedu 2013). Theoretically gross capital formation affects economic growth both directly and indirectly by increasing physical capital in the economy and promoting technology respectively, Levine and Renelt (1992). Our results suggests that the type on capital is important and the nature of technology. For example public investment in state owned businesses negatively affects growth while public investments in infrastructure have positive effect on growth. The productivity of capital depends on the level at which public investment is complementary to private investment, Knight et al (1993). This suggests that during the review period there was less investment on critical infrastructure like transport and communication resulting in a negative relationship between capital formation and growth. Our model had a value of 50.63% for R^2 which shows a low predictive power of the determinants during the review period. The predictive power of the model by Asiedu (2013) was 86.17% which was higher than in our case. This suggests that the growth in per capita GDP was better explained by factors outside our model.

Results on the short run interactions showed that there was bidirectional causality between inflation and per capita GDP, between inflation and gross fixed capital formation, Inflation and trade openness and between trade openness and FDI. Unidirectional causality flowed from trade openness to per capita GDP (finding is not consistent with Gries and Redlin (2010)) and from trade openness to gross fixed capital formation. This shows variables had predictive power on the levels of one another during the review period but this does not explain the amount of each variable. Our findings on the direction on causality are comparable with previous studies by Ndoricimpa (2009) and Zhang (1999) which support causal relationship among variables. Zeren and Ari (2013) found a bidirectional causal relationship between growth and openness which is contrary to our findings which had suggested unidirectional causality. Our results contradicts Gokal and Hanif (2004) who showed that causality was one way moving from GDP growth to inflation.

4.2: Results using IRF and FEVD

This section explains the extent to which macroeconomic variables explained movements in economic growth and vice versa and the extent to which innovations in one variable would explain the variances in another. All the graphs, as depicted in Figures 1, 2 and 3 in the appendix, show the percentage changes along the x-axis and period in years on the y-axis. Findings show that per capita GDP responded negatively to shocks in trade openness between the 3rd and the 6th year. Impulses from FDI resulted in slight positive response to changes in

per capita GDP. Generally the response of per capita GDP to shocks in gross fixed capital formation, trade openness and foreign direct investment was effective even beyond the 30 year period while shocks from inflation were ineffective. Shocks from per capita GDP had no effect on the macroeconomic variables. Results further showed that the major drivers of changes in per capita GDP were its own level in previous periods (80% in year one which would fall to 25% after 8 years and remain stable thereafter even beyond the 30 year period), inflation (accounting for 32% of variations in pGDP from year 5 and remained persistent but became insignificant after 20 years). The results suggested that economic growth was seriously hampered by high inflationary pressures which were experienced during the later years of our review period. Per capita GDP accounted for nearly 30% of variations in FDI which would maintain a level of 23% being persistent even beyond 30 months. Findings show that each of the macroeconomic variables were significantly driven by its own past performance for some years into the future, (see results in figure 1 and 2 in the appendix). These results in this paper can be compared with Girma (2012) and Bianchi and Civelli (2013).

