

Bank of Zambia

WP/2021/3

BoZ WORKING PAPER SERIES

Drivers of Growth in Zambia: Role of External Demand,
Foreign Direct Investment and Credit to the Private Sector

By
Dale Mudenda
Wilson Phiri
Mwika Mwenechanya
Evance Jeri

December 2021

The BoZ Working Papers Series describe research in progress by the author(s) and are published to elicit comments and to encourage debate. The views expressed in the BoZ Working Paper Series are those of the author(s) and do not necessarily represent the position of the Bank of Zambia.

Bank of Zambia Working Paper Series

Drivers of Growth in Zambia: Role of External Demand, Foreign Direct Investment and Credit to the Private Sector

By

Dale Mudenda¹Wilson Phiri^aMwika Mwenechanya^aEvanche Jeri^a

Bank of Zambia

December 2021

Abstract

This paper examines the determinants of economic growth in Zambia with specific focus on the role of external demand, foreign direct investment (FDI) and domestic credit to the private sector. Using annual data for the period 1970 to 2019, the standard Johansen multivariate cointegration analysis shows that external demand, FDI and credit to the private sector contribute to overall economic growth in Zambia. External demand and FDI have a much stronger impact on growth in the non-mining than in the mining sector. Deviation of growth from long-run equilibrium persists much longer in the mining than in the non-mining sector. These results highlight the need for policy makers to promote external competitiveness and economic diversification as important policy options to support growth. Effective implementation of an export-led growth and diversification strategy, promoting foreign investment into the non-mining sector, mobilising complimentary domestic investment and creating a conducive investment climate that minimises policy uncertainty are critical to spur growth.

Keywords: External demand, economic growth, FDI, private sector credit

¹ Corresponding author: dalemu7@gmail.com, University of Zambia, P.O. Box 32379, Lusaka, 10101.

^a Bank of Zambia, Box 30080 Lusaka.

Table of Contents

1.0 Introduction	4
2.0 Literature Review	8
3.0 Model Specification, Methodology and Data.....	10
3.1 Empirical Model	10
3.2 Estimation Method.....	11
3.3 Data Sources	12
4.0 Empirical Results and Discussion	14
5.0 Conclusion.....	19
References	20

1.0 Introduction

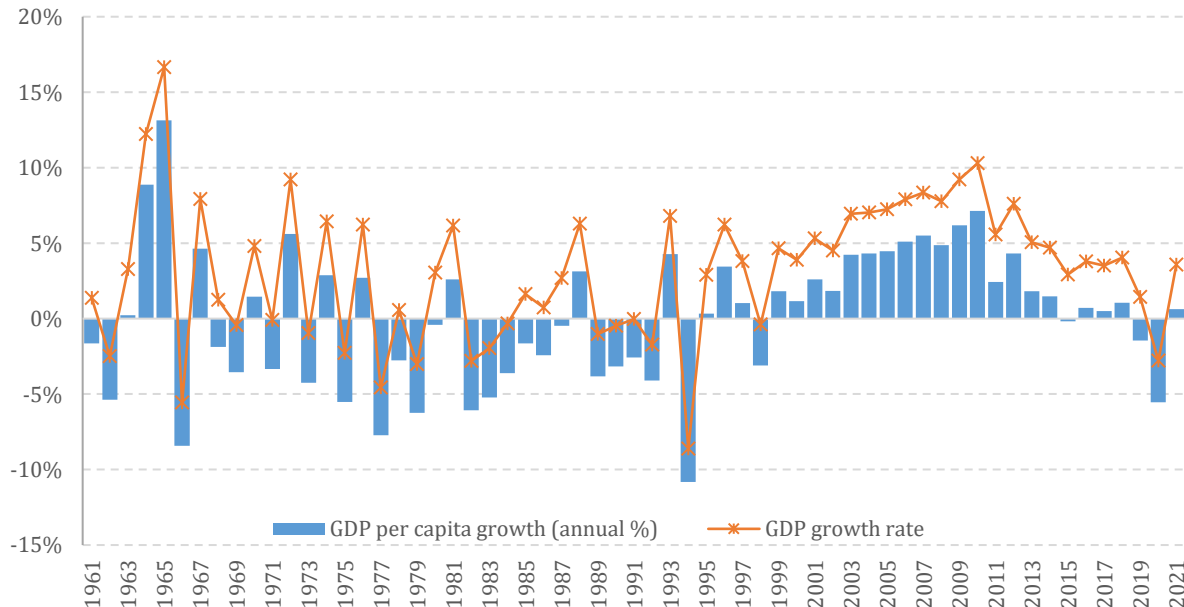
The recent fluctuations in global economic growth have rejuvenated interest in understanding the key drivers of growth. Many developed and developing countries have continued to pursue economic growth as a cornerstone of economic transformation and improved standards of living. In developing countries, especially in Africa, economic growth is considered an essential condition for economic development, poverty alleviation and reducing income inequalities (Ferdinand et al. 2015; Anyanwu, 2014). Economic growth has remained one of the key indicators used to assess the performance of an economy.

The importance of sustained economic growth has motivated an extensive body of theoretical research such as neoclassical growth models (Solow, 1956; Swan, 1956) and endogenous growth theories (Romer, 1990) which have provided the proximate causes of economic growth. At the same time, empirical literature has attempted to test the implications of economic growth theories and to determine the key drivers of economic growth across countries and regions (Loannidis and Bruns, 2020; Crespo-Cuaresma et al. 2009; Baro, 1991). These studies have found more than 145 factors that range from human capital (Ranis and Stewart, 2000), demographic (Sala-i-Martin, 2004), institutional quality (Saima et al, 2014) to geography and trade (Frankel and Romer, 1999) as proximate causes of economic growth.

The multiplicity of the determinants of economic growth continue to spur interest in identifying factors that foster it in specific countries or regions to shed light on the sustainability of growth rates. For example, Sachs and Warner (1997), Ndulu and O'Connell (1999), Harttgen, et al. (2013); McMillan, et al. (2014), Anyanwu (2014) and Rodrik (2018) have examined the proximate sources of growth in sub-Saharan African countries. Many of these studies have arrived at different conclusions. Further, there is little research on national level drivers of economic growth to inform policies (Anyanwu, 2014). Yet, such research can both broaden the understanding of the causes of growth and country specific context to inform policy. This study extends this analysis to Zambia, a landlocked country in sub-Saharan Africa.

