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MULTIVARIATE APPROACH

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DOES FOREIGN DIRECT INVESTMENT INFLUENCE POVERTY IN ZIMBABWE? A MULTIVARIATE APPROACH

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Abstract

This study examined the causal relationship between poverty and foreign direct investment inflows in Zimbabwe using data from 1990 to 2020. The study was motivated by the need to determine which factor influence the other between FDI and poverty. This would contribute to identifying possible solution to the challenge of low foreign direct investment and high poverty levels in Zimbabwe, despite the government open-door policy for foreign investors. The human development index and household consumption expenditure were used as poverty proxies. Using the autoregressive distributed lag to cointegration test and ECM-based causality test, the study found a unidirectional causal flow from poverty to foreign direct investment in both the short and long run, regardless of the poverty proxy used. The study confirms the importance of preconditions to foreign direct investment inflows. It is recommended that policy makers in Zimbabwe complement the open-door policy for foreign investors with policies that address preconditions such as poverty, infrastructure, education and health, to stimulate high levels of foreign direct investment.

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1.   Introduction

Foreign direct investment (FDI) has become one of the sources of development finance among other external sources such as remittance inflows. Although remittance is a huge external source of financing in pursuit of the sustainable development goals (SDGs), FDI and official development assistance and foreign direct investment still has a place in the development agenda, especially when it comes to public investments that require huge capital outlay (Ratha, 2013). This makes FDI important for the achievement of the SDGs, especially in developing countries that struggle with low savings that cannot support investment demands. The impact of remittances on poverty and financial development among other macroeconomic variables is attracting interest from researchers against the backdrop of surging remittance inflows. Although remittances have an advantage over FDI as they are not associated with any conditions of repayment and interest, their impact on the economy has become questionable, with some studies pointing to pre-conditions such as well-advanced social institutions, financial sector development, and a shift away from a large proportion of remittances being spent on consumption. The main objective of this study was to determine the impact of FDI on poverty in Zimbabwe. Can FDI be a panacea to worsening poverty levels in Zimbabwe as measured by a poverty headcount and the poverty gap?

FDI fell from $1.5 trillion in 2019 to $1 trillion in 2020, largely due to the COVID-19 pandemic (United Nations Conference on Trade and Development 'UNCTAD)', 2021). Greenfields FDI in developing countries declined from $454 billion in 2019 to $255 billion in 2020; for developed countries a decline of 16% was registered from $346 billion in 2019 to $289 billion in 2020 (UNCTAD, 2021). Although there has been a registered decline in FDI at a global level, Zimbabwe has been struggling to attract FDI to boost economic growth that would create resources to support poverty alleviation programmes (African Development Bank 'AFDB',

2022) Some of the contributing factors are economic instability and the removal of subsidies on maize meal, fuel and electricity (AFDB, 2022). Inflation in Zimbabwe averaged 622% in 2020, up from 226.9% in 2019 (AFDB, 2022). The budget deficit also rose from 2.7% in 2019 to 2.9% in 2020 (AFDB, 2022). Total public debt was 53.9% of the GDP, with 95.6% being external debt and $6.4 billion in arrears (AFDB, 2022). Zimbabwe has been in default since 2000, and the country must rely on domestic resource mobilisation and borrowing from non-Paris Club members (AFDB, 2022). Thus, sources for development finance have been limited, making the mobilisation of FDI difficult. These developments have also negatively impacted the poverty levels in the country as more and more people slip into poverty. Using the $5,50 a day poverty headcount, 74% were in poverty in 2011, and this figure grew to 83% in 2019, implying that more than 50% of the population live below $5,50 a day and 40% below $1,90 (World Bank, 2022).

There is extensive literature on the impact of FDI on poverty, and the number of studies that have taken a step further to examine the causal relationship between the two is limited but growing. In the latter studies, the results are mixed. Some studies found bidirectional causality between FDI and poverty (Gohou and Soumare, 2012), some confirmed a unidirectional causality running from FDI to poverty (Musakwa and Odhiambo, 2020; Fauzel, Seetanah and Sannassee, 2015), others found a unidirectional causal flow from poverty to FDI (Magombeyi and Odhiambo (2017), and some studies found no causal relationship (Magombeyi and Odhiambo, 2017; Gohou and Soumare, 2012). The inconclusive results on the causal relationship between FDI and poverty makes generalisation of results from one study to another inappropriate for policy formulation. A study on the nature of the relationship was therefore important for Zimbabwe, especially now when the country is making an effort to support foreign investment on one hand and deal with soaring poverty levels on the other. Should

government support FDI as a solution to socio-economic challenges? Can FDI be a multipronged solution to the economic and poverty challenges that the country is facing?

This study explored the causality between FDI and poverty using the human development index (HDI) and household consumption expenditure as measures of poverty and FDI as a percentage of the GDP as a measure of FDI. Autoregressive distributed lag (ARDL) was used to examine the nature of the relationship between the two variables. The ARDL approach was selected for this study as it has several advantages over other methods. For instance, the approach provides answers in short- and long-run timeframes. This is more informative to policy makers when it comes to timing of policies related to poverty reduction using FDI as a macroeconomic variable. ARDL is also robust in small samples.

