

FOREIGN DIRECT INVESTMENT AND INCOME INEQUALITY—EMPIRICAL EVIDENCE FROM THE SOUTHERN AFRICAN DEVELOPMENT COMMUNITY (SADC)

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ABSTRACT

Even though the impact that foreign direct investment (FDI) has on economic growth has received considerable empirical attention in Southern African Development Community (SADC), but its impact on income inequality has largely been neglected in the literature. But for FDI to catalyze inclusive growth and reduce poverty, a critical analysis of its distributional effects needs to be conducted. This paper therefore employs panel cointegration and causality techniques to examine the FDI-income inequality nexus in 15 SADC countries from 1990 to 2015. On the overall, FDI is found to have an inequality-increasing effect on the SADC region. Furthermore, a unidirectional causality-relationship is found running from FDI to income inequality, suggesting that FDI is a cause but not a consequence of inequality. But since education appears to reduce the level of FDI-induced inequality, it may be prudent for SADC to enhance its quality and quantity of education in order to reduce inequality.

Key words: Foreign Direct Investment, income inequality, panel cointegration and causality, Generalized Methods of Moments approach (GMM), SADC

JEL Classification: F21, F23, D31, C23

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INTRODUCTION

The Southern African Development Community (SADC) is among some of the most unequal regions on the African continent. While recent economic growth episode (1994-2017) in Africa has generally resulted in a reduction in income inequality for many countries on the continent, but the same cannot be said about many SADC countries where income inequality has marginally risen in both since the mid-1990s (Fosu, 2018). At the same time, countries in the above region have reported a stronger surge in foreign direct investment (FDI) inflows within the above period. Available data from United Nations Conference on Trade and Development (UNCTAD) reveals that from a meagre US\$372 million registered in 1980, FDI inflows into SADC countries have grown significantly to reach a record US\$15.96 billion in 2014 (UNCTAD, 2016). This rising trend has not only coincided with but also justified concerted efforts employed by host-governments in the SADC region aimed at attracting foreign investment.

If recent trends are anything to by, the persistence of inequality experienced in recent times may hinder the growth-enhancing efforts of the SADC countries. As a matter of fact, both theoretical and empirical economics literature are generally agreed on the idea that, on average, lower levels of income inequality are associated with rapid rates of growth and longer growth spells, but that higher inequality may smother growth more especially in developing countries (Barro, 2000; Berg and Ostry, 2011; Ostry et al., 2014; Dabla-Norris et al., 2015; Fosu, 2018). It is also widely accepted in economic circles that FDI spurs growth by bringing in foreign capital, know-how and superior technology into a host country. This is despite the positive FDI-effects largely being conditional on local characteristics such as policy environment, domestic financial markets, quality of institutions, human capital,

among others. Moreover, growth may sometimes attract FDI inflows thus implying an endogenous relationship between inward FDI and economic growth (Borenzstein et al., 1998; OECD, 2002; Alfaro, 2014). This strong evidence has compelled even critics of globalization including Stiglitz (2000) to concede that FDI may indeed contribute to economic development in developing countries.

It therefore comes as no surprise that FDI promotion for economic development and income redistribution programs through social policies has received wide support among researchers and currently rank as priorities in policy-making discourses in many developing regions across the globe such as SADC. But despite the above prominence, the fact that FDI and income inequality relationship can generate a policy dilemma in developing host countries has received very little attention among economists (Figini and Görg, 1999 and 2006). In fact, conventional economic wisdom suggests that the attraction of inward FDI may run counter to the inequality reduction efforts through income redistribution efforts of the above host governments more especially in instances where foreign investment induces greater levels of inequality (Herzer et al., 2014). This calls for an empirical examination of the FDI and inequality relationship in the above countries. Moreover, some SADC economies such as South Africa and Namibia inherited huge socio-economic inequalities from the Apartheid era which ended in the early 1990s. This post-Apartheid era coincides with the period that SADC has been active as an economic bloc from the early 1990s to date. This therefore gives license to this study to empirically assess the effect that increased FDI inflows has had on income inequality in the SADC region from 1990 to 2015.