Zambia's long-term vision is to move towards becoming a middle-income country by 2030. To achieve this, the country has, since 1964, implemented various policies aimed at fostering economic growth (Chansa et al., 2019; Chirwa and Odhiambo, 2017; Musonda and Adams, 1997). Figure 1 shows that the growth trend has been volatile, with periods of impressive and weak growth. The economy grew rapidly in the period 1964 to 1975. However, it could not sustain the initial average growth rate of 5.4 percent between 1964 and 1970 with a peak of 16.5 percent in 1965, albeit from low levels. The next decade coincided with exogenous shocks related to high increases in the price of oil and the fall in copper prices. Subsequently, growth stagnated and deteriorated to an average of 1.2 percent in the 1980s all through to the 1990s.

Figure 1: Trend in Annual Real GDP and GDP per Capita Growth Rate, 1964 -2021



Source: Zambia Statistics Agency and World Bank WDI

In 1991, the government initiated economic reforms to transform the centrally planned economy into a market oriented one. The reforms did not yield immediate growth results as it further deteriorated to an average of -0.2 percent per annum between 1991 and 1995. The deterioration was on account of declines of output in mining which was compounded by the fall in output in the manufacturing and utilities subsectors. Subdued copper prices and the associated poor performance of the mining sector prior to privatisation of major mines contributed to this outcome.

Since 2000, the country has recorded one of the fastest economic growth rates in Africa. In the period 2000 to 2005, real gross domestic product (GDP) averaged 4.6 percent before increasing to 6.4 percent between 2006 and 2014. Increased investments in mining following the privatisation of mines, favourable copper prices, private sector-led growth strategy and prudent macroeconomic management supported growth during the period. Because of the impressive growth, Zambia was considered one of the success stories in sub-Saharan Africa having achieved amongst the fastest growth rates. In 2011, the World Bank reclassified the country from a low-income country to a lower-middle income country (World Bank, 2017). Table 1 presents the average sector level growth rates for the period 1970 to 2020. The robust and consistent growth rates after 2000 is shared by all sectors of the economy. Growth has been greatest in the construction, financial services, transport and manufacturing sectors.

Table 1: Sectoral Output Growth in Zambia, 1970 – 2020

Sector	1970/ 1979	1980/ 1989	1990/ 1999	2000/ 2005	2006/ 2010	2011/ 2015	2016/ 2019	2020
Average Real GDP Growth Rate	1.5	1.4	-0.3	4.6	6.4	6.1	3.7	-2.8
Agriculture	2.2	3.2	-1.5	1.0	3.8	0.9	0.0	17.2
Mining	1.3	1.2	-11.1	9.3	9.8	-1.3	2.9	8.0
Manufacturing	4.3	3.3	1.6	4.8	3.4	7.0	3.2	-1.5
Electricity	19.4	-2.4	2.6	2.1	4.9	3.6	3.4	3.1
Construction	-2.7	-3.4	-4.7	16.5	12.1	9.4	3.5	-5.3
Wholesale & Retail Trade	na	na	na	4.4	2.7	6.0	1.1	-12.5
Transport	na	na	na	4.9	15.9	2.8	1.1	13.8
Finance	na	na	na	2.2	5.6	7.5	5.9	13.0
Other Services	-0.8	0.7	1.5	4.4	6.3	6.4	3.2	-10.5

Source: Zambia Statistics Agency and UN Stats

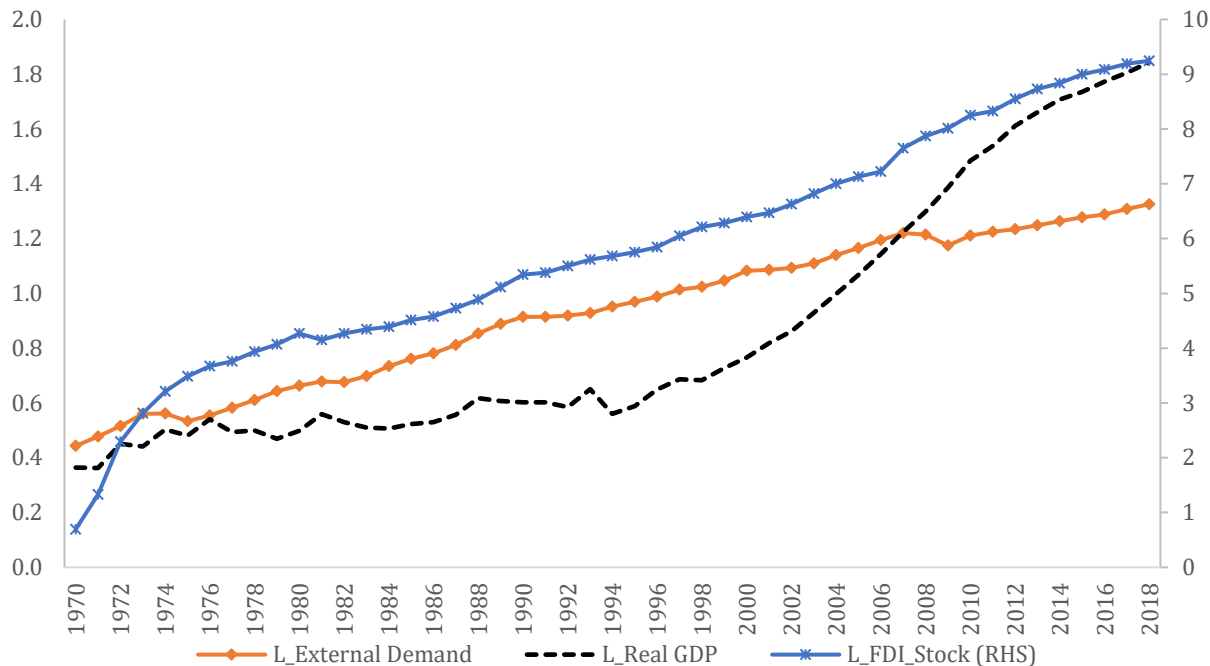
However, maintaining the impressive growth of the early 2000s became a challenge by 2014. Economic growth slowed down while inflation, fiscal deficits and public debt increased. Real economic growth dropped to 3.0 percent in 2016 and 1.4 percent in 2019 from an average of 6.2 percent between 2011 and 2015. The drop in growth is attributed to a number of factors that include external shocks, climate related challenges that weighed on electricity generation, crowding out of the private sector and limited linkages of the infrastructure developments projects with local supply chains. The country continues to grapple with challenges of significant levels of widening income inequality (with Gini coefficient rising from 0.57 in 2002/03 to 0.69 in 2015), high poverty levels (54.0 percent) and unemployment compounded by underemployment (LCMS, 2015). The high growth rate since 2000 has often fallen short of the targeted 7-10 percent required to transform Zambia into a middle-income-country by 2030.

