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FOREIGN DIRECT INVESTMENT AND ECONOMIC GROWTH IN KENYA: AN EMPIRICAL INVESTIGATION[1]

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Abstract

In this paper, the casual relationship between foreign direct investment (FDI) and economic growth in Kenya during the period 1980-2018 is examined. In an attempt to address the omission-of-variable bias, which has been detected in some previous studies, two variables, namely money supply and trade, are used as intermittent variables, thereby leading to a system of multivariate Granger-causality equations. Using the ARDL bounds testing approach, the results show that there is a unidirectional causal flow from economic growth to FDI in Kenya. These results apply, irrespective of whether the causality is conducted in the short run or in the long run. Based on these results, it can be concluded that the current burgeoning FDI inflows that Kenya has attracted in recent years are largely driven by the strong economic growth and prudent macroeconomic policies that the country has been pursuing in recent decades. To our knowledge, this may be the first study of its kind to examine in detail the causal relationship between FDI and economic growth in Kenya in recent years. Policy implications are discussed.

1. Introduction

The relationship between foreign direct investment (FDI) and economic growth has attracted a plethora of literature in past decades. The relationship between these two macroeconomic variables has been supported by the neoclassical and endogenous growth models. According to Findlay (1978), FDI increases the rate of technological progress in host economies through, among other channels, a 'contagion' effect arising from the introduction of more advanced technology and management practices. FDI has also been found to enhance economic growth through technology diffusion. FDI increases capital accumulation in the host country by introducing new inputs and technologies (Blomström, Lipsey and Zejan, 1996; Borenztein, DeGregorio, and Lee, 1998). Through new technologies, FDI is likely to be a potential source of productivity gains to domestic firms through a spillover effect (see Chanegriha et al., 2020). Multinational corporations (MNCs), for example, which are one of the vehicles of FDI, have been found to have a positive impact on human capital in recipient countries through training,

which ranges from less-skilled to highly skilled training (see Anwar and Nguyen, 2010). Studies have also shown that research-and-development activities undertaken by MNCs contribute significantly to the growth of human capital in host countries, thereby enabling their economies to grow rapidly in the long run (see Blomström and Kokko, 2001). Studies have also found FDI to be linked to more efficient management and productive methods (see Escobari and Vacaflores, 2015). Moreover, the capital flows that result from FDI are of immense importance to many developing countries as these countries are largely capital constrained (Escobari & Vacaflores, 2015).

Although a number of studies have been conducted on the relationship between FDI and economic growth in various countries, very few country-specific studies have been conducted into African countries (see, for example, Asongu and Kodila-Tedika, 2015; Asongu and Odhiambo, 2021). Moreover, some of the previous studies have relied on cross-country data, which fail to account for country-specific peculiarities. As has been reported in previous studies, by grouping countries that are at different stages of development, the cross-sectional method fails to address the country-specific effects of FDI on economic growth and vice versa. In particular, the method fails to explicitly address the potential biases induced by the existence of cross-country heterogeneity, which may lead to inconsistent and misleading estimates (see also Quah, 1993; Casselli et al., 1996; Ghirmay, 2004; Odhiambo, 2008). In addition, in some of the previous studies, a bivariate causality was used, which failed to address the omission-of-variable bias. The weakness of a bivariate Granger-causality model has been well documented in the literature. Studies have shown that the introduction of one or more additional variables in the bivariate model between two variables may not only change the magnitude of the results, but may even change the direction of causality between the two variables.

The current study, therefore, makes a significant contribution to knowledge on various fronts. First, unlike some of the previous studies on this topic, the current study aims to examine the causal relationship between FDI and economic growth in Kenya using a multivariate Granger-causality model. By including money supply and trade as intermittent variables in a causality between FDI and economic growth, the omission-of-variable bias, which has not been satisfactorily addressed by many previous studies, is addressed in this study. Secondly, the autoregressive distributed lag (ARDL) bounds testing approach, which has been found to be superior when compared to other time-series techniques, has also been used in the current study. Thirdly, to our knowledge, this may be the first study of its kind to examine in detail the dynamic causal relationship between FDI and economic growth in Kenya in recent years using modern time-series techniques.

The rest of the paper is organised as follows: Section 2 gives an overview of the dynamics of FDI and economic growth in Kenya. Section 3 presents the empirical literature review, while section 4 deals with the empirical model specification and estimation techniques. Section 5 presents the empirical analysis and the discussion of the results. Section 6 concludes the study.

2. Foreign Direct Investment and Economic Growth in Kenya

Kenya is currently the largest economy in East Africa. The country currently contributes approximately 50% of the East African community's GDP (Kenya Investment Authority, 2019). It is also one of the most advanced economies in sub-Saharan Africa. As a result, the country has been the prime choice for many foreign investors seeking to establish a presence in Eastern and Southern Africa. The country also has made a number of reforms in order to attract foreign direct investment inflows, which have significantly contributed towards the country's economic development. The investment policies and reforms in Kenya can be traced

as far back as 1964 when the Foreign Investment Protection Act was passed in order to provide basic protection to investors immediately after Independence. This Act was essentially enacted in order to serve as a guarantee for the protection of certain investments in the country (Republic of Kenya, 2019). In 1982, the country established the Investment Advisory and Promotion Centre under the then Ministry of Finance, which later became the Investment Promotion Centre (IPC) in 1986 through the Investment Promotion Centre Act, Cap 485 of 1986. The mandate of this important centre was to promote both local and foreign private investments in Kenya.