5. Conclusions and Policy implications

The main focus of this research was to establish the link between Zimbabwe's growth in per capita GDP and four macroeconomic variables (FDI, volume of trade, Inflation and capital accumulation); to analyze the impact of these macroeconomic variables on economic growth; to test if innovations in macroeconomic variables influence on the rate of growth of per capita GDP and vice versa; and to establish the major drivers of economic growth. Findings revealed that inflation and per capita GDP converged to long run equilibrium; inflation was detrimental to economic growth while trade openness was very instrumental in facilitating economic growth suggesting more needs to be done on the route of trade liberalization. The impact of Gross fixed capital formation and foreign direct investment on growth were negative and insignificant. This could be as a result of more outflows of capital during the period. This suggests more should be done to increase capital inflows which benefit on the growth of per capita GDP. The response of per capita GDP to shocks in Gross fixed capital formation, foreign direct investment and trade openness was consistent for more than 30 years. Our results suggest that policy makers should focus on maintaining low inflation and opening up more to international markets in order to stimulate high growth rates in per capita GDP. Policy that promotes more trade with other countries would be beneficial to the country because the degree of openness matters. There is still a long way for the country to attract more inflows for FDI and retention of human capital. The retention of human capital increases the impact of FDI flows on GDP growth in the long term. The overall performance of FDI just like in other African countries was disappointing, Michalowski (2012). FDI flows benefit a country only when there is a minimum threshold level of human capital, Borensztein et al (1998). We recommend incentives to firms in the export market like low tax rates so as to stimulate an increase in trade inflows into the Balance of payments account. Manufacturers should focus on increasing value to their exports and aim to sell final as opposed to raw products in order to increase trade inflows. The level of inflation should be kept at a low threshold to minimize its impact on growth in the long term. If the rate of inflation remains unchecked there is potential to reverse the rate of growth of per capita GDP in the long term. Thus any increase in demand in output should be matched by an increase in output to reduce inflationary pressures in the economy.

References

- Ahmed, S and Sattar, Z. (2004). Trade liberalization, growth and poverty reduction: The case of Bangladesh.
- Aka B F (2006), Openness, globalization and economic growth: Empirical evidence from Cote D'Ivoire, international Journal of applied econometrics and quantitative studies Vol 3-2 (2006).
- Ali M M, Shaheen S, Kauser A and Bashir F B (2013), Impact of trade liberalization on economic growth in PAKISTAN, Interdisciplinary Journal of Contemporary research in business, Vol 5, No 5.
- Alvarez, R and Lopez, R. (2008). Trade liberalization and industry dynamics: A difference in difference approach. Chile: Central Bank of Chile. Working paper N 40.
- Andersen L and Babula R (2008), The link between openness and long run economic growth, Journal of international commerce and economics.
- Andres J and Hernando I (1999), Does inflation harm economic growth? Evidence from the OECD, pp 315-348, University of Chicago Press
- Asiedu M K (2013), Trade liberalization and growth: The Ghanaian experience, Journal of economics and sustainable development, Vol 4 No 5.
- Ayyoub M, Chaudhry IS and Farooq F (2011), Does inflation affect economic growth? Pakistan Journal of social sciences, Vol 31, No 1, pp 51-64.
- Bajona C, Gibson M L, Kehoe T J and Ruhl K J (2010), Trade liberalization, growth and productivity, University of Nottingham.
- Bautista R M, Lofgren H and Thomas M (1998), Does trade liberalization enhance income growth and equity in Zimbabwe? The role of complementary policies, International policy research institute, Discussion