Several studies have been undertaken to analyse the determinants of economic growth in Zambia. For example, Mukupa et al. (2013) use foreign direct investment (FDI), gross national income per capita and construction to explain growth in Zambia. Chirwa and Odhiambo (2019) take a time series approach to examine the effect of 11 selected macroeconomic factors that include investment, real GDP per capita, FDI, population growth, government consumption, human capital stock, trade, aid and the real exchange rates while Mwenda and Mutoti (2011) examine the role of financial development on growth. Saungweme and Adhiambo (2020) examine the impact of external debt on economic growth. Mulungu and Ng'ombe (2017) use a growth accounting approach to explore the sectoral growth patterns in Zambia. Harttgen et al. (2015) and Young (2012) include Zambia in cross-sectional studies investigating the determinants of growth.

Despite the emerging literature on growth in Zambia, the role of external and internal demand has remained unexplored. The role of external demand in determining economic growth is undoubtedly important for trade dependent economies like Zambia in the face of increased globalisation. The impact of domestic demand, which distinguishes the impact of domestic capital from foreign capital, has not been explored. Further, the distinction of sector drivers of growth has not been explored. A closer look at data suggests that Zambia recorded impressive growth during periods when it practiced an outward-oriented

economic policy with high foreign direct investment, and export earnings supported by strong growth in demand from major export markets (Figure 2).

Figure 2: Zambia's Real GDP, External Demand and Foreign Direct Investment (Natural Log), 1970 -2018



Source: Zambia Statistics Agency, UN Stats, World Bank and Bank of Zambia

This raises the following empirical questions: Is the observed growth trend in Zambia due to strong external or domestic demand conditions? Does foreign capital drive growth at a higher pace than domestic capital? Do these factors impact growth in the mining and non-mining sectors² differently? This paper therefore examines the role of external demand, foreign direct investment and domestic credit to the private sector in driving growth in Zambia and contrasts the role of these factors in driving sector level - mining and non-mining sector output growth. The study is critical as it seeks to provide insights into the factors driving growth and provide policy implications. This is essential for creating jobs and reducing poverty.

The empirical findings in this paper show that external demand, FDI and domestic credit to the private sector are important drivers of overall growth in Zambia. External demand and FDI have much higher impact on growth in the non-mining than in the mining sector. In addition, deviation of growth from long-run equilibrium persists much longer in the mining than the non-mining sector. Therefore, policy response targeted at exploiting the potential in export-led growth and diversification strategy, promoting foreign investment into the

² The study is restricted to the split of mining and non-mining sectors due to data limitations with regard to disaggregation of key variables such as FDI and credit to the private sector.

non-mining sector, mobilising complimentary domestic investment and creating a conducive investment climate that minimises policy uncertainty are critical to spur growth.

The rest of the paper is structured as follows. The next section provides literature review on the drivers of growth. Section 3 presents the empirical model, methodology and data description. The empirical results and discussion are presented in section 4. Section 5 concludes and highlights policy implications.

2.0 Literature Review

Several studies have undertaken extensive survey of the literature on the determinants of growth. These include Barro and Sala-i-Martin (2004), the Commission on Growth and Development (2008), and Aghion and Howitt (2009). Evidence suggests that growth in Africa is determined by various factors that range from poor fiscal, exchange rate, institutional, poor functioning financial and labour markets and trade policies (Elbadawi and Ndulu, 1996; Knack and Keefer, 1995; Mauro, 1995) to the lack of sufficient democracy and good governance (Collier and Gunning, 1999). These are amplified by exogenous factors that include external aid allocation (Burnside and Dollar, 1997), lack of diversification of Africa's exports and poor governance (Sachs and Warner, 1997), ethno-linguistic diversity (Easterly and Levine, 1997) and geography of most landlocked African countries with tropical climates (Bloom and Sachs, 1998).

Evidence of the impact of human and physical capital is well established in the literature. Theoretical studies based on neoclassical and endogenous growth models show that investment in physical and human capital raises economic growth rate. These models posit that human capital through education induces productivity and innovation that accelerate economic growth rate (Barro, 2003). Empirical evidence based on the Solow growth model by Mankiw, Romer and Weil (1992) as well as Teixeira and Queiros (2016) find that investment, human capital proxied by education and population growth play a significant role in explaining cross-country growth in advanced economies. This result was confirmed by Levine and Renelt (1992) who found the investment share in GDP to be the most robust determinant of growth. Similarly, Ndambiri et al. (2012) find evidence supporting the importance of capital formation in economic growth in SSA.

Similarly, most of these factors have been found to be important in explaining growth in Africa. Ghazanchyan and Stotsky (2013) used panel data for 42 countries covering the period 1999 to 2011. Their findings show that higher private and public investment boost growth while no robust evidence shows that exchange rate regime and current account liberalization affect the performance of economic growth. Their results also suggest that capital accumulation boosts growth though not as strong as anticipated. Further evidence by Anyanwu (2014) and Mijiyawa (2013) show that growth in Africa is amplified by domestic investment, net ODA inflows, education, government effectiveness, urban population and metal prices. Mijiyawa (2013) further shows that private sector access to credit and the share of agriculture value added in GDP significantly affect economic growth.

The review of international literature on growth in developing countries is provided by Chirwa and Odhiambo (2016). The survey supports the evidence above though not

conclusive. They identify several macroeconomic determinants of economic growth, including foreign aid, external debt, foreign direct investment, fiscal policy, demographics, monetary policy, natural resource abundance and the geographical location of countries. Some of these results are contested. For example, some evidence shows that aid may have no effect (Easterly et al. 2004) or does not always have a positive effect on growth (Rajan and Subramanian, 2011). The impact of fiscal activism is also contested. Ndambiri et al., (2012) find evidence that government expenditure negatively affect growth.

Regarding the importance of credit to the private sector, empirical evidence also remains mixed across countries and studies. Allen and Ndikumana (2000) did not find any significant relationship between growth and credit to the private sector in Southern Africa while Arezki and Gylfason (2011) found an insignificant effect on economic growth. A study by Sarwar et al. (2013) shows that domestic credit negatively affected economic growth among Asian countries. This result is confirmed by Ghazanchyan and Stotsky (2013) who, using a sample of SSA countries, showed that government consumption slows down economic growth in the region. They argued that this suggested that government spending may have been unproductive due to padding a public work force or subsidizing loss-making state enterprises.