In 1992, the Investment Promotion Centre Act was amended to empower the IPC to issue a Certificate of General Authority to investments that had no policy, planning, security, health or environmental implications (Republic of Kenya, 2019:12). In 2004, the IPC was transformed to become the current Kenya Investment Authority through the Investment Promotion Act, which was enacted in 2004. This Act gave the Kenya Investment Authority an expanded mandate for investment promotion, investment facilitation and policy advocacy. The Kenya Investment Authority has done a very impressive job in marketing the country's investment climate over the years. Under the country's Investment Promotion Act of 2004, the Kenya Investment Authority aimed to issue an investment certificate to a foreign investor who committed at least US$100 000, provided that the investment was lawful and beneficial to Kenya (see UNCTAD, 2019). Between 2012 and 2015, FDI inflows into the country rose steadily and reached an annual average of close to US$1 billion. Although the investment dropped to US$393 million in 2016 due to election issues, FDI inflows later increased to US$672 in 2017.

In 2017, for example, Kenya reported a 68% increase in inward investment projects. According

to UNCTAD (2019), FDI inflows to Kenya later increased by 27% to US$1.6 billion in 2018. These investments were received in various industries, including manufacturing, chemicals, hospitality, oil and gas. The country's 'Ease of Doing Business' has also improved significantly. According to the 2020 rankings, Kenya was ranked 56th in Doing Business, which is very impressive by the standards of developing countries.

Kenya has also benefited immensely from the African Growth and Opportunity Act (AGOA) of 2000, which provides duty-free market access to the United States for qualifying sub-Saharan African countries. Since the AGOA was enacted in 2000, the value of Kenya's exports to the United States has increased from $110 million to $550 million in 2016 (UNCTAD, 2019). The export processing zones (EPZs) have also played a pivotal role in Kenya's export strategy. Kenya was one of the first countries on the African continent to establish special economic zones (SEZs). When the AGOA of 2000 came into force, the country zones had a well-functioning manufacturing ecosystem, including adequate infrastructure. The EPZs were given a pivotal role in the AGOA-based strategy by targeting foreign investors in the apparel industry seeking to export to the United States (UNCTAD, 2019). Kenya currently has approximately 71 EPZs, which account for 55 000 jobs and an annual sales turnover of about $650 million. It is estimated that in 2017, the EPZs accounted for 94% of the $340 million in apparel exports from Kenya to the United States. According to UNTAD (2019), EPZs have made Kenya the biggest exporter of apparel and textiles to the United States from sub-Saharan Africa, of which an estimated $4.3 billion worth of garments have been exported to the United States duty-free since 2000 (UNCTAD, 2019). The EPZs, which have been supported by the AGOA of 2000, have attracted foreign investors in the apparel industry and oriented them to target exports to the United States (UNCTAD, 2019). As part of broader economic planning, Kenya recently issued a five-year National AGOA Strategy and action plans, which

prominently feature the role of SEZs (UNCTAD, 2019:181). In addition, the country intends to increase the value of total exports and of SEZ exports in non-apparel industries to the United States. These will include products such as processed food, coffee, tea, fresh fruit and cut flowers, among other products. According to the FDI Intelligence and EY Africa Attractiveness Report (2019), Kenya ranked fifth among the largest recipients of FDI in Africa in 2018. Although South Africa still remains the most extensive investor in other African countries, Kenya has also contributed significantly to FDI to other East African countries.

3. Literature overview

A number of empirical studies have been conducted on the relationship between FDI and economic growth in a number of countries with conflicting and divergent findings. These studies could conveniently be clustered into four groups. The first group argues that there is a unidirectional causal flow from FDI to economic growth. This view is referred to as FDI-led growth hypothesis. The second group, however, argues that it is economic growth that Granger-causes FDI. This group, therefore, supports a growth-led FDI hypothesis. The third group, on the other hand, argues that FDI and economic growth Granger-cause each other. In other words, there is a bidirectional causal relationship between FDI and economic growth. Apart from these three views, there is a fourth group of studies, of which the findings show that there is no causality in either direction between FDI and economic growth. According to this view, the perceived relationship between FDI and economic growth could merely be as a result of presumptions.