Furthermore, available literature points to the fact that the FDI-inequality nexus is theoretically ambiguous in many host-developing countries. Actually, the majority of previous empirical research on the topic has been conducted

in developed countries (Blonigen and Slaughter, 2001; Driffield and Taylor, 2005; Herzer and Nunnenkamp, 2013). But owing to the differences in the levels of development and structures of the economies, the above findings may not hold in developing host regions such as SADC. It is against this background that this study employs cointegration and causality analyses to empirically examine the distributional impacts of inward FDI in the SADC region from 1990 to 2015. In undertaking this endeavor we employ the Westerlund (2005) cointegration test and the recently developed Dumitrescu-Hurlin (2012) panel causality test. On the same note, we also perform Arellano-Bond (1991) Generalised Method of Moments (GMM) procedure on the panel in order to not only obtain short-run causality results but also to ensure robustness of the conclusions. We prefer cointegration to conventional ordinary regression methods because we not only want to eliminate the possibility of conducting spurious regression but also to establish long-run equilibrium relationships between the variables. Thus cointegration allows the analysis to go beyond merely identifying correlation and instead to unearth causation (Enders, 2004). But more importantly, perhaps, determination of the direction of causality has important policy implications for the SADC region since it can guide policy makers in deciding whether or not to the above region should continue to aggressively promote FDI attraction without hampering inequality-reduction efforts.

The structure of the paper is arranged along the following lines: Section 1 presents a short introductory background to the topic. Furthermore, Section 2 gives a brief review of literature containing studies done on the subject across the world. Thereafter a description of analytical framework and empirical methodology used in the study is provided by Section 3. The study's empirical results are discussed in Section 4. Concluding remarks and suggestions

for future research on the subject in question are discussed in Section 5 as a conclusion.

A REVIEW OF THE LITERATURE

To begin with, theoretical literature suggests that, in general, conduits of FDI (multinational corporations-MNCs) possess firm specific assets such as superior technology, capital and managerial knowhow that puts them at an advantage over local firms originating from a host country (Alfaro, 2014). In concurrence with this view, Helpman et al., (2004) argue that only the most productive enterprises undertake FDI primarily to access and service external markets and resources. For Markusen (1995) ownership advantages that MNCs possess, enable them to overcome operational difficulties in foreign environments. This compensates for their lack of familiarity with external markets and hence empowers these foreign enterprises to effectively compete with local firms in host countries.

Given that MNCs generally have higher productivity than local firms, they therefore pay higher wages relative to the domestic enterprises (Aitken et al., 1996; Lipsey and Sjöholm, 2004). Apart from higher productivity, foreign firms may pay higher wages in order to avoid losing workers to rival multinationals or domestic firms. Empirical evidence is firm on the fact that foreign-owned firms on average, offer higher wage premia relative to domestic firms (ODI, 2002).

The above empirical evidence suggests that strong competition among host countries for potential inward FDI does not impede inequality reduction efforts of these countries. As predicted by the Hecksher-Ohlin model; foreign investment inflows would even aid inequality reduction initiatives in such a situation. Without doubt, under the Hecksher-Ohlin framework inward FDI would have similar effect to trade liberalization where relatively abundant factor endowments would benefit the most. Since

SADC member states are developing countries they are therefore considered as an abundant source of less-skilled laborers by above model. On the other hand, rich countries with an abundant supply of skilled laborers, are the main sources of foreign investment flows in these developing countries. Theoretically speaking therefore, FDI would increase the level of income inequality in the two host countries but at the same time; reduce inequality in the home countries of the multinationals (Feenstra and Hanson, 1997).

But Hecksher-Ohlin predictions for both host and source countries of FDI become more complex once differing skill intensities associated with the foreign investment are taken into consideration. According to Markusen and Venables (1997) headquarter activities of multinationals in source countries are more skill-intensive than plant and offshore activities in source countries of FDI. The two economists further argue that domestic firms operating in host markets are the least skill-intensive and are thus on the bottom of the classification ladder. It must also be borne in mind that in certain instances, host countries may play host to both the production operations of foreign MNCs and headquarter operations of domestic multinationals. This may result in the reduction in relative demand for skilled laborers in the host countries. Blonigen and Slaughter (2001) argue that the above scenario is most likely to happen in developed host-countries where head-office services of several domestic multinationals have traditionally influenced the demand for skilled laborers. In contrast, increases in FDI inflows in developing host-countries would lead to a surge in skill-intensive productions. Since SADC contains mostly developing countries it therefore ranks at lower end of spectrum. As already pointed out; apart from being a recipient of inward FDI, the SADC region is also a source of FDI. For example, SADC economies such as South Africa and Mauritius are important home bases of multinational corporations operating in Africa and other