Zimbabwe was selected for this study because it has put in place policies to support FDI and poverty alleviation since independence, with few results on both fronts as exhibited by the trends in the two variables. This comes at a time when the country has signed the agreement on the SDGs, putting more pressure on the government to meet the SDG targets. It is also clear that domestic savings are not sufficient to drive development targets set out in the SDGs, making external financing important in the development agenda of the country. Moreover, remittance inflows have increased over the years, but there is emerging evidence to suggest that remittances cannot solely support development targets at a national level, especially in countries like Zimbabwe where people prefer to operate outside the banking system. Thus FDI remains an important source of development, as well as poverty alleviation. The findings from the study suggest solutions to poverty in the country which threaten other economic development efforts.

Section 2 of this paper outlines the literature on FDI and poverty, section 3 covers estimation techniques and model specification, section 4 presents the empirical results and section 5 concludes the study.

2. Literature Review

2.1 Country-based literature review

Poverty dynamics

Poverty is a result of an accumulation of socio-economic events from the time the country gained independence. The post-independence era was marked by government efforts to reconstruct and align the inherited structures to deliver new economic and social policies (Sibanda and Makwata, 2017) through the Growth with Equity: Transitional National Development Plan (1982-1990). Government policy post the Growth with Equity Plan focused on social justice and equity. Primary education was offered for free, with secondary education being heavily subsidised. It is evident that government policy after independence was aimed at redressing the ills of the pre-independence error (Sibanda and Makwata, 2017). The structural adjustment programme from 1990 saw the side-lining of the redistributive role that the government had played since independence. This had a negative impact on poverty given that the years in which the programme was applied coincided with severe droughts that exacerbated the situation of the poor (Sibanda and Makwata, 2017). The structural adjustment programme negatively affected the economy and the poor, which resulted in the formulation of the Social Development Fund (SDF) in 1991 with the main objective of cushioning vulnerable groups from the negative effects of the structural adjustment programme. The Fund was aimed at covering frictional unemployment, cost recovery measures and removal of subsidies (Kaseke, 1994). It consisted of two channels: the Employment and Training Programme, and Social Welfare. Under Social Welfare, food money, school fees and health service user fees were the

main schemes that were offered to cater for the vulnerable. The Interim Poverty Reduction Strategy Paper 2016 to 2018 expressed one of the overarching objectives of the Zimbabwe Agenda for Sustainable Socio-Economic Transformation (ZimAsset) on poverty alleviation. It also aimed to accelerated inclusive growth. Poverty alleviation was clustered under seven pillars: agriculture productivity, growth and rural food security; social sector; private sector; infrastructure; environment and climate change; gender, women and youth empowerment; and strengthening governance and institutional capacity.

Despite the policy focus expressed in the ZimAsset and Strategy Paper, poverty dynamics also reflected the policy thrust of the government on poverty, with more and more people slipping into poverty as measured by the poverty headcount and poverty gap (World Bank, 2022). The poverty gap at $1,90 a day increased from 5.2% in 2011 to 13.4% in 2019; the poverty headcount also followed the same trend with 21.4% recorded in 2011 and a deterioration by 18.1% to register 39.5% in 2019 (World Bank, 2022).

Table 1: Poverty Dynamics using Headcount and Poverty Gap Measures

Year	Poverty Headcount		Poverty Gap	
	$1,90 a day	$5,50 a day	$1,90 a day	$5,50 a day
2011	21.4%	74%	5.2%	36.1%
2017	33.9%	81.3%	9.3%	45.2%
2019	39.5%	82.8%	13.4%	48.4%

World Bank (2022)

Despite the deterioration in poverty as measured by the poverty headcount and poverty gap metrics, the HDI recorded an improvement from 0,478 in 1990 to 0,571 in 2019 (United Nations Development Programme (UNDP), 2022). According to the UNDP (2020), the HDI is a composite measure of long-term progress on health, education and standards of living. These are captured by life expectancy, mean years of schooling and expected years of schooling. The HDI deteriorated from 1990 to 2006 before recovering from the downward

spiral with a marginal improvement each year to 0,571 in 2019 (UNDP, 2022). An average of 0,477 was recorded between 1990 and 2019, showing a need for more to be done to improve human development in Zimbabwe (UNDP, 2022). The positive development in human development could be attributed to the multiple components of the HDI that focus on income and non-income measures compared to the poverty headcount and poverty gap, which focus on income measures (UNDP, 2022).

Foreign direct investment dynamics

There are three platforms that facilitate foreign investment in Zimbabwe, namely the Zimbabwe Investment Development Agency (ZIDA), Zimbabwe Stock Exchange (ZSE) and the Reserve Bank of Zimbabwe Foreign Exchange Control. ZIDA was established by the ZIDA Act 4 of 2006 (Chapter 14) with a mandate to coordinate, promote and facilitate foreign direct investment and local investment. This agency was created out of the merger of the Zimbabwe Investment Centre and Export Processing Zones Authority (ZIDA, 2022). The role of ZIDA includes identifying sectors of the economy with potential for attracting foreign and domestic investors; facilitating and processing investment applications for approval; implementing investment promotion strategies for the purpose of encouraging investment by domestic and foreign investors; advising the Minister on investment policy and recommending the granting of incentives where applicable; and promoting and coordinating investment in strategic sectors and enterprises which have strategic importance for national development. Foreign investors willing to invest in Zimbabwe have no restriction on the amount of foreign currency brought into the country; investors are allowed 100% remittance dividends; they are allowed to borrow locally and offshore; there is 100% repatriation of disinvestment proceeds and equity investment can be made in cash or capital equipment (Reserve Bank of Zimbabwe (RBZ), 2022).