Studies, in which the findings are consistent with the first view (FDI-led growth response) include those conducted by Bengoa and Sanchez-Robles (2003) for the case of 18 Latin American countries during the period 1970-1999; Feridun (2004) for the case of Cyprus during

the period 1977-2002; Hsiao and Hsiao (2006) for the case of East and South-East Asia during the period 1986-2004; Apergis et al. (2008) for the case of 27 transition economies during the period 1991-2004; Tang et al. (2008) for the case of China during the period 1988-2003; Lee (2009) for the case of Malaysia in the short run during the period 1970-2000; Ming-Ru and Chang (2010) for the case of the Guangdong Province during the period 1982-2006; Campbell (2012) for the case of Barbados during the period 1979-2008; Inekwe (2013) for the case of Nigeria during the period 1990-2009; Mehic et al. (2013) for the case of South-East Europe during the period 1998-2007; Abbes et al. (2015) for the case of Asia and Oceanic, Middle East, North America, North Africa and Central African countries in the long run during the period 1980-2010; Ibrahiem (2015) for the case of Egypt during the period 1980-2011; Yusoff and Nuh (2015) for the case of Thailand during the period 1970-2008; Akoto (2016) for the case of South Africa in the short run during the period 1960Q1-2009Q4; Silajdzic and Mehic (2016) for the case of transition economies during the period 2000-2011; Sothan (2017) for the case of Cambodia in the long run during the period 1980-2014; Sunde (2017) for the case of South Africa during the period 1990-2014; Sultanuzzaman et al. (2018) for the case of Sri Lanka during the period 1980-2016; and more recently, Sokhanvar (2019) for the case of European economies during the period 1995-2014, among other others.

Studies, in which the findings are consistent with the second view (growth-led FDI response) include those conducted by Chowdhury and Mavrotas (2005) for the case of Chile during the period 1969-2000; Chakraborty and Nunnenkamp (2008) for the case of India during the period 1987-2000; Duttaray et al. (2008) for the case of 66 developing countries during the period 1970-1996; Lee (2009) for the case of Malaysia in the long run during the period 1970-2000; Lee (2010) for the case of Japan in the short run during the period 1977-2006; Mah (2010) for the case of China during the period 1983-2001; Varamini and Kalash (2010) for the case of

European countries during the period 1994-2006; Chakraborty and Mukherjee (2012) for the case of India during the period 1996Q1-2009: Q2; Tsaurai and Odhiambo (2012) for the case of Zimbabwe during the period 1980-2010; Gupta and Singh (2016) for the case of Brazil, India and China during the period 1992-2013; and more recently, Mahembe and Odhiambo (2016) for the case of middle-income SADC countries during the period 1980-2012.

Studies, in which the findings support a bidirectional causality between FDI and economic growth include those conducted by Liu et al. (2002) for the case of China during the period 1981:1-1997:4; Choe (2003) for the case of 80 countries during the period 1971-1995; Bogahawatte and Balamurali (2004) for the case of Sri Lanka during the period 1977-2003; Chowdhury and Mavrotas (2005) for the case of Malaysia and Thailand during the period 1969-2000; Zhao and Du (2007) for the case of China during the period 1985-2003; Lean (2008) for the case of Malaysia during the period 1980-2005; Anwar and Nguyen (2010) for the case of Vietnam during the period 1996-2005; Iqbal et al. (2010) for the case of Pakistan during the period 1998-2009; Lee (2010) for the case of Japan in the long run during the period 1977-2006; Dash and Sharma (2011) for the case of India during the period 1991Q3-2006Q3; Gwenhamo (2011) for the case of Zimbabwe during the period 1964-2005; Srinivasan et al. (2011) for the case of SAARC nations in the long run during the period 1970-2007; Chen and Zulkifli (2012) for the case of Malaysia in the long run during the period 1980-2010; Almfraji et al. (2014) for the case of Qatar during the period 1990-2010; Escobari and Vacaflores (2015) for the case of 19 Latin American countries during the period 1990-2011; Iamsiraroj (2016) for the case of 124 countries during the period 1971-2010; Mahmoodi and Mahmoodi (2016) for the case of developing countries (eight European developing countries and eight Asian developing countries) during the period 1986-2013; and more recently, Owusu-Nantwi and Erickson (2019) for the case of South America during the period 1980-2015.

Although very few studies have found evidence in support of a neutral relationship between FDI and economic growth, a few studies have found that the causal relationship between FDI and economic growth is either mechanical or does not exist. Studies, in which the findings support this neutral hypothesis include those conducted by Nath (2009) for the case of 13 transition economies of Central and Eastern Europe, and the Baltic region during the period 1991-2005; Naguib (2012) for the case of Argentina during the period 1971-2000; Tekin (2012) for the case of least-developed countries during the period 1970-2009; Belloumi (2014) for the case of Tunisia during the period 1970-2008; Mahembe and Odhiambo (2016) for the case of low-income SADC countries during the period 1980-2012; and more recently, Golitsis et al. (2018) for Albania during the period 1996-2014.

Although a number of studies have been conducted on this subject in a number of countries, very few of these studies have been conducted in African countries. In particular, in a country such as Kenya, which is currently one of the top recipients of FDI in Africa, studies of this nature are almost non-existent. Table 1 gives a summary of previous studies that have been conducted on the relationship between FDI and economic growth in both developed and developing countries.