Concerning the impact of external demand on economic growth, theories suggest trade-based globalisation promotes economic growth through the diffusion of technology and enlarging the market size (Grech and Rapa, 2019; Ho and Iyke, 2020). The effect of external demand on growth has been demonstrated by several authors, including Mishra (2019) and Grech and Rapa (2019). Using data based on BRICS countries, Mishra (2019) showed that the impact of external demand on economic growth is mixed and country specific. Grech and Rapa (2019) established that Malta's economic growth was more externally driven than internally.

Using a dynamic panel generalized method of moments (GMM) and fixed effects models, the African Capacity Building Foundation (2017) investigated the sources of economic growth in Africa. The results showed a strong positive effect of trade openness, FDI, Official Development Assistance (ODA) and human capital formation, gross fixed capital formation and remittances on real GDP growth but a strong negative effect of gross government debt and inflation.

Asmamaw (2016) investigated the macroeconomic determinants of economic growth in Ethiopia from 1974 to 2014 using a vector error correction model (VECM). The findings show a stable long-run relationship between real GDP, gross domestic saving, labor, human capital, exports, FDI, foreign aid and external debt. External debt, foreign aid and FDI had a negative and significant relationship with real GDP during the study period. The short-run dynamic results show that human capital, savings and FDI had a positive relationship with output growth whereas labour, export, aid and external debt had negative relationship with real GDP. Similar results for FDI and exports are confirmed by Popovici and Cantemir (2016) using a VECM for the period 2005-2014 in Romania. The Granger causality tests indicated a positive significant bi-directional relationship between FDI and GDP and a uni-directional relationship between GDP and exports.

A number of studies have also examined country level determinants of growth. Bonga-Bonga and Ahiakpor (2015) use the Bayesian model averaging (BMA) method to assess the determinants of economic growth in Ghana in the period 1970-2012. The results revealed the importance of the current account balance, inflation rate and population growth as well as the role of the dual economy in driving economic growth in Ghana.

Several studies investigating the determinants of growth in Zambia have found different determinants. Chikalipah and Makina (2019) for example examined the two-way relationship between economic growth and human development over the period 1970-2015 using a vector error correction model. The results showed cointegration between economic growth and human development. While growth did not influence human development in the short-run, it exerted a positive and significant effect in the long-run. Further, Chirwa and Odhiambo (2019) investigated the nexus between key macroeconomic determinants and economic growth by employing the autoregressive distributed lag (ARDL) model to test for Granger causality covering the period 1970–2015. The empirical results indicate dominant feedback between investment, population growth, foreign aid and economic growth, both in the short and long-run between real exchange rate, trade openness and economic growth in the short-run and between government consumption, inflation and economic growth in the long-run. The second is the supply-leading hypothesis that runs from government consumption and inflation to economic growth in the short-run and from real exchange rate and trade openness to economic growth in the long-run. Lastly, the neutrality hypothesis holds between human capital and economic growth in the short-run. Finally, Mulungu and Ng'ombe (2017) explored the sources of economic growth by sector. The study used growth accounting tools developed by Roe et al. (2014) to determine the sources of growth in agriculture, industry and services sectors between 1970 and 2013. Their results indicate that capital and labour growth have largely been the main drivers of growth. Labour growth is found to account for 50 percent of growth.

Despite the emerging literature on growth in Zambia, the role played by external demand and distinction between the role of domestic credit to private sector and foreign direct investment in driving economic growth have not been settled. Further, how differently these and other factors drive growth in the mining and non-mining sectors has not been explored, suggesting that the factors that determine growth in Zambia are far from being concluded in literature.

3.0 Model Specification, Methodology and Data

3.1 Empirical Model

The theoretical framework employed in this study is based on the neoclassical model of Solow (1956) and Swan (1956) which provides an appropriate framework through which macroeconomic factors affect growth. The neoclassical model stipulates that, at any point in time, the total output of an economy depends on the quality and quantity of physical capital employed, quantity of labour employed and the average level of skills of the labour force. In

its simplest form, the neoclassical growth model relates economic output as a function of labour and capital. An augmented Solow growth model is used specified as:

$$Y = K_t^\alpha H_t^\beta E_t^{1-\alpha-\beta} A_t \quad (1)$$

where K and H measure the stock of physical and human capital, respectively, Y is output and E is effective labour. The α and β are the shares of physical and human capital, respectively. The model also gives rise to determinants of economic growth. Equation 1 is the basis of the empirical framework as used by Knight et al. (1993), Mankiv, et al. (1992) and Dwan and Hussein (2001) who include other factors such as foreign direct investment and external demand. In particular, the model is augmented by A_t (total factor productivity) to capture a vector of other variables that may affect economic growth. Following Ho and Bernard (2018), a Cobb-Douglas function can be imposed on A_t to obtain:

$$A_t = EXD_t^{\beta_2} FDI_t^{\beta_3} DC_PS_t^{\beta_4} \quad (2)$$

where EXD is external demand, FDI is foreign direct investment and DC-PS is domestic credit to the private sector.

By replacing equation (2) into (1), an augmented version of the growth equation is obtained specified as:

$$Y_t = K_t^\alpha H_t^\beta E_t^{1-\alpha-\beta} EXD_t^{\beta_2} FDI_t^{\beta_3} DC_PS_t^{\beta_4} X_t \quad (3)$$

After decomposing and taking logs we obtain equation 4 is obtained, which forms the basis for empirical estimations in this study.

$$\ln Y_t = \alpha \ln K_t + \beta_0 \ln H_t + \beta_1 \ln E_t + \beta_2 \ln EXD_t + \beta_3 \ln FDI_t + \beta_4 \ln DC_PS_t + \beta_i \ln X_t + \varepsilon_t. \quad (4)$$

where, X comprises other control variables defined in Table 2, ε_t is the error term, and $\alpha, \beta_0, \dots, \beta_4$, and β_i are parameters to be estimated.

An adapted form of equation 4 was also used to estimate the sector level drivers of economic growth in the mining and non-mining sectors in Zambia. In particular, the sector level analysis investigated the role and importance of external demand, FDI and domestic credit to the private sector in influencing growth in the mining and the non-mining sectors.