The ZSE offers an alternative channel to foreign investors through the stock exchange. Currently, 58 companies are listed on the ZSE from different sectors of the economy. The guidelines for foreign investors that select this channel include, but are not limited to, the following: the purchase of shares on the ZSE must be financed by inward transfer of foreign currency through the banking channels; disinvestment proceeds can be fully remitted; capital gains made are subject to capital gains tax; investors are allowed to participate 100% in the primary issuance of bonds and stocks and are allowed to dispose in the secondary market, although they cannot purchase these primary instruments in the secondary market; and proceeds from the investment can be fully remitted subject to deduction of withholding tax (RBZ, 2022). The RBZ Exchange Control offers another avenue to foreign investors access to existing entities and operations through mergers, takeovers and rights issues. These are subject to approval by the Exchange Control within the RBZ (RBZ, 2022).

The national policies that were formulated to boost socio-economic development and investment from domestic and foreign investors have had mixed success. FDI remained depressed between 1990 and 1994 with inflows below 1% of GDP (World Bank, 2022). The inflows picked up in 1995, a period that coincided with the economic structural adjustment programmes, where liberalisation was one of the main objectives. Huge inflows were received in 1998 of 6% of GDP, making this year an outlier in the study period (World Bank, 2022). The country has never matched the FDI inflows received in that year (World Bank, 2022). However, from 2005 to 2020, an average of 1.7% of GDP was recorded (World Bank, 2022). Figure 1 reports the FDI and HDI for Zimbabwe covering the study period.

Figure 1: Trends in FDI and Human Development Index 1990-2020
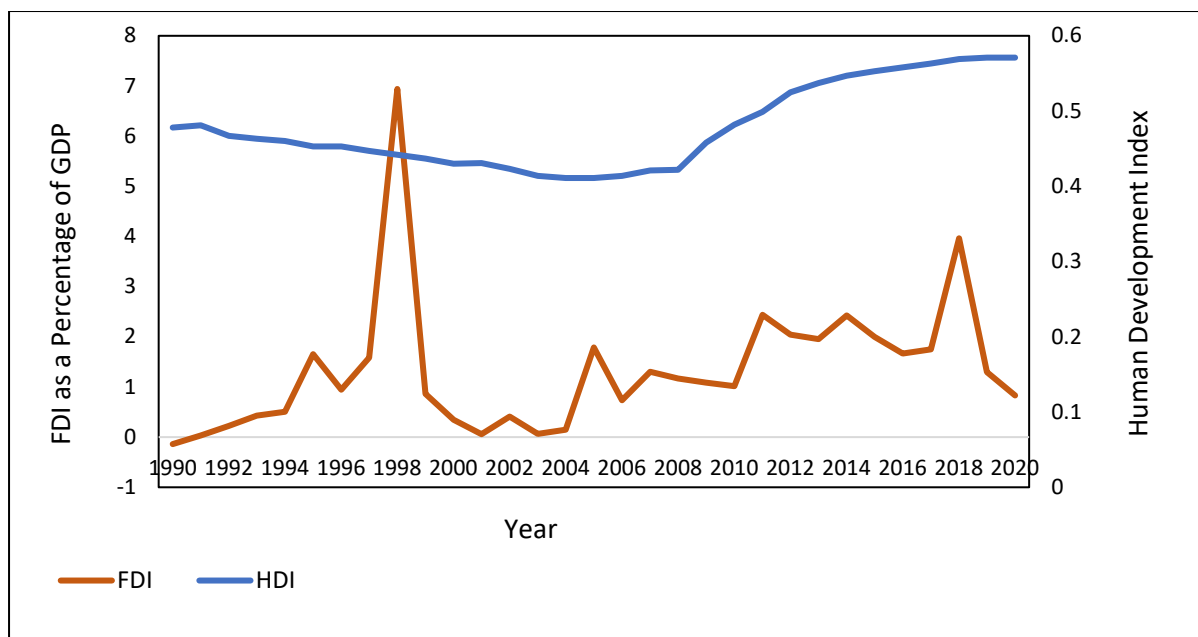
World Bank (2022) and UNDP (2022)

Figure 1 shows a high fluctuation in FDI compared to HDI, which remained stable over the study period. It is interesting to note that the fluctuations in FDI are not mimicked by the HDI, suggesting no close link between FDI and poverty levels in the country.