developing countries across the globe. In such a scenario, therefore, theoretical predictions of the FDI-effect on income inequality are more likely to become ambiguous and inconclusive.

Markusen further (1995) observes that in cases where the FDI flows between host and source countries with the same level of economic development then the ensuing foreign investment will be of the horizontal type. On the contrary, the majority of North–South (i.e. developed country-developing country) FDI models which have roots in the works of Feenstra and Hanson (1997) mostly envisage a vertical-type FDI relationship between developed countries of the Northern Hemisphere (i.e. sources) and developing countries of the Southern Hemisphere (i.e. hosts). On this, Markusen and Zhang (1999) argue that vertical FDI basically involves the splitting the production process and ensuring that specific production steps are allocated to geographic areas where the comparative advantage can be maximized. Following the Heckscher-Ohlin model, foreign investors efficiently utilize factor endowments and factor price differentials in their production activities in both host and source countries.

The prominence of North-South models is very visible in the type of FDI that flows into the SADC economic bloc. The abundance of natural resources and relatively cheap labor attracts significant amounts of FDI from developed countries as well as other developing countries such as China, India and Brazil. While the majority of SDC countries are primarily host countries to FDI inflows from the North, other SADC states such as South Africa and Mauritius, on the other hand, act as both a source and host to FDI. Apart from attracting inward FDI from other countries, South Africa and Mauritius have in recent times significantly increased its outward FDI to other developing countries but also to developed countries. This therefore renders predictions of the Feenstra-Hanson model (1997)

that vertical-type inward FDI would flow to these host countries, more applicable. But it must also be kept in mind that the vertical FDI also has the potential to worsen wage and employment prospects for less skilled laborers in both the source and host countries. This is specifically the case when offshoring takes the form of relatively skill-intensive activities in the host country, though these production activities are relatively unskilled by the source country standards. But nevertheless, the resultant FDI inflows may increase wage inequality in developing host countries, which is contrary to postulations of the traditional Heckscher-Ohlin model of international trade.

Empirical evidence from a number of developing host countries supports the notion that FDI is associated with increased incidences of inequality, primarily by increasing the skill premium in the host countries. Mexico is one of the middle-income host countries that have received particular attention on the above issue from researchers such as Aitken et al., (1996) and Feenstra and Hanson (1997). On the same note, an empirical study by Hanson (2003) found that FDI promotion together with trade liberalization has contributed to an increase in demand for skilled laborers in Mexico. In this case, it can be safely concluded that FDI increased income inequality by deepening wage differentials between skilled and unskilled laborers. But so far, no known similar study has ever been attempted in Southern Africa and this is what this research will try to address.

Still on the theoretical front, Aghion and Howitt (1998) suggest that the FDI-inequality nexus is essentially non-linear and varies over time as the host country undergoes technological transformation through learning-by doing/observing and skill upgrading. In this case, much as local firms may enjoy the fruits of FDI-induced knowledge spillovers but their absorption of foreign technology may drive-up income inequality in the short-run and gradually reduce inequality in the long term. This is the tendency the

above researchers refer to as “the Kuznets inverted-U hypothesis’ whereby inward FDI spurs the rising and then falling of the level of inequality. As local firms intensify their learning efforts the skill premium increases because of high demand for scarce skills. But under normal circumstances FDI tends to gravitate towards a host country’s economic hubs where there is abundant skilled labor force, which is mobile and can thus easily employment in export-oriented and technologically-advanced sectors of the economy. The above hypothesis stipulates that income inequality initially rises among skilled laborers in the urban centers in response to FDI-induced economic growth. But as local firms absorb foreign technology (i.e. “move to a new technological paradigm”) and supply of skilled labor increases as a result of skills upgrading, income inequality begins to steadily fall. It must also be noted that under this model, rural-urban migration in host countries facilitates the spreading of the fruits of FDI attraction such as wage increases to workers and knowledge spillovers to local firms (Herzer and Nunnenkamp, 2013).