3.2 Estimation Method

Prior to estimating the model, unit root tests are conducted to determine the time series properties of the variables. For the VECM to be used, the variables must be integrated of the same order. Stationarity can be tested by undertaking unit root tests of variables. In this study, the Augmented Dickey-Fuller (ADF) and the Phillips-Peron (PP) unit root tests for

stationarity are used. In a general form, the unrestricted vector autoregressive (VAR) of order ρ is specified as follows:

$$y_t = A_1 y_{t-1} + A_2 y_{t-2} + \dots + A_\rho y_{t-\rho} + Bx_t + \xi_t \dots \dots \dots 5$$

where y_t is a vector with k non-stationary I (1) variables, x_t is a vector with d deterministic variables and ξ_t is a vector of error terms. The above model when specified as a VECM is represented as follows:

$$\Delta y_t = \Pi y_{t-1} + \sum_{i=1}^{\rho-1} \Gamma_i \Delta y_{t-i} + Bx_t + \xi_t \dots \dots \dots 6$$

Where $\Pi = \sum_{i=1}^{\rho} A_i - I, \Gamma_i = -\sum_{j=i+1}^{\rho} A_j$

If the coefficient matrix $\Gamma_i = -\sum_{j=i+1}^{\rho} A_j$, which gives the number of independent cointegrating vectors, has a reduced rank $r < k$, then there exists $k \times r$ matrices of $\alpha \times \beta$ each with rank r such that $\Pi = \alpha\beta'$ and $\alpha\beta'y_t$ is I(0), r is the number of cointegrating vectors (*the cointegrating rank*) and each column of β is the cointegrating vector. α is a matrix of speed of adjustment, which gives the response of y_t to the error correction term.

Further, the study employs the standard Johansen multivariate cointegration analysis (Johansen 1991, and Johansen and Juselius (1990, 1992)). The Johansen framework has an added advantage of proving feedback between the variables in the model, which is important in this study.

After ascertaining that variables are I(1) and testing for structural breaks, an unrestricted VAR was run and appropriate (optimal) lag length chosen, followed by tests of serial correlation and normality of the residuals using Breuch-Godfrey LM Test and Jarque-Bera test, respectively. The test for the number of cointegrating vectors was done using the trace test statistic to establish the existence of long-run relationships among the variables. A VECM was run to obtain both the long-run parameters β_{ij} and speed of adjustment α_{ij} . The size and signs of each the error correction term (ECT) α_{ij} represent the direction and speed of adjustment of the system to its long-run equilibrium after a shock.

3.3 Data Description and Sources

The study used annual time series data for the period 1970 to 2019. The data for Real GDP, mining and non-mining FDI, domestic credit to the private sector, sectoral GDP, external demand, employment and copper reserves were obtained or constructed using data drawn from the Bank of Zambia, Zambia Statistics Agency, World Bank World Development Indicators Data base, Pen World Tables, UN Statistics and other sources presented in Table 2.

Table 2: Variable Description and Sources

Variable	Description	Source
RGDP	Real Gross Domestic Product	World Bank WDI database
RGDP_M	Real Gross Domestic Product for the Mining Sector	UN Database
RGDP_NM	Real Gross Domestic Product for the Non-Mining Sector	UN Database
DC_PS	Domestic Credit to the Private Sector	World Bank WDI database and Bank of Zambia Bank of Zambia, UNCTAD FDI data base, IMF
FDIS	Foreign Direct Investment Stocks	CDIS, World Bank WDI 2014 database, as well as accumulation of flows where there were gaps.
FDIS_M	Foreign Direct Investment in Mining Stocks	Bank of Zambia, as well as accumulation of flows where there were gaps.
FDIS_NM	Foreign Direct Investment in Non-Mining Stocks	Bank of Zambia, as well as accumulation of flows where there were gaps.
EXD	External Demand (GDP of Major export markets)	World Bank WDI database & UNCOMTRADE
EXD_M	External Demand Non-Mining (GDP of Major export markets for Copper)	World Bank WDI database & UNCOMTRADE
EXD_NM	External Demand Non-Mining (GDP of Major export markets for NTEs)	World Bank WDI database and Exporter Audit Reports
COPRES	Copper Reserves	MMMD, BOZ, Bureau of Mines Minerals Yearbooks (1964-2008). http://minerals.usgs.gov/minerals/pubs/usbmmyb.html . for other years Estimated by subtracting production from previous years stock plus new stock in subsequent year
E	Employment	Penn World Tables
H	Human Capital	Penn World Tables
GFCF	Gross Fixed Capital Formation	World Bank WDI database
D1	Dummy Economic Liberalisation	Constructed
D2	Dummy Structural Break	Constructed

Source: Authors Compilation

4.0 Empirical Results and Discussion

The unit root test results are presented in table 3. All the variables were stationary in first difference using the two test procedures.

Table 3: Unit Root Tests using Augmented Dickey Fuller and Phillips-Perron method

Variable	Augmented Dickey fuller(P-Value)		Phillips Perron (P-Value)		Conclusion
	Levels	First difference	Levels	First difference	
L_RGDP	1.0000	0.0040	0.9992	0.0000	I(1)
L_RGDP_M	0.9762	0.0001	0.9843	0.0002	I(1)
L_RGDP_NM	1.0000	0.0000	0.9374	0.0000	I(1)
L_FDIS	1.0000	0.0004	1.0000	0.0038	I(1)
L_FDIS_M	0.9998	0.0001	0.9830	0.0017	I(1)
L_FDIS_NM	1.0000	0.0032	0.9984	0.0048	I(1)
L_E	0.9993	0.0095	0.9995	0.0070	I(1)
L_GFCF	0.9628	0.0001	0.8635	0.0000	I(1)
L_EXD	0.9797	0.0009	0.9981	0.0009	I(1)
L_EXD_M	0.9996	0.0000	0.9845	0.0000	I(1)
L_EXD_NM	0.5738	0.0000	0.6607	0.0000	I(1)
L_COPRES	0.6047	0.0000	0.6367	0.0000	I(1)
L_DC_PS	0.7191	0.0002	0.7309	0.0003	I(1)

Source: Authors Computations

Since the variables are integrated of order one, after obtaining the optimal lag length the test for cointegration was done which suggested one cointegrating vector. The VECM approach was then employed to disentangle the short-run from the long-run effects.

Firstly, the empirical results of the drivers of overall real economic growth are presented and discussed focusing on the role of external demand, foreign direct investment and domestic credit to the private sector. Secondly, the drivers of growth in mining and non-mining are distinguished with specific focus on the role of external demand, FDI and domestic credit.