- paper 32.
- Barro R J (1995), Inflation and growth, NBER working paper series.
- Barro R J (2013), Inflation and economic growth, *Annals of economics and finance* 14-1, 85-109 (2013).
- Benito E M (2007), Determinants of economic growth: A Bayesian panel data approach, CEMFI Working paper No 0719.
- Bianchi F and Civelli A (2013), Globalization and inflation: Structural evidence from a time varying VAR approach, Princeton University.
- Billmeier A and Nannicini T (2007), Trade openness and growth: Pursuing empirical glasnost, IMF working paper 07/156.
- Biwott P K, Moyi E D and Khainga D (2013), Trade liberalization and economic growth: the role of regulatory policies, *Journal of world economic research*, 2(3): 45-57.
- Borensztein E, De Gregory J and Lee JW (1998), How does foreign direct investment affect economic growth? *Journal of international economics* 45 (1998) 115-135.
- Bruno M and Easterly W (1998), Inflation crises and long run growth, *Journal of monetary economics* 41(1998) 3-26, Elsevier.
- Campos N F and Kinoshita Y (2002), Foreign direct investment as technology transferred: Some panel evidence from the transition economies, William Davidson Institute Working paper 438.
- Carkovic M and Livine R (2002), Does foreign direct investment accelerate economic growth? Carlson school of management, University of Minnesota.
- Cavallo E A (2007), Output volatility and openness to trade: A reassessment, Inter-American development bank, Research department.
- Chaudhry A M and Muhammad Z F (2010). "Exploring the causality relationship between trade liberalization, human capital and economic growth," *Journal of Economics and International Finance: Vol. 2(8)*, pp. 175-182.
- Dava E (2012), Trade liberalization and economic growth in the SADC: A difference in difference analysis, IESE conference paper no 8.
- Davies R and Rattso J (1999), Zimbabwe: Economic adjustment, income distribution and trade liberalization, Center for economic policy analysis.
- Down I (2007), Trade openness, country size and economic volatility: the compensation hypothesis revisited, *Business and Politics*, Vol 9, Issue 2, Article 3.
- Faria J R and Carneiro F G (2001), Does high inflation affect growth in the longrun and short run, *Journal of applied economics*, Vol IV, No 1 (May 2001), 89-105.
- Ferrantino B, Michael A, Babula R and Ingersoll D (1997). *The Dynamic Effects of Trade Liberalization: An Empirical Analysis*. Washington, DC 20436: United States International Trade Commission, Publication 3069.
- Gokal, V. and S. Hanif (2004). Relationship between Inflation and Economic Growth, Economics Department, Reserve Bank of Fiji, Suva, Fiji, Working Paper 2004/04.
- Gries T and Redlin M (2010), Trade openness and economic growth: A panel causality analysis, University of Paderborn, Germany.
- Gwenhamo F (2009), Foreign direct investment in Zimbabwe: The role of institutional factors, University of CAPETOWN, Working paper Number 144.
- Haddad M, Lim J J, Pancaro C and Saborowski C (2012), Trade openness reduces growth volatility when countries are well diversified, European central bank, WP series No 1491/November 2012.
- Hermes N and Lensink R (2003), Foreign direct investment, Financial development and economic growth, *Journal of development studies*, Vol 38, 2003.
- Holtz-Eakin D (1993), Solow and states: capital accumulation, productivity and economic growth, *National Tax Journal*, Vol 46, No 4, pp 425-39.
- Jha R and Dang T (2011), Inflation variability and the relationship between inflation and growth, ASARC working paper 2011/08.
- Karras G (2003), Trade openness and economic growth: Can we estimate the precise effect? *Applied econometrics and international development*, Vol 3-1 (2003).
- Karras G (2006), Trade openness, economic size, and macroeconomic volatility: Theory and empirical evidence, *Journal of economic intergration* 21(2); 254-272.
- Kasidi F and Mwaknemela K (2013), Impact of inflation on economic growth: A case study of Tanzania, *Asian Journal of empirical research*, 3(4) 2013: 363-380.
- Knight, M., Loyaza, N., and Villanueva, D. (1993). Testing the neoclassical theory of economic growth, *IMF Staff Papers*, 40, 512-541.
- Levine, R and Renelt, D. (1992) A sensitivity analysis of cross-country growth regressions, *American Economic Review*, 82, 942-963.