Table 1: Summary of previous studies on FDI-growth Nexus

A: Studies in favour of FDI-led Growth Response				
Author (Year)	**Region/Countries**	**Study period**	**Methodology**	**Causality**
Bengoa and Sanchez-Robles (2003).	18 Latin American countries	1970-1999	Panel data analysis	FDI →Y
Feridun (2004).	Cyprus	1977-2002	Granger causality and vector auto regression (VAR)	FDI →Y
Hsiao and Hsiao (2006).	East and Southeast Asia	1986-2004	Fixed effects and random effects approaches to	FDI →Y

A: Studies in favour of FDI-led Growth Response				
Author (Year)	**Region/Countries**	**Study period**	**Methodology**	**Causality**
			estimate the panel data VAR equations for Granger causality tests	
Apergis et al. (2008).	27 transition economies	1991-2004	Panel cointegration and causality tests	FDI →Y
Tang et al. (2008).	China	1988-2003	Multivariate VAR system with error correction model (ECM) and the innovation accounting (variance decomposition and impulse response function analysis) techniques	FDI →Y
Lee (2009)	Malaysia	1970-2000	The bounds test within the autoregressive distributed lag (ARDL) framework and Granger causality tests	FDI →Y(Short-run)
Ming-Ru and Chang (2010).	Guangdong Province	1982-2006	Granger causality test, co-integration test and error correction model	FDI →Y
Campbell (2012).	Barbados	1979-2008	Engle-Granger two-step procedure	FDI →Y
Inekwe (2013).	Nigeria	1990-2009	The Wald test/Granger causality test and Johansen cointegration technique and the vector error correction model	FDI →Y
Mehic et al. (2013).	Southeast Europe	1998-2007	Prais–Winsten regression with panel-corrected standard errors for the preferred estimation model and Granger causality test using a LSDV dynamic regression (the Anderson–Hsiao estimator)	FDI →Y
Abbes et al. (2015).	cross-country observations for 65 countries	1980-2010	Co-integration and panel Granger causality tests in panel data	FDI →Y (Long run; Asia and oceanic, Middle East, North America North Africa and central Africa).
Ibrahiem (2015).	Egypt	1980-2011	Auto Regressive Distributed Lag (ARDL) bound testing approach	FDI →Y
Yusoff and Nuh (2015).	Thailand	1970-2008	Wald test and Granger causality test	FDI →Y
Akoto (2016).	South Africa	1960Q1-2009Q4	VECM Granger causality	FDI →Y(Short-run)
Silajdzic and Mehic (2016).	Transition Economies	2000-2011	Panel data estimates with PCSE panel-corrected standard errors and Granger causality test	FDI →Y
Sothan (2017).	Cambodia	1980-2014	Granger causality test based on the vector error	FDI →Y (Long run)

A: Studies in favour of FDI-led Growth Response				
Author (Year)	**Region/Countries**	**Study period**	**Methodology**	**Causality**
			correction model	
Sunde (2017).	South Africa	1990-2014	autoregressive distributed lag model, known as the ARDL bounds testing approach to cointegration and VECM Granger causality approach	FDI →Y
Sultanuzzaman et al. (2018).	Sri Lanka	1980-2016	Autoregressive Distributed Lag (ARDL) bounds testing approach	FDI →Y
Sokhanvar (2019).	Selected European economies	1995-2014	Block exogeneity tests and impulse responses	FDI →Y
B: Studies in favour of Growth-led FDI Response				
Author (Year)	**Region/Countries**	**Study period**	**Methodology**	**Causality**
Chowdhury and Mavrotas (2005).	Three developing countries, namely Chile, Malaysia and Thailand,	1969-2000	Toda-Yamamoto test for causality	Y → FDI (Chile)
Chakraborty and Nunnenkamp (2008)	India	1987-2000	Cointegration and causality analyses	Y → FDI
Duttaray et al. (2008)	66 developing countries	1970-1996	Toda and Yamamoto (1995) for testing Granger causality	Y → FDI
Lee (2009)	Malaysia	1970-2000	The bounds test within the autoregressive distributed lag (ARDL) framework and Granger causality tests	Y → FDI(Long-run)
Lee (2010)	Japan	1977-2006	Bivariate and multivariate Granger causality frameworks	Y → FDI(Short-run)
Mah (2010)	China	1983-2001	Cointegration test and Granger causality test	Y → FDI
Varamini and Kalash (2010)	European countries	1994-2006	Granger causality test	Y → FDI
Chakraborty and Mukherjee (2012)	India	1996: Q12-2009: Q2	Time series techniques	Y → FDI
Tsaurai and Odhiambo (2012)	Zimbabwe	1980-2010	ARDL-bounds testing approach and error-correction-based causality test	Y → FDI
Gupta and Singh (2016)	Brazil, Russia, India, China and South Africa (BRICS nations)	1992-2013	Vector error correction model (VECM) and standard Granger causality test	Y → FDI (Brazil, India and China).
Mahembe and Odhiambo (2016)	SADC countries	1980-2012	Panel-data analysis methods	Y → FDI (middle-income countries)