2.2 Theoretical and empirical literature review

FDI, according to the Organisation for Economic Cooperation and Development (OECD) (2022), is cross-border investment made by a resident from one economy with the main aim of establishing a lasting interest in an enterprise. This could be a direct investment enterprise or with an affiliate company (OECD, 2022). Foreign direct investors are motivated by the need to establish long-term influence with normally 10% of the voting rights in the investment enterprise. FDI can be in the form of brownfields and greenfields. Greenfields are new investments that involve building new factories in the investment economy, and brownfields involve mergers and acquisitions of existing companies. Greenfields are the most preferred FDI as they provide new job opportunities and fresh capital injection. FDI has several benefits for businesses upstream and downstream the foreign subsidiary and the locals (Farole and Winkler, 2012; Meyer, 2004). It boosts vertical and horizontal integration, brings new

management techniques, increases competition in the domestic industries, which consequently leads to competitive prices, quality and variety to consumers and to the use of new technology in production and marketing (Meyer, 2004; Gorg and Greenaway, 2004). In other words, FDI speeds up the diffusion of technology and good management practices into the economies invested in. FDI also facilitates innovation through imitation and reverse engineering. The most important link between FDI and poverty, especially in developing countries, is job creation (Borensztein et al., 1998). FDI subsidiaries lead to an increase in demand for labour from locals. Given the close link between earning and poverty, FDI contributes to increased earnings, enabling the poor to access other social services. Further, some FDI subsidiaries develop infrastructure around the enterprises they have established, thereby improving accessibility and indirectly benefitting the local communities.

The studies that have investigated the impact of FDI on poverty are inconclusive. The same can be said about the studies that examined the causal relationship between the two factors, referred to earlier. The variation in the findings of different studies suggests the importance of a country-by-country analysis to determine the nature of the relationship. Given the limited extant literature on the causality between FDI and poverty, studies that have examined the impact of FDI on poverty and those that have analysed the causality between the two variables are discussed below.

Topalli et al. (2021) examined the impact of FDI on poverty in six western Balkan countries. Using panel data from 2002 to 2021 and the generalised method of moments, they found that FDI contributed positively to poverty reduction. The effects of FDI on poverty were found to depend on where and how FDI was invested, especially in productive sectors of the economy. Do et al. (2021) investigated the spatial effect of FDI on poverty reduction in Vietnam using

provincial level panel data, spatial econometrics and fixed-effects regression. They found that FDI contributed to poverty reduction directly and indirectly through human capital development. Gnangnon (2021) investigated the effects of poverty on FDI in 117 countries using panel data from 1980 to 2017. Poverty headcount and poverty gap were used as poverty measures. Using the two-step system generalised method of moments, in the full sample, poverty was found to have an adverse effect on FDI. The impact was found to be greatest in countries with low-income levels.

In a separate study, Gochero and Boopen (2020) investigated the impact of mining FDI on economic growth using data from 1988 to 2018. The findings of the study revealed that mining FDI had a high positive impact on economic growth compared to non-mining FDI. A combination of mining, non-mining and domestic investment had a positive impact on economic growth in the short run but at a weak level. Bharadwaj (2014) examined the impact of FDI on poverty in a study of 35 developing countries using data from 1990 to 2004. Poverty headcount and poverty gap were used as proxies of poverty. Employing panel regression, FDI was found to alleviate poverty in the sample countries. In the same vein, Fowowe and Shuaibu (2014) studied the impact of FDI on poverty in a sample of 30 African countries using pooled data between 1981 and 2011. Poverty headcount was used as a measure of poverty. Using the generalised method of moments, the study found FDI to be good for the poor, with the impact being high in poor countries with high poverty incidence. The results were consistent with findings from a study by Shamim et al. (2014) on the impact of FDI on poverty in Pakistan using data from 1973 to 2011 and poverty headcount as a measure of poverty. Ucal (2014), in a study on the effect of FDI on poverty in 26 developing countries using panel data from 1990 to 2009, found the same results as Do et al. (2021), Bharadwaj (2014) and Fowowe and Shuaibu (2014). Fauzel et al. (2015) investigated the impact of FDI on poverty in selected sub-Saharan

African countries using data spanning from 1990 to 2010. Using the panel vector correction approach, the study found FDI to have a negative effect on poverty.

Apart from studies that found a positive impact, Anetor, Esho and Verhoef (2020) examined the effects of international flows in the form of FDI and foreign aid on poverty in sub-Saharan African countries using panel data from 1990 to 2017. Using feasible generalised least squares, they found that FDI had a negative effect on poverty reduction in the countries studied. Nguea, Noumba and Noula (2020) examined the impact of FDI on poverty in Cameroon using data from 1994 to 2012. Three poverty proxies were used, namely life expectancy, per capita household consumption expenditure and infant mortality rate. Employing the ARDL approach, they found the impact of FDI on poverty to be less significant, with one out of three proxies confirming a positive contribution of FDI to poverty reduction in the short run. FDI had a insignificant impact on poverty when measured by per capita household consumption expenditure, irrespective of the period considered. When infant mortality rate was used as a proxy, FDI was seen to cause an increase in the infant mortality rate, implying that FDI worsened poverty. When life expectancy was used as a proxy, FDI worsened poverty in the short run and was insignificant in the long run.