There is a raging debate in the literature on whether FDI-driven income inequality is a permanent or transitory phenomenon in developing countries. On the same, Basu and Guariglia (2007) observe that in the absence of sufficient human-capital accumulation FDI-induced inequality is more likely to be a long term phenomenon among poor sections of the society that fail to adequately utilize modern technology. It is an open secret that the SADC countries just like the majority of their developing country peers lag behind considerably in terms of human capital formation when compared to other middle-countries in other regions of the world. This theoretical ambiguity in the FDI-income inequality relationship existing in these countries necessitates further empirical examination on the distributional or equity effects of inward foreign investment. But there is a dearth in empirical literature on the subject in

question especially among middle-income host-countries across the globe. Worse still, this acute shortage of empirical literature on the FDI-inequality nexus is compounded by the inconclusiveness of the results among the few available studies (Sylwester, 2005; Herzer et al., 2014). For example, researchers such as Tsai (1995) interpret the significant correlation between FDI and income inequality as a positive foreign investment-effect as merely reflecting structural differences among various sectors, geographical areas and income groups in the host country. In stark contrast, other economists such as Choi (2006) argue that inward FDI generates deleterious effects on income inequality in host countries where the FDI-GDP ratio is higher (i.e. in middle-income countries). As if this was not enough, Basu and Guariglia (2007) further observe that FDI-inequality nexus involves a trade-off between foreign investment-driven growth stimulation and increasing income inequality in many developing host-countries. The above discussion clearly depicts a glaring lack of theoretical and empirical consensus on the subject. It is against this background that this paper seeks to address the above knowledge gap by empirically examining the FDI-income inequality nexus in the case of the SADC region.

EMPIRICAL METHODOLOGY

Analytical Framework and Data

We examine the effect of inward FDI in the SADC region by utilizing a simple empirical model where income inequality is a function of inward FDI and other control variables given as follows:

$$INEQ_{it} = \varphi_0 + \varphi_1 FDI + \varphi_3 X + \gamma_{it} + \varepsilon_{it} \dots \dots \dots (1)$$

Where $INEQ$ represents income inequality in country i at a given time t , FDI is inward FDI as a percentage of the GDP. Furthermore X is a vector of control parameters that are correlated with the level of income inequality in the country. Also, γ is a term capturing country-specific effects and ε_{it} is a random disturbance term. We will empirically estimate the above model using an unbalanced panel of 15 SADC members covering the period 1990-2015. These countries are listed in the Appendix section of the paper. SADC is a very important economic bloc in Africa and also contains countries with some of the highest levels of income inequality in the world. On top of this, SADC not only receives a significant proportion of total inward FDI coming into Africa but the region is also an important source of outward FDI in Africa. This therefore makes the empirical analysis of the FDI-income inequality nexus very pertinent.

In this analysis we will measure income between sectors and between workers rather than between skilled employees and unskilled employees in order to adequately capture the complex interactions that exist between inward FDI, labor structure and innovation of the enterprise. Moreover, empirical evidence suggests that FDI-induced innovation tends to spread its productivity benefits to all workers across the economy thus affecting the overall level of income inequality in a host country (Figini and Görg, 1999 and 2006). Data for income inequality is obtained from the global dataset on industrial pay-inequalities developed by University of Texas Inequality Project (UTIP) and United Nations Industrial Development Organization (UNIDO).

The three control variables captured by X in equation (1) are: the level of economic development of the host country, openness to international trade, and the level of education in the host country. As pointed out earlier on: the basic Heckscher-Ohlin theory of international trade argues that increased levels of international trade reduce income inequality in host countries that have a relatively abundant

unskilled labor force. From this therefore it is clear that in countries that are more open to international trade, the wage-inequality effect would be more visible than in countries that are less open to external trading. Openness to international trade will be approximated by the ratio of exports and imports to GDP whose data will be obtained from the World Bank's World Development indicators 2015.