Determinants of overall growth

Table 4 presents the findings for the drivers of overall real GDP estimated via a VECM. The results show that external demand, foreign direct investment and domestic credit to the private sector are important determinants of economic growth in Zambia. The estimated error correction term is negative and statistically significant. It suggests that the speed of adjustment of overall growth to long-run equilibrium is 0.363 per annum (VECM I). Holding other factors constant, 36.3 percent of the deviation of growth from long-run equilibrium is corrected within a year. It takes about three years for growth to revert to long run equilibrium after a shock.

External demand is significant at 5.0 percent level in affecting growth. In the long run, a 1 percent increase in external demand (measured as real GDP of major export markets) results in 0.7 percent increase in real GDP for Zambia. The effect is also similar in the short run (0.6) but on statistically significantly at 10 percent. This result suggests that Zambia's growth prospects are strongly linked to developments in the external markets. This finding is in line with expectation as trade accounts for over 75 percent of the country's GDP. The result is similar to the findings for Malta by Grech and Rapa (2019). Thus, external competitiveness is key for the growth of the Zambian economy. This result points to the fact that an export-oriented growth and diversification strategy is critical to spur economic growth in Zambia.

Table 4: VECM Results for Overall GDP Growth Determinants³

Cointegrating Eq:	VECM I		VECM II	
	Coefficient	T-statistic	Coefficient	T-statistic
L_RGDP(t-1)	1		1	
L_E(t-1)			-0.274	-1.755
L_GFCF(t-1)			-0.376	-9.548
L_FDIS(t-1)	-0.113	-2.600		
L_DC_PS(t-1)	-0.142	-10.106		
L_EXD(t-1)	-0.708	-2.005	-0.369	-2.283
C	1.074			
Error Correction:	D(L_RGDP)	T-statistic	D(L_RGDP)	
ECM(t-1)	-0.363	-3.378	-0.225	-2.434
$\Delta(L_RGDP(t-1))$	-0.044	-0.270	-0.128	-0.766
$\Delta(L_RGDP(t-2))$	0.104	0.654	0.200	1.353
$\Delta(L_RGDP(t-3))$	-0.126	-0.827		
D(L_EMPL(t-1))			0.579	1.184
D(L_EMPL(t-2))			-0.285	-0.729
D(L_GFCF(t-1))			0.010	0.275
D(L_GFCF(t-2))			0.016	0.423
$\Delta(L_FDIS(t-1))$	0.009	0.144		
$\Delta(L_FDIS(t-2))$	0.083	1.867		
$\Delta(L_FDIS(t-3))$	0.095	1.929		
$\Delta(L_DC_PS(t-1))$	-0.043	-1.908		
$\Delta(L_DC_PS(t-2))$	0.034	1.643		
$\Delta(L_DC_PS(t-3))$	-0.056	-2.779		
$\Delta(L_EXD(t-1))$	0.605	1.809	-0.145	-0.510
$\Delta(L_EXD(t-2))$	-0.481	-1.371	0.190	0.595
$\Delta(L_EXD(t-3))$	0.134	0.438		
C	-0.028	-2.153		
D1	0.059	3.598	0.074	3.586
D2	0.056	2.337	0.037	1.644
R-squared	0.654		0.553	
Adj. R-squared	0.476		0.425	
Sum sq. resids	0.025		0.033	
S.E. equation	0.029		0.031	
F-statistic	3.661		4.328	
Log likelihood	105.030		101.431	
Akaike AIC	-3.957		-3.932	
Schwarz SC	-3.314		-3.494	
Mean dependent	0.031		0.030	
S.D. dependent	0.040		0.040	

Note that a (-) in the above long-run equation signifies a positive relationship.

The results also show that FDI has a significant positive effect on economic growth in Zambia both in the long-run and short-run, at 5 percent and 10 percent, respectively. Holding other factors constant, this result shows that a 1 percent increase in FDI increases real GDP by

³ The Human Capital Variable (H) was dropped as it yielded inconsistent results, partly reflecting data quality challenges.

between 0.11 percent in the long-run (0.10 percent in the short-run). The results are consistent with Hussin et al., (2013) for Malaysia and Anyanwu (2014) for a sample of African countries. They argue that FDI is a critical channel for transferring technology from developed to developing countries, which stimulates the latter's economic growth. It is therefore important for Zambia to create a conducive environment to attract FDI to spur economic growth.

Further, the effect of domestic credit to the private sector is positive and statistically significant at 5 percent level. A 1 percent increase in credit to the private sector is expected to raise real GDP by 0.14 percent in the long run. This indicates that credit, especially to the private sector, is important for Zambia's economic growth. This result is consistent with Adu et al (2013) for the case of Ghana who argue that a well-functioning credit market, proxying financial development, is essential for economic growth. However, the results contradict Anyanwu (2014) who found a negative effect explained by banking crises. The short run results are inconclusive with both positive and negative effects at different lag lengths.

Overall, the results demonstrate that both FDI and domestic credit to the private sector are important drivers of economic growth in Zambia. A closer observation shows that the size of the coefficients for FDI and domestic credit to the private sector in the long-run are not very different. Taken together, these results suggest that promoting FDI and facilitating private sector access to credit are equally critical to stimulating long-run economic growth in Zambia. Therefore, it is important for policy makers to promote the inflow of FDI while mobilising complimentary domestic investment to support growth. While FDI is a critical channel for technological transfer, affordable credit to the private sector is necessary to spur innovation and expansion in plant capacity to generate growth. The dummy variables D1 and D2 capturing liberalisation and the structural break in the series, respectively were significant. The findings reflect the effect of implementation of economic reforms to transform the centrally planned economy into a market oriented one and increased investments following the privatisation of mines amid a recovery in copper prices.

Gross fixed capital formation has a significant positive effect in line with expectation (VECM II). However, employment was found to have an insignificant positive effect partly attributed to the measurement limitations of the data used. The human capital variable (H) was dropped as it yielded inconsistent results, partly reflecting data quality challenges.

Sectoral drivers of growth

The results above show the aggregate effect of the identified factors on economic growth in Zambia. However, these factors could have heterogeneous effects on different sectors of the economy especially mining and non-mining sectors. Table 5 presents the results for the sector-level estimations. The results show that both external demand and FDI are important drivers of economic growth in the mining and the non-mining sectors in Zambia.

A closer look at sector results shows that external demand and FDI have a stronger impact on growth in the non-mining than mining sector. Holding other factors constant, a percentage increase in external demand increases output by 0.6 percent in the non-mining sector compared to 0.2 percent for the mining sector in the long-run. A percentage increase

in FDI in the non-mining sector increases output by 0.2 percent compared to the 0.1 percent for the mining sector. These findings reflect the higher contribution of a one million US dollar investment to value added and employment in non-mining than in the mining sector. Mining is highly capital-intensive relative to non-mining. This underscores the enormous potential of economic diversification in generating growth and employment.