2.3   Studies on the causal relationship between FDI and poverty

Studies that examined the causal relationship between the two also had mixed results. Musakwa and Odhiambo (2020) examined the causality between FDI and poverty reduction in Tanzania using data from 1980 to 2014. Using household consumption expenditure, infant mortality rate and life expectancy as measures of poverty, they found a unidirectional causal flow from poverty reduction to FDI in both the short and long run when household consumption expenditure and life expectancy were used as poverty reduction measures. When infant mortality rate was used as a poverty measure, a unidirectional causal flow was only confirmed

in the short run and no causality was found in the long run. Musakwa and Odhiambo (2019) examined the causality between FDI and poverty reduction in Botswana using annual time series data from 1980 to 2014. They used life expectancy, infant mortality rate and household consumption expenditure as poverty proxies. Employing the ARDL approach to cointegration and ECM-based Granger causality, they found a unidirectional causal flow from FDI to poverty when infant mortality rate and life expectancy were used as poverty proxies. However, no causality was found between poverty and FDI when household expenditure was used as a proxy. Magombeyi and Odhiambo (2017) investigated the causal relationship between FDI and poverty in South Africa using data from 1980 to 2014. Life expectancy, infant mortality rate and household consumption expenditure were used as measures of poverty. Using the ARDL approach, they found a distinct unidirectional causal flow from poverty reduction to FDI in both the short and long run when poverty was measured by life expectancy and infant mortality rate. No causality was confirmed when household consumption was used as a proxy. Fauzel et al. (2015) examined the causality between FDI and poverty for selected sub-Saharan African countries using poverty headcount as a poverty measure. The results from this study were consistent with those of Musakwa and Odhiambo (2020). A distinct unidirectional causal flow from FDI to poverty was confirmed. Gohou and Soumare (2012) examined the causality between FDI and poverty for 52 African countries using data from 1990 to 2007. HDI and per capita GDP were used as poverty measures and bidirectional causality was found in at least one country and a unidirectional causal flow from FDI to HDI in at least one country. The literature review confirms variation of causality results even within one study, making a country-by-country study important.

There is overwhelming evidence of the positive impact of FDI on poverty reduction. Regarding the causal relationship between the two, despite the dearth of studies, mixed results are

attributed to the proxies used, the country under study and methodology. These conflicting results make generalisation of results from one study to the other inappropriate.

3. Estimation Techniques

The ARDL approach to cointegration and ECM-based Granger causality framework were used in this study to explore the causal relationship between FDI and poverty in Zimbabwe. The approach was selected due to its advantages, such as being robust in small samples and determining the impact of FDI on poverty in both the long and short run, which can be used to tie policy outcomes to timeframes.

3.1   Definition of variables

Variables of interest in this study were FDI and poverty measured by the HDI. The HDI measures three outcomes: health (measured by life expectancy), education (measured by years of schooling) and standards of living (measured by GDP) (UNDP, 2022). Household consumption is the second measure of poverty that focus on income metric. Human development index and household consumption expenditure are regressed separately in Model 1 and 2 respectively. Other intermittent variables added to the Models to form a multivariate framework are trade openness (TOP), GDP per capita (GDPP), inflation (INFL) and unemployment (UNEMP).

Table 2: Definition and Sources of the Variables included in the Model

Variable	Proxy	Notation	Data Source
Human development index	Human development index	HDI	UNDP
Household consumption expenditure	Household consumption expenditure as a percentage of GDP	HCE	World Development Indicator
Foreign direct investment	Foreign direct investment inflows	FDI	World Development Indicator

Trade openness	Sum of imports and exports as a percentage of GDP	TOP	World Development Indicator
GDP per capita	GDP divided by population	GDPP	World Development Indicator
Inflation	Change in consumer price index	INFL	World Development Indicator
Unemployment	Total unemployment as a total of labour force	UNEMP	World Development Indicator

3.2 Model specification

ARDL Model Specification for Equation 1 (HDI, FDI, TOP, INFL, UNEMP)

Following Anetor et al. (2020), with a modification of variables included in the model, the ARDL model specification is given in Equation 1-5:

$$\Delta PV_{mt} = \varphi_0 + \sum_{i=1}^{n} \varphi_{1i} \Delta PV_{mt-i} + \sum_{i=0}^{n} \varphi_{2i} \Delta FDI_{t-i} + \sum_{i=0}^{n} \varphi_{3i} \Delta TOP_{t-i} + \sum_{i=0}^{n} \varphi_{4i} \Delta INFL_{t-i}$$
$$+ \sum_{i=0}^{n} \varphi_{5i} \Delta UNEMP_{t-i} + \beta_1 PV_{mt-1} + \beta_2 FDI_{t-1} + \beta_3 TOP + \beta_4 INFL_{t-1}$$
$$+ \beta_5 UNEMP_{t-1} + \mu_{1t} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

$$\Delta FDI_t = \varphi_0 + \sum_{i=0}^{n} \varphi_{1i} \Delta PV_{mt-i} + \sum_{i=1}^{n} \varphi_{2i} \Delta FDI_{t-i} + \sum_{i=0}^{n} \varphi_{3i} \Delta TOP_{t-i} + \sum_{i=0}^{n} \varphi_{4i} \Delta INFL_{t-i}$$
$$+ \sum_{i=0}^{n} \varphi_{5i} \Delta UNEMP_{t-i} + \beta_1 PV_{mt-1} + \beta_2 FDI_{t-1} + \beta_3 TOP + \beta_4 INFL_{t-1}$$
$$+ \beta_5 UNEMP_{t-1} + \mu_{2t} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