A: Studies in favour of FDI-led Growth Response				
Author (Year)	**Region/Countries**	**Study period**	**Methodology**	**Causality**
C: Studies in favour of a Bi-directional causality between Economic Growth and FDI				
Author (Year)	**Region/Countries**	**Study period**	**Methodology**	**Causality**
Liu et al. (2002)	China	1981:1-1997:4	VARECM framework	FDI ↔Y
Choe (2003)	80 countries	1971-1995	Panel VAR model	FDI ↔Y
Bogahawatte and Balamurali (2004).	Sri Lanka	1977-2003	The Engle and Granger error correction approach	FDI ↔Y
Chowdhury and Mavrotas (2005).	Three developing countries, namely Chile, Malaysia and Thailand,	1969-2000	Toda-Yamamoto test for causality	FDI ↔Y (Malaysia and Thailand)
Zhao and Du (2007).	China	1985-2003	vector auto regression (VAR) approach developed by Toda and Phillips, time-series estimations through ADF [Augmented Dickey Fuller] unit-root tests, cointegration tests, and error-correction analyses	FDI ↔Y
Lean (2008).	Malaysia	1980-2005	A two-step approach to testing causality and cointegration	FDI ↔Y
Anwar and Nguyen (2010).	Vietnam	1996-2005	GMM estimation	FDI ↔Y
Iqbal et al. (2010).	Pakistan	1998-2009	VAR model, the integration and Cointergration analysis and VECM causality test	FDI ↔Y
Lee (2010).	Japan	1977-2006	Bivariate and multivariate Granger causality frameworks	FDI ↔Y (Long-run)
Dash and Sharma (2011).	India	1991Q3-2006Q3	Vector Autoregression (VAR) model applying the Ganger non-causality test of Toda and Yamamoto (1995)	FDI ↔Y
Gwenhamo (2011).	Zimbabwe	1964-2005	Multivariate cointegration framework	FDI ↔Y
Srinivasan et al. (2011).	SAARC nations	1970-2007	Johansen's cointegration test, vector error correction model (VECM and impulse response function (IRF)	FDI ↔Y (Long-run)
Chen and Zulkifli (2012).	Malaysia	1980-2010	Vector error-correction model (VECM)	FDI ↔Y (Long-run)
Almfraji et al. (2014).	Qatar	1990-2010	The VAR Impulse Responses and the Granger Causality test	FDI ↔Y
Escobari and Vacaflores (2015).	19 Latin American countries	1990-2011	Panel data estimators	FDI ↔Y

A: Studies in favour of FDI-led Growth Response				
Author (Year)	**Region/Countries**	**Study period**	**Methodology**	**Causality**
Iamsiraroj (2016).	124 countries	1971-2010	Simultaneous system of equations approach	FDI ↔Y
Mahmoodi and Mahmoodi (2016).	Developing countries (eight European developing countries and eight Asian developing countries	1986-2013	Panel- VECM causality	FDI ↔Y
Owusu-Nantwi and Erickson (2019).	South America	1980-2015	Pedroni's cointegration test and vector error correction model (VECM)	FDI ↔Y
D: Studies in favour of a neutrality relationship between Economic Growth and FDI				
Author (Year)	**Region/Countries**	**Study period**	**Methodology**	**Causality**
Nath (2009).	13 transition economies of Central and Eastern Europe, and the Baltic region	1991-2005	Panel data estimation techniques	FDI ≠Y
Naguib (2012).	Argentina	1971-2000	Error correction model (ECM)	FDI ≠Y
Tekin (2012).	Least Developed Countries	1970-2009	Panel-data approach	FDI ≠Y
Belloumi (2014).	Tunisia	1970-2008	Bounds testing (ARDL) approach to cointegration and Granger causality test	FDI ≠Y
Mahembe and Odhiambo (2016)	SADC countries	1980-2012	Panel-data analysis methods	FDI ≠Y (Low-income countries)
Golitsis et al. (2018).	Albania	1996-2014	Vector error correction model	FDI ≠Y
Note: FDI →Y means Foreign direct investment causes Economic growth; Y → FDI means Economic growth causes Foreign direct investment; FDI ↔Y means there is bidirectional causal relationship between Foreign direct investment and Economic growth; and FDI ≠Y means there is no causality				

4. Methodology and data

4. 1 Methodology

4.1.1 ARDL-bounds testing approach to cointegration

The ARDL-modelling approach, which was originally introduced by Pesaran and Shin (1999), and later extended by Pesaran, Shin and Smith (2001), has been found to be stronger than previous cointegration tests. The ARDL cointegration approach has been found to have numerous advantages when compared with previous cointegration tests. Firstly, unlike

previous cointegration techniques, the ARDL approach does not require all variables to be integrated of the same order. The technique can be used regardless of whether the underlying regressors are integrated of order one [I(1)], order zero [I(0)], or fractionally integrated. Secondly, the ARDL approach is not sensitive to the size of the study sample. In other words, the ARDL approach can provide reliable results even when the sample size is small. Thirdly, the ARDL technique may provide unbiased estimates of the long-run model and valid T-statistics even when some of the regressors are endogenous (see also Harris and Sollis 2003; Odhiambo 2008; Odhiambo 2011).