- Lopez R A (2005), Trade and growth: Reconciling the macroeconomic and microeconomic evidence, Department of economics, Indiana University.
- Lutz M B and Ndikumana L (2007), The growth of openness to trade and the role of institutions: New evidence from African countries, University of Massachusetts, WP 2007-05.
- Ledyeva S and Linden M (2008), Determinants of economic growth: Empirical evidence from Russian Regions, EJCE, Vol 5, No 1 (2008)..
- Manni U H and Afzal M N I (2012), Effect of trade liberalization on economic growth of developing countries: A case of Bangladesh economy, Journal of business, economics and finance ISSN: 2146-7943.
- Marelli E and Signorelli M (2009), China and India: Openness, trade and effects on economic growth, The European Journal of comparative economics, Vol 8, No 1, pp 129-154.
- Mercan M, Gocer I, Bulut S and Dam M (2013), The effect of openness on Economic growth for BRIC-T countries: Panel data analysis, Eurasian Journal of business and economics 6(11), 1-14.
- Michalowski T (2012), Foreign direct investment in Sub Saharan Africa and its effects on economic growth of the region, Working Papers Institute of International Business University of Gdansk 2012, no. 31.
- Muibi S F (2012), Capital flows, trade openness and economic growth dynamics: New empirical evidence from Nigerian economy, Department of economics and econometrics, University of Johannesburg, South Africa.
- Mwaba A (2000), Trade liberalization and growth: Policy options for African countries in a global economy, AFDB, Economic research papers No 60.
- Ndambiri H K, Ritho C, Ng'ang'a S I, Kubowon PC, Mairura F C, Nyangweso P M, Muiruri E M and Cherotwo F H (2012), Determinants of economic growth in Sub Saharan Africa: A Panel data approach, International Journal of economics and management, Vol 2, No 2, 2012, pp 18-24.
- Ndoricimpa A (2009), Foreign direct investments, exports and economic growth in COMESA countries: A heterogeneous panel causality approach, Masters thesis, University of Burundi.
- Pollin R and Zhu A (2005), Inflation and Economic growth: A cross country Non linear analysis, Political economy research institute, working paper series number 109.
- Rattso J and Torvik R (1998), Zimbabwe trade liberalization: ex post evaluation, Cambridge Journal of economics 1998, 22, 325-346.
- Reserve bank of Zimbabwe Statistics, 2013, Harare, Zimbabwe.
- Simorangkir I (2006), The openness and impact to Indonesian economy: A SVAR approach, Centre for central banking education and studies, Bank Indonesia.
- Solow R M (1956), A contribution to the theory of economic growth. *Quarterly Journal of Economics*, 70(1):65-94, February 1956.
- Swan T W, Economic growth and capital accumulation. *Economic Record*, 32:334-361, November 1956.
- Tan C J K (2012), International Trade and economic growth: Evidence from Singapore, University of Columbia.
- Tekere M (2001), Trade liberalization under structural economic adjustment – impact on social welfare in Zimbabwe, SAPRI.
- Tiwari A K and Mutascu M (2011), Economic growth and FDI in Asia: A panel data approach, Economic analysis and policy, Vol 41, No 2.
- Ulasan B (2008), Trade openness and economic growth: A cross country empirical investigation, Thesis submitted to the University of Nottingham.
- UNDP.2008 Comprehensive economic recovery in Zimbabwe. A discussion document.
- Wang Y and Yao Y (2001), Sources of China's economic growth, 1952-99: Incorporating Human capital accumulation, World bank.
- Wong S A (2006), Productivity and trade openness: Micro-level evidence from manufacturing industries in Ecuador 1997-2003, Guayaquil, Ecuador.
- World Bank development indicators (2014): Retrieved from <http://data.worldbank.org/indicator/SP.POP.TOTL>
- Yanikkaya H (2002), Trade openness and economic growth: A cross country empirical investigation, Journal of development economics 72 (2003) 57-89.
- Yanikkaya, H. (2003). Trade Openness and Economic Growth: A cross country empirical investigation, Journal of Development Economics.
- Yeboah O, Naanwaab C, Saleem S and Akuffo A (2012), Effects of trade openness on economic growth: The case of African countries, Agribusiness, applied economics and Agriscience Education-NC A & T.
- Zeren F and Ari A (2013), Trade openness and economic growth: A panel causality test, International journal of business and social science, Vol 4 No 9.
- Zhang, H (1999) FDI and economic growth: evidence from ten East Asian Economies, *Economia Internazionale*, 7(4), 517-535.

Appendix

Table 1: Results on Modified Dickey Fuller (DF-GLS)

The table provides the optimal lag length and levels of significance for test of stationarity for all variables used being per capita GDP, gross fixed capital formation (GFCF), inflation rate (IF), Foreign direct investment (FDI) and trade openness (TO).