Furthermore, the level of a host-country's economic development is introduced as an additional control variable because income inequality has an important linkage to a country's economic structure. We will utilize per capita GDP growth as a proxy for a host country's level of economic development in order to ensure that inward FDI does not just pick-up the impact of economic development on income inequality. Data for per capita GDP is obtained from World Development Indicators 2015.

On the same note, the level of a host country's education is utilized as another important control variable in order to take into consideration the supply side of the labor market and it can also counteract the effects of both inward FDI and international trade on income inequality. From theory, it can be expected that, initially, an increase in the level of education increases the wage premium of skilled workers compared to unskilled thus increasing inequality in the host country. But over time as the supply of skilled workers increases relative to demand in the host economy, income inequality would gradually reduce. We use secondary school enrolment ratio as a proxy of education in the host economy and its data is also obtained from World Development indicators 2015.

Lastly, we will utilize FDI stock to GDP ratio as a proxy for inward and this data is obtained from UNCTADstat database. Following Herzer et al. (2014) we prefer FDI stocks relative to FDI inflows because stocks can capture long-run effects more efficiently since they are an accumulation of flows over time .

Generalized Methods of Moments (GMM) Procedure

In order to test for short-run causality, the GMM estimation procedure, as outlined by Arellano and Bond (1991), is applied on the panel data for 15 SADC member states using annual observations for each country. In this undertaking, the SADC countries are grouped into low-income and middle-income categories according to World Bank income classification that is located in the Appendix section of the paper. This categorization is helpful in determining whether differences in income levels (i.e. levels of economic development) affect the FDI-income inequality relationship in the aforementioned region. The estimated model takes the following form as determined by the analytical framework:

$$\begin{aligned}
 \Delta INEQ_{it} &= \sum_{j=1}^m \gamma_{1j} \Delta INEQ_{it-j} + \sum_{j=1}^m \gamma_{2j} \Delta FDI_{it-j} \\
 &\quad + \sum_{j=1}^m \gamma_{3j} \Delta OPEN_{it-j} + \sum_{j=1}^m \gamma_{4j} \Delta EDU_{it-j} \\
 &\quad + \sum_{j=1}^m \gamma_{5j} \Delta GDPPC_{it-j} + \Delta \varepsilon_t \\
 \Delta FDI_{it} &= \sum_{j=1}^m \delta_{1j} \Delta FDI_{it-j} + \sum_{j=1}^m \delta_{2j} \Delta INEQ_{it-j} \\
 &\quad + \sum_{j=1}^m \delta_{3j} \Delta OPEN_{it-j} + \sum_{j=1}^m \delta_{4j} \Delta EDU_{it-j} \\
 &\quad + \sum_{j=1}^m \delta_{5j} \Delta GDPPC_{it-j} + \Delta \varepsilon_t
 \end{aligned}$$

s already pointed out in the discussion; *INEQ* denotes income inequality, *GDPPC* represents gross domestic product per capita, *FDI* is inward FDI-to-GDP ratio, *EDU* is secondary school enrolment ratio and *OPEN* is openness to international trade. Furthermore, *i* represent countries, and *t* captures number of years under consideration.

Direction of Causality - Dumitrescu-Hurlin Granger-Causality Test

In order to determine the direction causality between inward FDI and income inequality in the SADC region, we employ Dumitrescu-Hurlin (2012) causality tests on panel of low-income and middle-income SADC countries. The typical Dumetriscu-Hurlin method for testing panel causality takes the following generic form:

$$y_{i,t} = \varphi_i + \sum_{k=1}^k \vartheta_{ik} y_{i,t-k} + \sum_{k=1}^k \pi_{ik} x_{i,t-k} + \varepsilon_{i,t} \dots \dots \dots (2)$$

where $x_{i,t}$ and $y_{i,t}$ are the observations of two variables that do not have unit roots (i.e. stationary variables) for individual *i* in period *t*. Further to this, even though the coefficients(ϑ and π) may vary across individual panel but they do not vary over time. This fact is illustrated by the *i* subscripts attached to the coefficients. Just like in the conventional Granger causality test (1969), the Dumitrescu-Hurlin procedure is also a potent method of determining the existence of significant causal effects of past values of an independent variable (*x*) on the present value of a dependent variable (*y*).