$$\Delta TOP_t = \varphi_0 + \sum_{i=0}^{n} \varphi_{1i} \Delta PV_{mt-i} + \sum_{i=0}^{n} \varphi_{2i} \Delta FDI_{t-i} + \sum_{i=1}^{n} \varphi_{3i} \Delta TOP_{t-i} + \sum_{i=0}^{n} \varphi_{5i} \Delta INFL_{t-i}$$
$$+ \sum_{i=0}^{n} \varphi_{6i} \Delta UNEMP_{t-i} + \beta_1 PV_{t-1} + \beta_2 FDI_{t-1} + \beta_3 TOP + \beta_4 INFL_{t-1}$$
$$+ \beta_5 UNEMP_{t-1} + \mu_{3t} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3)$$

$$\Delta INFL_t = \varphi_0 + \sum_{i=0}^{n} \varphi_{1i} \Delta PV_{mt-i} + \sum_{i=0}^{n} \varphi_{2i} \Delta FDI_{t-i} + \sum_{i=0}^{n} \varphi_{3i} \Delta TOP_{t-i} + \sum_{i=1}^{n} \varphi_{4i} \Delta INFL_{t-i}$$
$$+ \sum_{i=0}^{n} \varphi_{5i} \Delta UNEMP_{t-i} + \beta_1 PV_{mt-1} + \beta_2 FDI_{t-1} + \beta_3 TOP + \beta_4 INFL_{t-1}$$
$$+ \beta_5 UNEMP_{t-1} + \mu_{4t} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (4)$$

$$\Delta UNEMP_t = \varphi_0 + \sum_{i=0}^{n} \varphi_{1i} \Delta PV_{mt-i} + \sum_{i=0}^{n} \varphi_{2i} \Delta FDI_{t-i} + \sum_{i=0}^{n} \varphi_{3i} \Delta TOP_{t-i}$$

$$+ \sum_{i=0}^{n} \varphi_{4i} \Delta INFL_{t-i} + \sum_{i=1}^{n} \varphi_{5i} \Delta UNEMP_{t-i} + \beta_1 PV_{mt-1} + \beta_2 FDI_{t-1}$$

$$+ \beta_3 TOP + \beta_4 INFL_{t-1} + \beta_5 UNEMP_{t-1} + \mu_{5t} \dots\dots\dots\dots\dots\dots\dots\dots (5)$$

Where PV = Poverty measured by HDI and household consumption expenditure as a percentage of GDP (HCE); FDI = Foreign direct investment inflows as a percentage of GDP; TOP = Trade openness; INFL= Inflation rate; UNEMP = Total unemployment as a total of labour force; and ED$\alpha_{1-}\alpha_5$ and $\beta_1 - \beta_5$ are coefficients.

A test for cointegration was done to determine if there was a long-run relationship among the variables in each model. If cointegration was confirmed in some of the functions, causality was tested for both the short and long run. Only short-run causal flow was tested for these functions where cointegration was not confirmed. To determine cointegration in the function in this study, the calculated F-statistic was compared to the upper and lower bound critical values. If the F-statistic was above the upper bound, then cointegration was confirmed; if the F-statistic was below the lower bound, no long-run relationship was confirmed; and if the F-statistic was between the upper and the lower bound, no long-run relationship was confirmed. The general ECM specification for Equations 1-6 is given in Equations 6-10 as:

$$\Delta PV_{mt} = \varphi_0 + \sum_{i=1}^{n} \varphi_{1i} \Delta PV_{mt-i} + \sum_{i=1}^{n} \varphi_{2i} \Delta FDI_{t-i} + \sum_{i=1}^{n} \varphi_{3i} \Delta TOP_{t-i} + \sum_{i=1}^{n} \varphi_{4i} \Delta INFL_{t-i}$$

$$+ \sum_{i=1}^{n} \varphi_{5i} \Delta UNEMP_{t-i} + \gamma_1 ECM_{t-1} + \gamma_{1t} \dots\dots\dots\dots\dots\dots\dots (6)$$

$$\Delta FDI_t = \varphi_0 + \sum_{i=1}^{n} \varphi_{1i} \Delta PV_{mt-i} + \sum_{i=1}^{n} \varphi_{2i} \Delta FDI_{t-i} + \sum_{i=1}^{n} \varphi_{3i} \Delta TOP_{t-i} + \sum_{i=1}^{n} \varphi_{4i} \Delta INFL_{t-i}$$

$$+ \sum_{i=1}^{n} \varphi_{5i} \Delta UNEMP_{t-i} + \gamma_2 ECM_{t-1} + \gamma_{2t} \dots\dots\dots\dots\dots\dots\dots (7)$$

$$\Delta TOP_t = \varphi_0 + \sum_{i=1}^{n} \varphi_{1i} \Delta PV_{mt-i} + \sum_{i=1}^{n} \varphi_{2i} \Delta FDI_{t-i} + \sum_{i=1}^{n} \varphi_{3i} \Delta TOP_{t-i} + \sum_{i=1}^{n} \varphi_{4i} \Delta INFL_{t-i}$$

$$+ \sum_{i=1}^{n} \varphi_{5i} \Delta UNEMP_{t-i} + \gamma_3 ECM_{t-1} + \gamma_{3t} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (8)$$

$$\Delta INFL_{mt} = \varphi_0 + \sum_{i=1}^{n} \varphi_{1i} \Delta PV_{mt-i} + \sum_{i=1}^{n} \varphi_{2i} \Delta FDI_{t-i} + \sum_{i=1}^{n} \varphi_{3i} \Delta TOP_{t-i}$$