Following Pesaran et al. (2001), the generic ARDL model used in this study can be expressed in the form of a set of four cointegration equations as follows (see Odhiambo, 2021):

$$\Delta y_t = \alpha_0 + \sum_{i=1}^{n} \alpha_{1i} \Delta y_{t-i} + \sum_{i=0}^{n} \alpha_{2i} \Delta FDI_{t-i} + \sum_{i=0}^{n} \alpha_{3i} \Delta M3/GDP_{t-i} + \sum_{i=0}^{n} \alpha_{4i} \Delta TRADE_{t-i} + \alpha_5 y_{t-1} + \alpha_6 FDI_{t-1} + \alpha_7 M3/GDP_{t-1} + \alpha_8 TRADE_{t-1} + \mu_{1t} \quad \ldots (1)$$

$$\Delta FDI_t = \beta_0 + \sum_{i=1}^{n} \beta_{1i} \Delta FDI_{t-i} + \sum_{i=0}^{n} \beta_{2i} \Delta y_{t-i} + \sum_{i=0}^{n} \beta_{3i} \Delta M3/GDP_{t-i} + \sum_{i=0}^{n} \beta_{4i} \Delta TRADE_{t-i} + \beta_5 FDI_{t-1} + \beta_6 y_{t-1} + \beta_7 M3/GDP_{t-1} + \beta_8 TRADE_{t-1} + \mu_{2t} \quad \ldots (2)$$

$$\Delta M3/GDP_t = \pi_0 + \sum_{i=1}^{n} \pi_{1i}\Delta M3/GDP_{t-i} + \sum_{i=0}^{n} \pi_{2i}\Delta y_{t-i} + \sum_{i=0}^{n} \pi_{3i}\Delta FDI_{t-i} + \sum_{i=0}^{n} \pi_{4i}\Delta TRADE_{t-i} + \pi_5 M3/GDP_{t-1} + \pi_6 y_{t-1} + \pi_7 FDI_{t-1} + \pi_8 TRADE_{t-1} + \mu_{3t} \quad \ldots\ldots\ldots\ldots (3)$$

$$\Delta TRADE_t = \Omega_0 + \sum_{i=1}^{n} \Omega_{1i}\Delta TRADE_{t-i} + \sum_{i=0}^{n} \Omega_{2i}\Delta y_{t-i} + \sum_{i=0}^{n} \Omega_{3i}\Delta FDI_{t-i} + \sum_{i=0}^{n} \Omega_{4i}\Delta M3/GDP_{t-i} + \Omega_5 TRADE_{t-1} + \Omega_6 y_{t-1} + \Omega_7 FDI_{t-1} + \Omega_8 M3/GDP_{t-1} + \mu_{4t} \quad \ldots\ldots\ldots\ldots (4)$$

Where:

y = Economic growth= real GDP per capita;

FDI = Foreign direct investment (FDI/GDP)

M3/GDP = Broad money supply

TRADE = Exports +Imports /GDP

α_0, β_0, π_0 and Ω_0 = respective constants;

$\alpha_1 - \alpha_4$, $\beta_1 - \beta_4$, $\pi_1 - \pi_4$, and $\Omega_1 - \Omega_4$ = respective short-run coefficients;

$\alpha_5 - \alpha_8$, $\beta_5 - \beta_8$, $\pi_5 - \pi_8$, and $\Omega_5 - \Omega_8$ = respective long-run coefficients;

Δ = difference operator;

n = lag length;

t = time period; and

μ_{it} = white-noise error terms.

The ARDL-bounds testing approach involves two steps. The first step requires the order of lags on the first differenced variables to be obtained from the unrestricted models by using either the Akaike Information Criterion (AIC) or the Schwartz-Bayesian Criterion (SBC). In the second step, the bounds F-test is applied to equations (1) – (4) in order to establish whether a long-run relationship exists. To establish the existence of a cointegration relationship among the variables used in this study, the null hypothesis of no cointegration is tested against the alternative hypothesis, i.e. that there is a cointegration relationship. This procedure is based on the joint F-statistic for cointegration analysis, during which two sets of critical values are used. While the first set of critical values assumes that all the variables are integrated of order zero [i.e. I(0)], the second set assumes that the variables are integrated of order one [i.e. I(1)]. When the computed T-statistic exceeds the upper critical bounds value, the null hypothesis of no cointegration is rejected. However, when the F-statistic is lower than the lower bounds value, the null hypothesis of no cointegration is accepted.

4.1.2 Multivariate Granger-Causality

Although cointegration among the variables indicates the possibility of Granger-causality at least in one direction, it does not indicate the direction of causality between variables. The direction of Granger-causality can only be determined using the Granger-causality model. Consequently, the following generic ECM-based Granger-causality model can be used to examine the casual relationship between the variables used in this study (see Odhiambo, 2010; Odhiambo, 2009; Narayan and Smyth, 2008).