We therefore set up our FDI-income inequality causality equations as follows:

$$FDI_{i,t} = \varphi_i + \sum_{k=1}^k \vartheta_{ik} FDI_{i,t-k} + \sum_{k=1}^k \pi_{ik} INEQ_{i,t-k} + \varepsilon_{i,t} \dots \dots \dots (3)$$

$$INEQ_{i,t} = \varphi_i + \sum_{k=1}^k \vartheta_{ik} INEQ_{i,t-k} + \sum_{k=1}^k \pi_{ik} FDI_{i,t-k} + \varepsilon_{i,t} \dots \dots \dots (4)$$

Where is *INEQ* income inequality, *FDI* is inward FDI to GDP ratio, ϑ and π are coefficients, φ is a constant and ε is a stochastic disturbance term.

EMPIRICAL RESULTS

Even though income inequality has sharply increased in developing countries over the years but empirical evidence from many Sub-Saharan African countries shows a great degree of contradiction, with other countries in the region experiencing surges while others reporting significant declines (Hakura et al., 2016). It is therefore necessary to examine these trends as well as the nature of the FDI-inequality nexus in the case of the SADC region. In undertaking this task the study begins by testing whether income inequality and FDI is non-stationary variables in an integrated process. This implies that panel unit-root testing in order to adequately deal with stationarity issues in the data so as to eliminate the possibility of generating spurious relationships among the variables. To achieve this we perform the Fisher-type panel unit-root tests based of the Phillips-Perron (1988) framework. Results of the test which are given in Table 1 below clearly show that majority of the series are non-stationary (i.e. have unit roots) in levels. After first differencing, all the series become stationary. In econometric parlance: the series are integrated of order one, $I(1)$.

Table 1
Fisher-type unit root tests

Method	Variables (in levels)	Test statistic (p-value)	Variables (first-differenced)	Test statistic (p-value)
Fisher-type (Phillips-Perron)	INEQ	-8.2316 (0.0000)	Δ INEQ	-5.0016 (0.0000)
	FDI	0.2886 (0.6135)	Δ FDI	-5.0551 (0.0000)
	OPEN	-12.4998 (0.0000)	Δ OPEN	-9.1202 (0.0000)
	EDU	0.8004 (0.4403)	Δ EDU	-12.0091 (0.0000)
	GDPPC	0.8994 (0.5691)	Δ GDPPC	-8.2311 (0.0000)

Source: author's own analysis using Stata

The next step is to determine the existence of a long-run equilibrium relationship (i.e. cointegration) between the variables. Stock and Watson (2007) observe that in the presence of cointegration parameter estimates are consistent and also have faster rate of convergence to the true parameter values (i.e. super-consistency). This shows that cointegration gives more accurate estimates relative to conventional regression methods. Apart from the super-consistency in temporal and contemporaneous correlation in error terms and regressors, cointegration also ensures that no biasedness exists as far as omitted stationary variables are concerned

(Gujarati, 2003). But our principal interest is primarily on the relationship between inward FDI and income inequality. The Westerlund (2005) panel cointegration method is our analytical tool of choice and its results are given in Table 2 which is given below.

Table 2
Westerlund ECM panel cointegration test results

	Low-income SADC countries			Middle-income SADC countries		
	<i>H₀: no cointegration</i>			<i>H₀: no cointegration</i>		
Statistic	Value	Z-value	P-value	Value	Z-value	P-value
G_t	-2.334	-2.677	0.005	-1.993	-2.394	0.008
G_a	-2.804	0.558	0.712	-1.249	-1.988	0.025
P_t	-2.322	-2.911	0.002	-1.420	0.145	0.442
P_a	-1.355	-0.058	0.012	-1.149	-0.924	0.011

Source: author's own analysis using Stata

From the above table it can be clearly visualized that there is cointegration between inward FDI and income inequality in both low-income and middle-income SADC countries since most of the p-values are significant at 5 percent level of significance. This shows that a long-run equilibrium relationship exists between FDI and income inequality. The presence of cointegration gives the study license to undertake Granger causality performed on the panel using vector auto-regression (VAR) method (Dumitrescu and Hurlin, 2012).