$$+ \sum_{i=1}^{n} \varphi_{4i} \Delta INFL_{t-i} + \sum_{i=1}^{n} \varphi_{5i} \Delta UNEMP_{t-i} + \gamma_4 ECM_{t-1} + \gamma_{4t} \ldots\ldots\ldots\ldots (9)$$

$$\Delta UNEMP_t = \varphi_0 + \sum_{i=1}^{n} \varphi_{1i} \Delta PV_{mt-i} + \sum_{i=1}^{n} \varphi_{2i} \Delta FDI_{t-i} + \sum_{i=1}^{n} \varphi_{3i} \Delta TOP_{t-i}$$

$$+ \sum_{i=1}^{n} \varphi_{4i} \Delta INFL_{t-i} + \sum_{i=1}^{n} \varphi_{5i} \Delta UNEMP_{t-i} + \gamma_5 ECM_{t-1} + \gamma_{5t} \ldots\ldots\ldots\ldots (10)$$

Where ECM = Error correction term; θ_1 = Coefficient of the ECM; and all the other variables and characters are as described in Equations 1 and 2.

3.3 Data sources

This study used annual time series data from 1990 to 2020 to investigate the causal relationship between FDI and poverty in Zimbabwe. Foreign direct investment inflows (FDI), household consumption expenditure (HCE), trade openness (TOP), inflation (INFL) and unemployment (UNEMP) were extracted from the World Development Indicators database. The HDI was retrieved from the UNDP database.

4. Empirical Results
4.1 Unit root test
Table 3: Unit Root Test

Dickey-Fuller Generalised Least Square (DF-GLS)				
Variable	**Stationarity of All Variables in Levels**		**Stationarity of All Variables in First Difference**	
	Without Trend	With Trend	Without Trend	With Trend
HDI	-0.891	-1.960	-1.939*	-3.006*
HCE	-1.552	-2.157	-6.501***	-6.681***
FDI	-1.362	-2.225	-5.083***	-5.130***
TOP	-1.220	-1.819	-1.833*	-3.108*
INFL	-1.075	-2.470	-3.265***	-3.442**
EDU	-1.688	-2.129	-6.501***	-6.996***
Phillip Perron (PP) Test				
HDI	-1.840	-1.562	-5.383***	-5.141***
HCE	-1.799	-2.006	-6.574***	-6.490***

FDI	-2.134	-1.509	-4.949***	-5.040***
TOP	-2.148	-2.566	-8.092***	-7.460***
INFL	-2.431	-1.085	-3.478**	-3.425*
EDU	-1.603	-2.545	-6.505***	-6.807***

Note: *, ** and *** denote stationarity at 10%, 5% and 1% significance levels, respectively.

4.2 Cointegration test
Table 4: ARDL Bound Test to Cointegration Results

Dependent Variable	Function	F-statistic	Cointegration Status
	Model 1: HDI as a measure of poverty		
HDI	F(HDI|FDI, TOP, INFL, UNEMP)	2,414	Not cointegrated
FDI	F(FDI| TOP, INFL, UNEMP,HDI)	8,118***	Cointegrated
TOP	F(TOP|FDI, INFL, UNEMP, HDI)	6,298***	Cointegrated
INFL	F(INFL|FDI, TOP, HDI, UNEMP)	1,183	Not cointegrated
UNEMP	F(UNEMP|FDI, TOP, INFL, HDI)	1,512	Not cointegrated
	Model 2: Household consumption expenditure as a measure of poverty		
HCE	F(HCE|FDI, TOP, INFL, UNEMP)	3,173	Not cointegrated
FDI	F(FDI| TOP, INFL, UNEMP,HCE)	4,497**	Cointegrated
TOP	F(TOP|FDI, INFL, UNEMP, HCE)	3,019	Not cointegrated
INFL	F(INFL|FDI, TOP, HEC, UNEMP)	2,287	Not cointegrated
UNEMP	F(UNEMP|FDI, TOP, INFL, HCE)	3,625*	Cointegrated

Asymptotic critical values (unrestricted intercept and no trend)					
Critical values	1%		5%		10%
	I (0)	I (1)	I (0)	I (1)	I (0)	I (1)
	3.74	5.06	2.86	4.01	2.45	3.52

Note: *, ** and *** denote stationarity at 10%, 5% and 1% significance levels, respectively.

The cointegration results reported in Table 4 show that some functions in Models 1 and 2 have a long run relationship. Cointegration suggest causality at least in one direction in the function. To proceed with the analysis, those function where cointegration was confirmed causality is estimated in long-run and short-run, while those functions without cointegration only short run estimation is done. Table 5 reports causality results for Model 1 and 2.