$$\Delta y_t = \alpha_0 + \sum_{i=1}^{n} \alpha_{1i} \Delta y_{t-i} + \sum_{i=1}^{n} \alpha_{2i} \Delta FDI_{t-i} + \sum_{i=1}^{n} \alpha_{3i} \Delta M3/GDP_{t-i} + \sum_{i=1}^{n} \alpha_{4i} \Delta Trade_{t-i} + \xi_1 ECM_{t-1} + \mu_{1t} \ldots \ldots \ldots (5)$$

$$\Delta FDI_t = \beta_0 + \sum_{i=1}^{n} \beta_{1i} \Delta FDI_{t-i} + \sum_{i=1}^{n} \beta_{2i} \Delta y_{t-i} + \sum_{i=1}^{n} \beta_{3i} \Delta M3/GDP_{t-i} + \sum_{i=1}^{n} \beta_{4i} \Delta Trade_{t-i} + \xi_2 ECM_{t-1} + \mu_{2t} \ldots \ldots \ldots (6)$$

$$\Delta M3/GDP_t = \delta_0 + \sum_{i=1}^{n} \delta_{1i} \Delta M3/GDP_{t-i} + \sum_{i=1}^{n} \delta_{2i} \Delta y_{t-i} + \sum_{i=1}^{n} \delta_{3i} \Delta FDI_{t-i} + \sum_{i=1}^{n} \delta_{4i} \, \Delta Trade_{t-i} + \xi_3 ECM_{t-1} + \mu_{3t} \ldots \ldots \ldots (7)$$

$$\Delta Trade_t = \theta_0 + \sum_{i=1}^{n} \theta_{1i} \Delta Trade_{t-i} + \sum_{i=1}^{n} \theta_{2i} \Delta y_{t-i} + \sum_{i=1}^{n} \theta_{3i} \Delta FDI_{t-i} + \sum_{i=1}^{n} \theta_{4i} \, \Delta M3/GDP_{t-i} + \xi_4 ECM_{t-1} + \mu_{4t} \ldots \ldots \ldots (8)$$

Where:

ECM = error-correction term;

$\xi_1 - \xi_4$ = respective coefficients for the error-correction terms;

$\mu_{1t} - \mu_{4t}$= mutually uncorrelated white-noise residuals; and all other variables and characters are as described in equations 1–4.

Based on equations 5-8, the short-run causality is determined by the F-statistic, while the long-run causality is determined by the T-statistic on the coefficient of the lagged error-correction term (see also Oh and Lee, 2004; Narayan and Smyth, 2006; Odhiambo, 2010).

4.2 Data

The data used in this study, which spanned from 1980 to 2018, were obtained from the World Development Indicators of the World Bank. The economic growth variable is proxied by real GDP per capita. The main advantage of using real GDP per capita is that it takes into account the overall population of a country and it can be used to measure the average real GDP per person in an economy. In addition, it takes into consideration adjustments for changes in inflation. Foreign direct investment (FDI) is measured by the net inflows of investment as a ratio of GDP. Money supply is measured by broad money as a percentage of GDP (M3/GDP), while trade is measured by the sum of exports and imports as a ratio of GDP.

5. Empirical analysis

5.1 Stationarity test

In order to ensure that no variable used in the model is integrated of order two or higher, three unit root tests were used in this study, namely Augmented Dickey-Fuller (ADF), Phillips-Perron (PP) and Dickey-Fuller – GLS. The results of the stationarity tests are presented in Table 2.

Table1 2: Unit Root Results

Panel 1: Augmented Dickey Fuller (ADF)				
Variable	**Stationarity of all Variables in Levels**		**Stationarity of all Variables in First Difference**	
	Without Trend	With Trend	Without Trend	With Trend
Y	1.115	1.017	-2.819**	-3.763**
FDI	-0.754	-1.454	-3.919**	-4.260***
M3/GDP	-1.779	-3.003	-7.135***	-7.134***
Trade or Exports	-1.596	-2.112	-6.099***	-6.060***

Panel 2: Phillips-Perron (PP)				
Variable	**Stationarity of all Variables in Levels**		**Stationarity of all Variables in First Difference**	
	Without Trend	With Trend	Without Trend	With Trend
Y	2.504	1.017	-3.041**	-3.997**
FDI	-1.784*	-4.020**	-	-
M3/GDP	-1.768	-2.363	-7.122***	-7.134***
Trade or Exports	-1.596	-2.117	-6.154***	-6.244***
Panel 3: Dickey-Fuller – GLS				
Variable	**Stationarity of all Variables in Levels**		**Stationarity of all Variables in First Difference**	
	Without Trend	With Trend	Without Trend	With Trend
Y	0.392	-0.844	-2.823***	-3.960***
FDI	-0.510	-1.528	-8.1380***	-8.660***
M3/GDP	-1.446	-2.381	-7.037***	-7.266***
Trade or Exports	-1.288	-2.256	-6.170***	-6.221***

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

The results reported in Table 2 show that none of the variables used in this study are integrated of order two or higher. This implies that the ARDL-bounds testing approach can be used to examine the cointegration relationship between FDI, y, M3/GDP and trade.

5.2 Cointegration Test: ARDL-Bounds Testing Approach

The ARDL-bounds testing approach requires two steps. The first step requires a lag selection on the first differenced variables in equations (1)-(4) from the unrestricted models, while the second step involves the application of the bounds F-test in order to establish whether there is cointegration relationship among the variables used in the study. The results of the cointegration test based on the bounds F-test are reported in Table 3.