Successful performance of cointegration tests enables the analysis to proceed to determining short-run causality among the variables. The Generalized Method of

Moments (GMM) procedure offers one of the most robust but intuitive ways of accomplishing this task in a heterogenous and dynamic panel framework. Results of the GMM estimation procedure are reported in Table 3 below.

Table 3
GMM short-run effects results for low-income and middle-income SADC countries from 1990-2015

Dependent variable: Income inequality		
Independent variables	Low-income SADC Countries	Middle-income SADC countries
$INEQ_{t-1}$	-0.894 (0.983)	-0.661 (0.891)
FDI	0.098** (0.018)	0.603** (0.233)
$OPEN$	-1.278* (0.958)	-0.964** (0.285)
EDU	-1.186* (0.901)	-0.758* (0.598)
$GDPPC$	1.386*** (0.040)	1.508** (0.101)
$Constant$	-6.007** (4.011)	-2.235 (3.555)

NB: standard errors are in parentheses

* $p < 0.01$, ** $p < 0.05$, *** $p < 0.001$

From the above table, one can deduce that in the short run a 1 percentage increase in inward FDI increases the level of income inequality by 0.098 and 0.0.603 percentage in low-income and middle income SADC states respectively. Thus FDI has a significant inequality increasing effect on the above region. On the same, a comparison of the coefficients shows that inward FDI has a

higher inequality-increasing effect in middle-income relative to low-income countries.

Likewise, per capita GDP appears to increase the level of income inequality in the region. Indeed middle income countries appear to experience a higher inequality increasing effect compared to low-income ones which suggests that the level of economic development is a significant contributor to inequality increases in SADC.

In contrast, increases in openness to international trading and education appear to reduce the level of income inequality in the short run. But one can also notice that the result for education is only significant at 10 percent but not the standard 5 percent level of significance. This relatively weak statistical significance may reflect the low levels of enrolment and poor quality of secondary education in the region.

Table 3 also reveals that previous levels of income inequality do not have any significant effect on the present inequality in the region.

We now proceed to determine of the direction of causality which is one of the principal aims of the study. To achieve this we utilize one of the recent innovations in panel Granger causality testing, the Dumitrescu-Hurlin (2012) causality test. Results for the Dumitrescu-Hurlin causality tests are reported in Table 4 presented below. The optimal lag length in both low and middle-income countries is 2 as determined by Akaike Information Criteria (AIC).

Table 4
Dumitrescu-Hurlin Panel Granger-causality tests for low and middle income SADC countries

Low-Income SADC countries					
Null hypothesis (H₀)	Optimal lags Chosen by AIC	Test Statistics		P-value	Conclusion
		W-Stat	Z-bar Stat		
FDI does not Granger-cause INEQ	2	8.0221	2.0012	0.0000	Reject H ₀
INEQ does not Granger-cause FDI	2	6.0018	6.9830	0.2149	Reject H ₀
Middle-Income SADC countries					
Null hypothesis (H₀)	Optimal lags Chosen by AIC	Test Statistics		P-value	Conclusion
		W-Stat	Z-bar Stat		
FDI does not Granger-cause INEQ	2	9.0871	5.0116	0.0000	Reject H ₀
INEQ does Not granger-cause FDI	2	7.2105	11.3931	0.3410	Reject H ₀

Source: author's own analysis using Stata

It is clear from the above table that a unidirectional causality relationship exists between FDI and income inequality in both low-income and middle-income SADC countries. This direction of causality runs from FDI to income inequality in both cases and not the other way round. This suggests that FDI is a cause but not a consequence on income inequality in the SADC region. This appears to tally

with GMM results found in Table 3 which indicates that, on the overall, inward FDI has increased the level of inequality in the SADC region.