Table 5: Results on Causal Relationship between Poverty and FDI

Panel A	Model 1: Human Development Index as a poverty proxy (HDI)					
Dependent Variable	F-statistic [Probability value]					ECM t-statistics
	ΔHDI	ΔFDI	ΔTOP	ΔINFL	ΔUNEMP	
ΔHDI	-	0,019 [0.891]	6,274*** [0.005]	3,539** [0.047]	6,896** [0,015]	-
ΔFDI	10,328*** [0.004]	-	5,050** [0.011]	3,235* [0.085]	3,267* [0.056]	-0,966*** [-7,020]
ΔTOP	5,756** [0.011]	8,269*** [0,009]	-	2,947 [0.101]	2,654 [0.103]	-0,869** [-5,721]
ΔINFL	5,756** [0.011)	1,220 [0.281]	7,836*** [0,003]	-	2,653 [0.103]	-
ΔUNEMP	0,767 [0.391]	4,222* [0.257]	1,352 [0,026]	0,170 [0.685]	-	-

Panel B	Model 2: Household consumption expenditure (HCE) as a poverty proxy					
ΔHCE	ΔHCE	ΔFDI	ΔTOP	ΔINFL	ΔUNEMP	-
ΔHCE	-	0,031 [0.891]	9,681*** [0.005]	0,003 [0.954]	6,002** [0,022]	
ΔFDI	5,680** [0.012]	-	3,545** [0.034]	1,121 [0.303]	5,792** [0.056]	-0,862** [-5,137]
ΔTOP	4,780** [0.018]	1,607 [0,223]	-	0,071 [0.793]	3,597* [0.071]	-
ΔINFL	1,503 [0.254)	4,217** [0.035]	3,115* [0,058]	-	2,252 [0.154]	-
ΔUNEMP	1,593 [0.216]	0,037 [0.840]	1,802 [0,192]	4,275** [0.049]	-	-0,260* [-3,084]

Note: *, ** and *** denote stationarity at 10%, 5% and 1% significance levels, respectively.

The results reported in Table 5, Panel 1, Model 1, where poverty is measured by the HDI, confirm both a long- and short-run causal flow from HDI to poverty. The same causal flow is confirmed in Panel B, Model 2, where household consumption expenditure was used as a proxy for poverty. The findings of the study are therefore consistent, regardless of the poverty measure used. This points to the importance of preconditions for FDI to be realised. Investors consider infrastructure development, institutional capacity and education, among other investment aspects in the host country (see Farole and Winkler, 2012; Klein et al., 2001). Gnangnon (2022), in a study of 117 countries, confirmed the negative impact of poverty on FDI, especially human development aspects such as education and health. These results are not unique to Zimbabwe only — Magombeyi and Odhiambo (2017) found the same results in a study on South Africa.

Other results reported in Table 5, Panel A, confirm (i) bidirectional causality between FDI and TOP in both the short and long run; (ii) bidirectional causality between HDI and INFL in the short run; (iii) bidirectional causality between HDI and TOP in the short run and a unidirectional causal flow from HDI to TOP in the long run; (iv) a unidirectional causal flow from unemployment to HDI in the short run, pointing to the importance of income earned from employment in alleviating poverty in Zimbabwe; (v) a unidirectional causal flow from inflation

to FDI in both the short and long run, confirming the importance of a stable macroeconomics environment as an important factor considered by investors; (vi) bidirectional causality between FDI and unemployment in the short run and a unidirectional causal flow from unemployment to FDI in the long run; (vii) a unidirectional causal flow from TOP to inflation in the short run; (viii) a unidirectional causal flow from unemployment to TOP in both the short and long run; and (ix) no causality between inflation and unemployment.

Other results reported in Table 5, Panel B, Model 2, confirm (i) a unidirectional causal flow from TOP to FDI in both the short and long run; (ii) no causality between HCE and inflation; (iii) bidirectional causality between poverty and TOP in the short run; (iv) a unidirectional causal flow from unemployment to poverty in the short run, showing the dependence of most households in Zimbabwe on income earned from different jobs; (v) a unidirectional causal flow from FDI to inflation in the short run; (vi) a unidirectional causal flow from unemployment to FDI in both the long and short run, confirming government's open-door policy for foreign investors to ease unemployment and foster economic growth; (vii) a unidirectional causal flow from TOP to inflation in the short run; (vii) bidirectional causality between TOP and unemployment in the short run and a unidirectional causal flow from TOP to unemployment in the long run; and (ix) no causality between unemployment and inflation in both the short and long run.

The findings of this study confirm the preconditions that attract foreign investors as one of the most important aspects to FDI. High poverty levels discourage foreign investment in Zimbabwe, which could explain why foreign investment has remained low despite government's open-door policy for every investor willing to do business with the country. The

results suggest the need for government to improve the preconditions that investors look for, such as poverty, infrastructure and macroeconomic stability to improve FDI.

5. Conclusion

This study investigated the casual relationship between FDI and poverty in Zimbabwe using time series data from 1990 to 2020. The study was motivated by the need to determine what influence each variable has on each other to formulate informed policies in Zimbabwe. This has become even more important with the commitment of Zimbabwe to the SDGs. The HDI and household consumption expenditure were used as poverty measures. To fully specify the models, inflation, trade openness and unemployment were included to develop a multivariate causality framework. Using the ARDL approach to cointegration and ECM-based Granger causality test, the study found a unidirectional causal flow from poverty to FDI in both the short and long run, irrespective of the poverty proxy used. The findings of this study confirm the importance of preconditions that foreign investors consider before making an investment commitment. It can be concluded that preconditions are an important aspect that investors look for when considering Zimbabwe as an investment destination. Based on the findings of this study, it is imperative that policy makers in Zimbabwe roll out policies that target preconditions such as poverty, education, health and infrastructure in order to positively influence FDI. The open-door policy for any investor willing to do business with Zimbabwe can yield improved results if policy makers complement it with targeted policies on the preconditions.

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