Variables	Optimal lags	Test statistics	
pGDP	1	-2.522**	
GFCF	1	-1.806**	
IF	1	-4.078*	
FDI	1	-2.001***	
TO	1	-1.645**	
Critical values		Level	Value
		1%	-2.639
		5%	-1.950
		10%	-1.605

Source: Author's computation

* = Reject null hypothesis at all levels of significance

** = Reject null hypothesis at 10% level of significance

*** = Reject null hypothesis at both 5% and 10% levels of significance

Table 2: Selection-order criteria

The table shows the selection of the optimal lag length using the Akaike information criterion (AIC), Hannan-Quinn information criterion (HIQC) and the Schwarz Bayesian Information criterion (SBIC).

Sample: 5 - 38

Number of obs = 34

lag	LL	LR	df	p	FPE	AIC	HQIC	SBIC
0	-1167.21				6.1e+23	68.9537	69.0302	69.1781
1	-1088	158.43	25	0.000	2.6e+22	65.7646	66.2239	67.1114
2	-1037.14	101.71	25	0.000	6.2e+21	64.2437	65.0857	66.7128
3	-991.984	90.319	25	0.000	2.5e+21*	63.0579*	64.2826*	66.6493*
4	-967.402	49.163*	25	0.003	4.8e+21	63.0825	64.69	67.7962

Table 3: Johansen tests for cointegration

The table shows the results for the presence for cointegration for the variables using Johansen tests. The number of cointegration equations is selected using trace statistic.

Trend: constant

Number of obs = 35

Sample: 4 - 38

Lags = 3

1%

maximum rank	parms	LL	eigenvalue	trace statistic	critical value
0	55	-1088.0419	.	116.7650	76.07
1	64	-1061.3117	0.78291	63.3046	54.46
2	71	-1046.3048	0.57580	33.2906*	35.65
3	76	-1036.8292	0.41810	14.3395	20.04
4	79	-1031.9898	0.24159	4.6607	6.65
5	80	-1029.6594	0.12468		

Table 4: VECM equation

The results on the impact of the macroeconomic variables on growth are provided in table 4. The VECM model was used to measure the effect gross fixed capital formation (GFCF), inflation (IF), trade openness (TO) and foreign direct investment (FDI) on economic growth as proxied by per capita GDP. All variables are percentages of GDP.

Equation	Variable	Coefficient (β)	Standard error	z-statistic	p-value
	pGDP	1			
	GFCF	-6.29	4.52	-1.39	0.164
	IF	-8.08e-06	1.04e-06	-7.79	0.000*
	TO	11.74	2.33	5.03	0.000*
	FDI	-39.36	38.28	-1.03	0.304
	Constant	-1187.45			