Table 3: Bounds F-test for Co-integration

Dependent Variable	Function	F-statistic
y	y (FDI, M3/GDP, Trade)	1.0458
FDI	FDI (y, M3/GDP, Trade)	4.5034**
M3/GDP	M3/GDP (y, FDI, Trade)	1.3250
Trade	Trade (y, FDI, M3/GDP)	4.4043**

Asymptotic Critical Values						
Pesaran *et al*. (2001), p.300 Table CI(iii) Case III	1%		5%		10%	
	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
	4.29	5.61	3.23	4.35	2.72	3.77

Note: *, ** and *** denote statistical significance at the 10%, 5% and 1% levels, respectively

The results reported in Table 3 show that there is a cointegration relationship among the variables used in this study when FDI and trade are used as dependent variables. This can be confirmed by the calculated F-statistics in the FDI and trade equations, which have been found to be higher than the critical values only when the FDI and trade are used as dependent variables.

5.3 Causality Results

Since the results of cointegration confirmed the presence of cointegration among the variables used in this study, we can now proceed and test for the short-run and long-run causality between FDI, economic growth and the two intermittent variables. The results are reported in Table 4.

Table 4: Causality Results

Dependent variable	**F-statistics [probability]**				***ECT*$_{t-1}$ [t-statistics]**
	Δy_t	ΔFDI	ΔM3/GDP	ΔTrade	
Δy_t	-	0.341 [0.564]	2.966* [0.096]	0.594 [0.447]	-
ΔFDI	3.839* [0.059]	-	0.444 [0.510]	7.246*** [0.000]	-4.797*** [0.000]
ΔM3/GDP	7.742*** [0.000]	5.486** [0.028]	-	4.752** [0.039]	-
ΔTrade	3.008* [0.093]	6.750*** [0.002]	3.701* [0.064]	-	-3.741*** [0.001]

The results reported in Table 4 show that there is a unidirectional causality from economic growth to FDI in Kenya. The results apply, irrespective of whether the causality is estimated

in the short run or in the long run. The short-run causality is supported by the corresponding F-statistic in the FDI equation, which has been found to be statistically significant. The long-run causality, on the other hand, is supported by the coefficient of the error-correction term in the FDI equation, which is also statistically significant and has a negative sign, as expected. These findings, therefore, support the growth-led FDI hypothesis in Kenya, and they are consistent with previous studies, such as Chakraborty and Nunnenkamp (2008) for the case of India; Mah (2010) for the case of China; Tsaurai and Odhiambo (2012) for the case of Zimbabwe; and Mahembe and Odhiambo (2016) for the case of SADC countries. The study, however, found that the causality between FDI, economic growth, and the two intermittent variables differs significantly over time. The results show that there is a unidirectional causality from money supply and economic growth to trade. The results apply both in the short run and in the long run. The short-run causality is confirmed by the corresponding F-statistics in the money supply and economic growth equations, which have been found to be statistically significant. The long-run causality, on the other hand, is confirmed by the coefficients of the ECM terms in the money supply and economic growth equations, which have also been found to be statistically significant and negative, as expected. The results also show that there is a bidirectional causality between FDI and trade – both in the short and in the long run. This finding has been supported by the corresponding F-statistics and the ECM coefficients in the FDI and trade equations, which have been found to be statistically significant, as expected. Other results show that, in the short run, there is i) a bidirectional causality between money supply and economic growth, as supported by the corresponding F-statistics in the money supply and economic growth equations, which have been found to be statistically significant; ii) a unidirectional causality from FDI to money supply, as supported by the corresponding F-statistic in the FDI equation, which has been found to be statistically significant; and iii) a bidirectional causality between trade and money supply, as supported by the corresponding F-statistics in the trade

and money supply equations, which have been found to be statistically significant.

6. Conclusion

In this study, the causality between FDI and economic growth is examined in Kenya using data from 1980 to 2018. The study attempts to answer one critical question. Does FDI spur economic growth in Kenya? The study was motivated by the lack of adequate studies on the relationship between FDI and economic growth in sub-Saharan African countries, on the one hand, and the recent burgeoning FDI inflows that Kenya has attracted in recent decades, on the other hand. Although a number of studies have been conducted on the link between FDI and economic growth in a number of countries, very few studies have been conducted on sub-Saharan African countries; and where studies have been conducted, the results have been largely inconclusive. In particular, the empirical studies on the causal link between FDI and economic growth in a country such as Kenya, which is currently one of the largest recipients of FDI in Africa, is difficult to come by. The study uses the ARDL bounds testing approach to cointegration and ECM-based Granger-causality to examine this linkage. Unlike some previous studies, the current study uses two variables, namely money supply and trade, as intermittent variables between FDI and economic growth in order to address the omission-of-variable bias. Using a multivariable Granger-causality model, the empirical findings show that there is a unidirectional causality from economic growth to FDI in Kenya. The results apply, irrespective of whether the causality is conducted in the short run or in the long run. These findings show that the current burgeoning FDI inflows that Kenya has attracted in recent years are largely driven by the strong economic growth and prudent macroeconomic policies that the country has been pursuing in recent decades. It is, therefore, recommended that the country should continue to pursue prudent macroeconomic policies and a balanced growth path in order to attract more FDI inflows into the country.

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