Table 5: VECM Estimates of the Determinants of Growth in Mining and Non-Mining

	Mining				Non-Mining		
	VECM I		VECM II		VECM		
Cointegrating Eq:	Coefficient	T-statistic	Coefficient	T-statistic	Variable	Coefficient	T-statistic
L_GDP_M(t-1)	1		1		L_RGDP_NM(-1)	1	
L_FDIS_M(t-1)			-0.087	-3.161	L_FDIS_NM(-1)	-0.172	-9.132
L_DC_PS(t-1)	-0.410	-11.31	-0.367	-15.23	L_DC_PS(-1)	0.004	0.183
L_COPRES(t-1)	0.431	4.27	0.248	3.628			
L_EXD_M(t-1)	-0.22	-2.10			L_EXD_NM(-1)	-0.585	-4.838
C	0.448	5.95	0.905	7.767	C	0.399	
Error Correction:	$\Delta(L_GDP_M)$	T-statistic	$\Delta(L_GDP_M)$	T-statistic	Error Correction:	$\Delta(L_GDP_NM)$	T-statistic
ECM(t-1)	-0.112	-2.686	-0.111	-2.134	ECM(t-1)	-0.387	-2.152
$\Delta(L_RGDP_M(t-1))$	0.053	0.388	0.020	0.13	$\Delta(L_GDP_NM(t-1))$	-0.690	-3.664
			0.046	1.061	$\Delta(L_GDP_NM(t-2))$	-0.163	-1.047
$\Delta(L_FDIS_M(t-1))$					$\Delta(L_FDIS_NM(t-1))$	0.098	1.598
$\Delta(L_DC_PS(t-1))$	-0.005	-0.218	0.004	0.167	$\Delta(L_FDIS_NM(t-2))$	-0.004	-0.077
$\Delta(L_COPRES(t-1))$	0.045	1.380	0.020	0.538	$\Delta(L_DC_PS(t-1))$	-0.001	-0.034
$\Delta(L_EXD_M(t-1))$	-0.387	-2.940			$\Delta(L_DC_PS(t-2))$	-0.007	-0.299
D1	0.077	5.420	0.072	4.468	$\Delta(L_EXD_NM(t-1))$	0.084	0.354
					$\Delta(L_EXD_NM(t-2))$	0.577	2.232
R-squared	0.521		0.409		C	-0.025	-0.765
Adj. R-squared	0.463		0.337		D1	0.042	1.387
Sum sq. resids	0.080		0.098		D2	0.080	3.113
S.E. equation	0.044		0.049				
F-statistic	8.924		5.675		R-squared	0.639	
Log likelihood	83.189		78.245		Adj. R-squared	0.523	
Akaike AIC	-3.285		-3.074		Sum sq. resids	0.060	
Schwarz SC	-3.048		-2.838		S.E. equation	0.042	
Mean dependent	0.025		0.025		F-statistic	5.484	
S.D. dependent	0.060		0.060		Log likelihood	87.494	
					Akaike AIC	-3.282	
					Schwarz SC	-2.805	
					Mean dependent	0.031	
					S.D. dependent	0.061	

Note that a (-) in the above long run equation E-views output table signifies a positive relationship.

Domestic credit to the private sector is an important driver of growth in mining. Mining companies often use domestic credit as a form of bridge financing. The result for the non-mining sector, however, was insignificant. This finding is in part due to data limitations as disaggregated data for domestic credit to the private sector by industry was not available. Data permitting, future research could exploit the role of domestic credit to the private sector by industry in driving growth. Copper reserves had a negative sign reflecting the effect of

the drop in copper deposits as production increased. An increase in mineral deposits is expected to support growth in mining. However, in the case of Zambia there has been limited discoveries of new copper deposits after the initial exploration prior to and just after independence.

In the short run, external demand was also a significant driver of growth in the non-mining sector but had a negative sign in the mining sector. Overall, these findings suggest that short-term developments in global demand are not as important as long-term prospects in driving investment and growth in the mining sector.

The speed of adjustment of growth to long-run equilibrium is high in the non-mining sector (0.4) but much lower in the mining sector (0.1). This result suggests that it takes several years for growth in mining to return to long-run equilibrium after a shock. This implies that it takes long for investments in mining to reach gestation period and begin to contribute to growth of output. Investments in mining by nature are based on long-term decisions and depend on the policy environment. Uncertainty in mining tax policy, for example, may weigh on investment decisions and ultimately on growth in the sector for several years.

5.0 Conclusion

Using the vector error correction model this paper investigated the role of external demand, foreign direct investment and domestic credit to the private sector in driving economic growth in Zambia over the period 1970–2019. It also distinguished how these, and other factors impact growth in mining and non-mining sectors. The results show that external demand, foreign direct investment and domestic credit to the private sector are important drivers of growth in Zambia. At the sector level, external demand and FDI have a much stronger impact on growth in the non-mining than in the mining sector. This result suggests that the Zambian economy is more outward-oriented, making the retention and improvement in external competitiveness and economic diversification ever more important as policy options to support growth and cushion the economy against external shocks. Policy makers should exploit potential of growing the economy through export-led growth and diversification strategies. Promoting foreign investment into the non-mining sector while mobilising complimentary domestic investment and creating a conducive investment climate that minimises policy uncertainty are critical to spur growth.