Table 5: Adjustment parameters

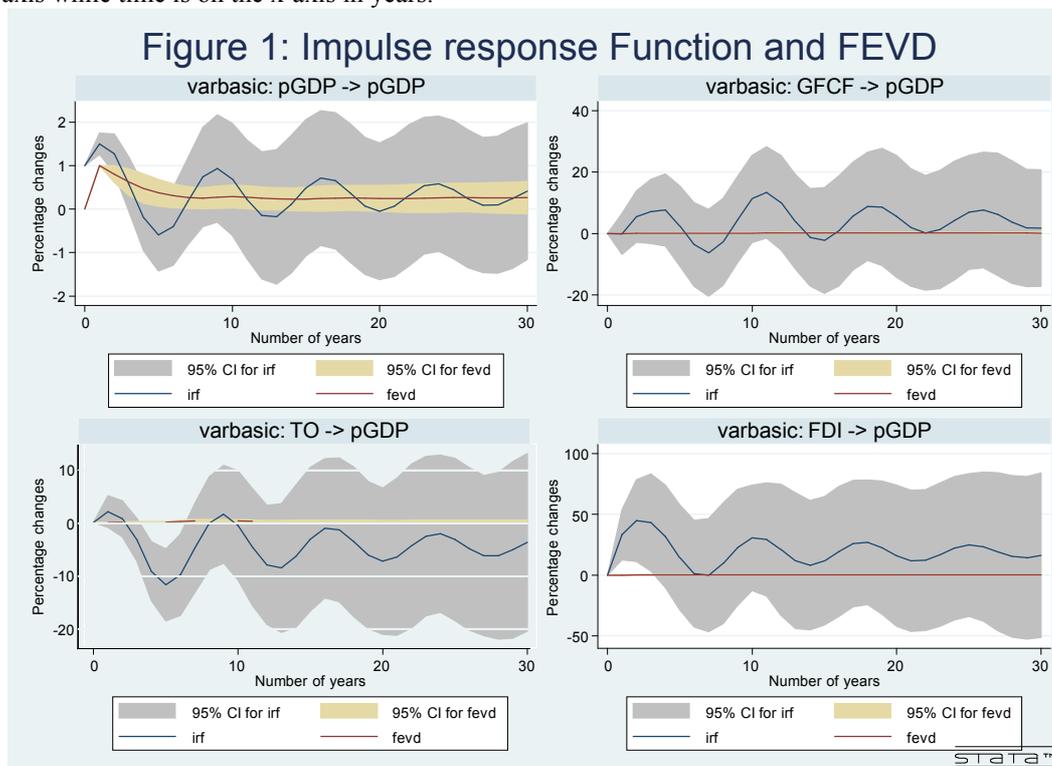
The table shows results on the adjustment parameters for variables as they converge to long run equilibrium. Convergence to a long run equilibrium is present for variables which are statistically significant (*).