We conclude our empirical analysis by checking for autocorrelation in the panel models for low-income and middle-income SADC countries in order to ensure robustness of the results. Indeed, given that serial correlation in panel-data models biases standard errors and causes inefficiencies in the estimated regression results, it is vital to detect serial correlation in the error term and remedy it if possible (Drukker, 2003). A standard procedure for testing for panel data autocorrelation is the Wooldridge (2002) test. With Stata software, the Wooldridge test is computed by simply comparing the computed F-value against the p-value. If the former value is greater than the latter the null hypothesis of no autocorrelation is accepted and vice versa. Wooldridge test results for the two panel models are presented in Table 5.

Table 5
Wooldridge test for autocorrelation

Low-income SADC countries		Middle-income SADC countries	
H_0 : No first-order autocorrelation		H_0 : No first-order autocorrelation	
F(1, 5)	6.665	F(1, 4)	3.005
Prob > F	0.1776	Prob > F	0.1904

Source: author's own analysis using Stata

From the aforementioned table, the null hypothesis of no first order autocorrelation is accepted since all the p-values (i.e. Prob >F) are greater than the p-value (0.05). This finding suggests that there is no serial correlation in the data.

CONCLUDING REMARKS AND DIRECTIONS FOR FURTHER RESEARCH

Basically, the paper set out to analyze relationship between inward FDI and income inequality in the SADC region from the period 1990-2015. In pursuit of this principal objective, the study applied panel cointegration and causality techniques in order to empirically examine both the short-run and long-run effects of the above nexus. The study finds that in general inward FDI appears to have increased the level of inequality in the SADC region during the period under consideration. This is supported by empirical findings from the analysis which reveals that the direction of causality is unidirectional in both low-income and middle income countries. Moreover, cointegration results indicate that a long-run equilibrium relationship exist between inward FDI and income inequality in SADC. On the same note, other important control variables such as per capita income, openness to international trade and education appear to have significant short-run effects on the FDI-inequality nexus. Indeed while per capital income appears to increase the level of inequality in the short-run, openness to international trade and education reduce the level on inequality in the aforementioned region.

The above empirical findings suggest important policy implications. Firstly, given that inward FDI appears to increase the level of inequality, the region needs to strike a balance between attracting economic growth-stimulating FDI and managing the FDI-induced income inequality. A possible solution for addressing this FDI-driven rising inequality is the implementation of social policy and social protection programs. Indeed given that many countries in the SADC have some form of social protection program, be it at pilot level or at fairly advanced level (Devereaux, 2010); therefore the region needs to put concerted efforts in upscaling these programs in order to reach the majority of

their poor citizens who often times are affected the most by globalization-induced rising inequalities. Indeed provision of transformative social policy programs has the potential to play a crucial role in not only containing social unrest associated with high inequality but at the same time improving skill levels in the host economies and thus make SADC an attractive FDI destination.

More importantly perhaps, another possible solution to tackling rising inequality in the above countries is provision of education. As the empirical findings of the study appear confirm, education not only has the ability to reduce the skills differential between unskilled and skilled workers in a host-economy. This overtime reduces wage inequality in the economy by increasing the number of workers with a minimum qualification of primary or secondary school education. On the other hand, education can also enable domestic firms in the SADC region to easily absorb technologies introduced by foreign firms this would in the long run increase knowledge spillovers which are crucial for economic development. In the words of Aghion and Howitt (1998): “education can smooth their FDI-induced transition to a new technological paradigm”. However, the weak statistical significance of the education coefficient in the empirical findings suggests that SADC needs to improve its quality and quantity of education it provides to its citizens. It is our considered view that improved education access is a win-win formula for attracting high quality FDI and also reducing income inequality in the aforementioned countries.

In conclusion, even though this paper generated a couple of insights on the nature of the FDI-income inequality nexus, further research could generate deeper understanding of the above issue. As more comprehensive data is gradually becoming available; prospects for future research on the topic in equation look promising. We therefore suggest that researchers interested in further research on the above topic

should consider analyzing whether or not distributional effects of inward FDI in the region depend on the structure, type or origin of foreign investment. Such an analysis would reveal if inward FDI into the region differ by industries and/or sectors.

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Appendix

Low-income countries	SADC	Middle-income countries	SADC
Democratic Republic of Congo Malawi Tanzania Mozambique Madagascar Zimbabwe		Angola Botswana Lesotho Mauritius Namibia Seychelles South Africa Swaziland Zambia	