References

- The African Capacity Building Foundation (ACBF), (2017) 'Drivers of Economic Growth in Africa', *Occasional Paper*, 29.
- Adu, G., Marbuah, G., & Mensah, J. T. (2013) 'Financial development and economic growth in Ghana: Does the measure of financial development matter?' *Review of Development Finance*, 3(4), 192-203.
- Acikgoz, S., & Mert, M. (2014) 'Sources of growth revisited: The importance of the nature of technological progress', *Journal of Applied Economics*, 17(1), 31-62.
- Arezki, R., & Gylfason, T. (2011). *Commodity Price Volatility, Democracy, and Economic Growth*. In *Economic Growth and Development*. Emerald Group Publishing Limited.
- Asmamaw, K. A. (2016). *Macroeconomic determinants of economic growth in Ethiopia. A Vector Correction Model*. MA Dissertation. University of Addis Abbaba.
- Anyanwu, J. C. (2014) 'Factors affecting economic growth in Africa: Are there any lessons from China?' *African Development Review*, 26 (3): 468-493.
- Bahar Bayraktar (2006) *Investigation on Sources of Growth for Turkey*, *Canadian Journal of Development Studies*, 27:1, 25-38
- Barro, R. (1995). *Determinants of economic growth*. Cambridge, MA: MIT Press.
- Barro, R. J. (2003). *Determinants of economic growth in a panel of countries*. *Annals of Economics and Finance*, 4, 231-274.
- Bonga-Bonga, L. & Ahiakpor, F. (2015) 'Determinants of economic growth in Sub-Saharan Africa: The case of Ghana', *MPRA Paper*, 66923. University Library of Munich.
- Burnside, C., & Dollar, D. (2000). *Aid, growth and policies*. *American Economic Review*, 90(4), 847-868.
- Chansa, F., Mubanga, N., Mudenda, D., & Ndulo, M. (2019) 'Industrial growth and policy in Zambia: Lessons from South Korea', *African Journal of Economic Review*, 7(2), 1-26.
- Chirwa, T.G., & Odhiambo, N.M. (2019) 'The nexus between key macroeconomic determinants and economic growth in Zambia: A dynamic multivariate Granger causality linkage', *Empir Econ*, 57, 301-327. <https://doi.org/10.1007/s00181-018-1439-2>
- Chirwa T.G., & Odhiambo N.M. (2016) 'Macroeconomic determinants of economic growth: A review of international literature', *South East European Journal of Economics and Business*, 11(2), 33-47. DOI: 10.1515/jeb-2016-0009.

Chirwa T.G., & Odhiambo N.M. (2015) 'The dynamics of the real sector growth in Zambia: Key macroeconomic drivers and challenges', *Global Journal of Emerging Economies*, 7(3), 217-235. <https://doi.org/10.1177/0974910115592286>

Chirwa, T.G., & Odhiambo, N.M. (2017) 'Sources of economic growth in Zambia: An empirical investigation', *Global Business Review*, 18(2), 275-290.

Easterly, W. (2003). Can foreign aid buy growth? *The Journal of Economic Perspectives*, 17(3), 23-48.

Frankel, J. A., & Romer, D. H. (1999) 'Does trade cause growth?' *American economic review*, 89(3), 379-399.

Ghazanchyan M. & Stotsky J. G. (2013) 'Drivers of growth: Evidence from Sub-Saharan African countries', *IMF Working Papers*, WP/13/236 November 2013.

Grech A.G. & Rapa, N. (2019) 'A reassessment of external demand's contribution to Malta's economic growth', *Journal of Economic Structures*, 8(12).

Harttgen, K., Klasen, S., & Vollmer, S. (2013). 'An African growth miracle? Or: what do asset indices tell us about trends in economic performance?' *Review of Income and Wealth*, 59, S37-S61.

Ho, S. Y., & Iyke, B. N. (2020). The determinants of economic growth in Ghana: new empirical evidence. *Global Business Review*, 21(3), 626-644.

Hussin, F., Mat Ros, N., & Zamzuri Noor, M. S. (2013) 'Determinants of economic growth in Malaysia 1970-2010', *Asian Journal of Empirical Research*, 3(9), 1140-1151.

Johansen, S., (1990) 'Estimation and Hypothesis Testing of Cointegration Vectors in Gaussian Vector Autoregressive Models' *Econometrica* 159, 1551

Johansen, S., & Juselius, K., (1990) 'Maximum Likelihood estimation and inference on cointegration with applications to Demand for Money' *Oxford Bulletin of Economics and Statistics*.

McMillan, M. S., & Kenneth, H. (2014) 'What is driving the African growth miracle?' *National Bureau of Economic Research*, w20077.

Masanjala, W. H., & Papageorgiou, C. (2008) 'Rough and lonely road to prosperity: a re-examination of the sources of growth in Africa using Bayesian model averaging', *Journal of Applied Econometrics*, 23(5), 671-682.

Mulungu, K., & Ng'ombe, J. N. (2017) 'Sources of economic growth in Zambia, 1970-2013: A growth accounting approach,' *Economies*, 5(2), 15.

- Mwenda, A., & Mutoti, N. (2011). Financial sector reforms, bank performance and economic growth: Evidence from Zambia. *African Development Review*, 23(1), 60-74.
- Ndulu, B. J., & O'Connell, S. A. (1999). Governance and growth in sub-Saharan Africa. *The Journal of Economic Perspectives*, 13(3), 41-66.
- Oana, C. P. & Căflin, A. C. (2016) 'Economic growth, foreign investments and exports in Romania: A VECM analysis', *Romanian Economic Journal, Department of International Business and Economics from the Academy of Economic Studies Bucharest*, 19(61), 95-122.
- Pesaran, M. H. & Shin Y. (1995) 'An Autoregressive Distributed Lag Modelling Approach to Cointegration Analysis' *Working Paper in Economics' University of Cambridge*
- Rajan, R. G., & Subramanian, A. (2011). Aid, Dutch disease, and manufacturing growth. *Journal of Development Economics*, 94(1), 106-118.
- Rodrik, D. (2018) 'An African growth miracle?' *Journal of African Economies*, 27(1), 10-27.
- Sachs, J. D., & Warner, A. M. (1997). Sources of slow growth in African economies. *Journal of African economies*, 6(3), 335-376.
- Saima, N., Nasir, I. & Muhammad, A. K. (2014) *The Pakistan Development Review*, 53(1), 15-31.
- Sydney, C. & Makina, D. (2019) 'Economic growth and human development: Evidence from Zambia', *Sustainable Development*, 27(6), 1023-1033. <https://doi.org/10.1002/sd.1953>
- Teixeira, A. A., & Queirós, A. S. (2016). Economic growth, human capital and structural change: A dynamic panel data analysis. *Research policy*, 45(8), 1636-1648.
- Turnovsky, S. (2009) *Capital Accumulation and Economic Growth in a Small Open Economy* (The CICSE Lectures in Growth and Development). Cambridge: Cambridge University Press. doi:10.1017/CBO9780511641978.
- Young, A. (2012) 'The African growth miracle', *Journal of Political Economy*, 120(4), 696-739.



REGISTERED OFFICES

Head Office

Bank of Zambia, Bank Square, Cairo Road
P.O. Box 30080, Lusaka, 10101, Zambia
Tel: +260 211 399 300
E-mail: info@boz.zm, Website: www.boz.zm

Regional Office

Bank of Zambia, Buteko Avenue,
P.O. Box 71511, Ndola, Zambia
Tel: +260 212 399 600
E-mail: info@boz.zm, Website: www.boz.zm