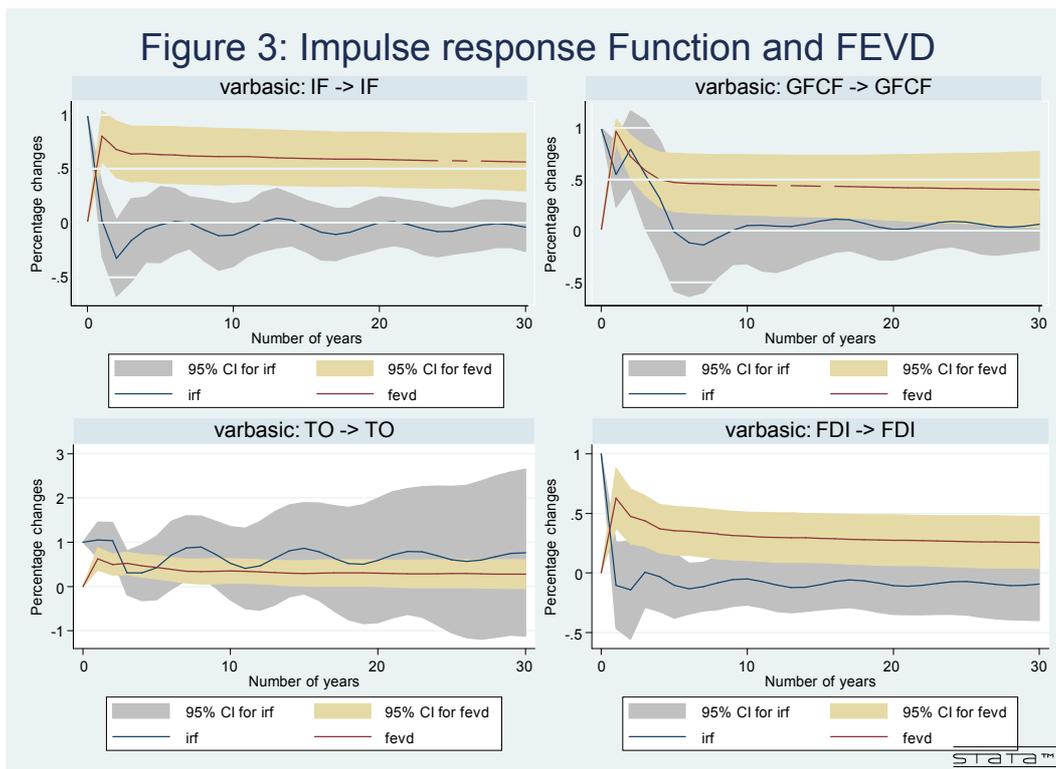
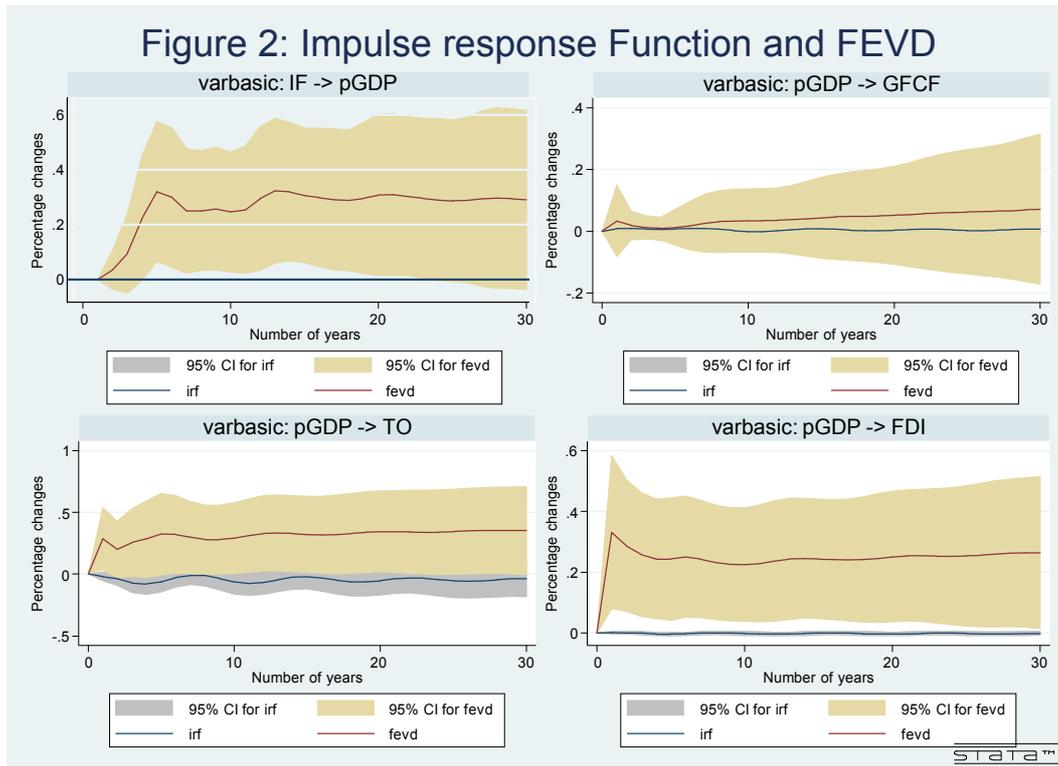
Regressors	Coefficient	Standard error	z-statistic	p-value
pGDP	-0.202	0.054	-3.76	0.000*
GFCF	-0.010	0.003	-3.54	0.000*
IF	124918.70	33556.47	3.72	0.000*
TO	-0.010	0.007	-1.41	0.16
FDI	-0.0005	0.001	-0.45	0.650

*significant at 5%

Forecast error decomposition variance and Impulse response function results

Figures 1 to 3 provide results on how each variable responded to innovations in another variable and also to innovations in its own variable. This is measured by impulse response function (IRF). The key drivers of growth are determined using the forecast error decomposition variance (FEVD). Percentage changes are measured along the y-axis while time is on the x-axis in years.





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