
# The Impact of Foreign Direct Investment on Economic Growth in Lesotho

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**Dedication**

*To my mother Mphonyane Nkhasi*

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**Abstract**

This study evaluates the impact of the inflow of foreign direct investment (FDI) on Lesotho's economic growth in both the short- and long-run from 1977 to 2020. Three versions of the exogenous model guided by Solow (1956), Mankiw Gregory et al. (1992), and World Bank (1990) and augmented by FDI are used and then estimated by the Auto-Regressive Distributed Lag (ARDL) approach to cointegration. The findings show that FDI's influence on economic growth is negligible, while capital investment (i.e. gross fixed capital formation) and human capital induce economic growth in both the long-run and the short-run. It is also noted that population growth is detrimental to economic growth in both periods whereas trade openness only exerts a positive influence on economic growth in the long-run. The policy implications that are derived from this study suggest amendments in land allocation policies and increased governmental support for the investment promotion agency, LNDC, which currently relies on limited income sources. Moreover, the paper recommends that policymakers boost technological progress by regularly updating school curricula and promoting trade, particularly in tech-intensive sectors.

**Keywords:** FDI, economic growth, ARDL, exogenous growth theory, Lesotho

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# 1. Introduction

Foreign Direct Investment (FDI) has garnered a lot of attention regarding its potential to induce growth in host countries. Notably, China's remarkable economic expansion over the past three decades, is partly attributed to its export-oriented growth strategies and effective utilization of FDI. This has inspired policymakers globally to attract FDI in the hopes of replicating similar growth patterns. However, the effect of FDI on economic growth differs from country to country, necessitating a nuanced examination of this relationship.

It is widely believed that FDI stimulates economic growth, however, there are counterarguments suggesting that FDI can have detrimental effects on growth. One major concern is that local businesses struggling to compete with more powerful foreign companies may be displaced. Additionally, profit repatriation by foreign firms can lead to a deficit in the balance of payments of the host economy. Also, profit repatriation diverts funds that could have otherwise been reinvested locally to foster further economic development of the host economy, thus hindering its growth. Another critical issue is that an over-reliance on FDI can undermine the governance autonomy and sovereignty of the host country. This problem arises from the substantial influence foreign investors can wield over national policies, leading to policies that are not in favor of the host country’s development.

The two most conversed economic growth theories are the neoclassical growth theory (also referred to as the Solow growth model or the exogenous model) and the endogenous growth theory. Both theories concur on the importance the accumulation of capital, human capital development (Mankiw Gregory et al., 1992), and technological progress in fostering economic growth. However, they diverge in their perspectives on the FDI-growth relationship.

Firstly, the neoclassical growth theory assumes that there are diminishing returns on capital and that capital depreciates over time (Solow, 1956). Additionally, technological progress which is instrumental for sustained growth, and human capital are assumed to be exogenous factors of production. Implying that the neoclassical theory only recognizes the influence of FDI on growth in the short-run through its direct impact on the level of capital and enhancement of efficiency.

Conversely, the endogenous growth theory internalizes technology and human capital. It postulates that these factors can be determined within domestic economies through research and development (R&D), policies, and learning-by-doing. Thus, the theory recognizes the ability of FDI to impact growth in the long-run through spillover effects. These spillover effects encompass the transfer of technology, skills development among employees, the adoption of managerial expertise from multi-national enterprises (MNCs) through learning-by-doing (Arrow, 1962), integration into global production networks, expanded access to international markets, and more. This theory also views FDI as a potential mitigator of income inequality, primarily through job creation.

There is no consensus within the empirical literature in this discourse. In general, in the majority of studies where subjects are middle-income to high-income countries, there usually prevails a positive relationship between FDI and economic growth (Azman-Saini et al., 2010; Berthélemy & Démurger, 2000; Pegkas, 2015). In contrast, most studies focusing on less developed countries find an insignificant FDI-growth relationship (Adams & Opoku, 2015; Khaliq & Noy, 2007; Makhetha & Rantaoleng, 2017; Sharif et al., 2009). For an economy to experience FDI-led growth, there needs to be some threshold level of financial development (Azman-Saini et al., 2010). Human capital and the quality of institutions determine the magnitude of the impact of FDI on growth and are also rendered pre-requisites for FDI-led growth (Adams & Opoku, 2015; Borensztein et al., 1998; Li & Liu, 2005; Pegkas, 2015; Zhang, 2001). Additionally, trade openness is also found to have a significant implication on the FDI-growth nexus(Iamsiraroj & Ulubaşoğlu, 2015; Nair-Reichert & Weinhold, 2001; Zhang, 2001).

Very little research focusing on developing Southern African countries has been done in this discourse, especially Lesotho. For instance, only one published paper by Makhetha & Rantaoleng (2017) was found relevant to this discourse. The authors examine the FDI-Growth nexus based on Granger causality and find no significant bi-directional causal relationship between FDI and economic growth in Lesotho from 1980 to 2011. The main shortcoming of their study is that it relies much on Granger causality and little on the theory of economic growth. While Granger causality tests present statistical association and the temporal order between variables, they do not explain the mechanisms behind the underlying relationships.

The current study aims to analyze the relationship between FDI and economic growth over the long and short term in Lesotho, spanning the years 1977 to 2020. It utilizes the neoclassical growth theory as a guiding framework and employs the Autoregressive Distributed Lag

(ARDL) approach, developed by Pesaran & Shin (1999), for the empirical analysis. Some of the reasons for this choice include the flexibility of the approach to accommodate variables that are integrated of order zero (or I (0)) and variables that are integrated of order 1 (or I (1)) simultaneously. Additionally, the approach is robust for comprehensive analysis of the relationship between two variables by allowing an examination of both the long-run and short-term relationship of the variables.

For developing economies focused on sustainable development, a deep understanding of how FDI influences economic growth is essential for making well-informed decisions. This is particularly true for countries like Lesotho, which have been striving to harness the potential of FDI to fuel their economic expansion. Despite these efforts, Lesotho has recently been grappling with a period of slow economic growth. This research, therefore, becomes increasingly significant as it sheds light on the specific channels through which FDI contributes to economic growth. It delves into the various channels, such as technology transfer, skill development, and infrastructural improvements, through which FDI can positively impact the economy. By doing so, the study not only provides a comprehensive analysis of these mechanisms but also offers insights into how FDI's interaction with economic growth can be enhanced and leveraged for better outcomes.

Furthermore, this paper serves as an up-to-date examination of the dynamics of FDI and its impact on economic growth in Lesotho, revisiting and expanding upon the findings of Makhetha & Rantaoleng (2017). What sets the current study apart is its reliance on neoclassical growth theory, a formal economic growth model that has not been widely used in empirical research on this topic. By applying this theoretical lens, the study offers a unique perspective on the FDI-growth relationship based on a formal economic growth theory. This approach not only contributes to a more nuanced understanding of the FDI-growth nexus in Lesotho but also adds to the broader discourse in economic literature, offering fresh insights and implications for other developing nations seeking to optimize the benefits of FDI for sustainable economic growth.

The subsequent sections of this thesis are structured as follows: Section 2 delves into different theoretical frameworks and empirical literature on the FDI-economic growth relationship. Section 3 provides an overview of Lesotho's economic status and the history of FDI in the country. Section 4 outlines the data sources, and variable formation, and discusses the estimation technique. Section 5 presents a comprehensive analysis of the results from the

empirical models. Finally, Section 6 concludes with the findings and offers policy recommendations based on the study.

# 2. Literature Review

In the scope of this research, there are two main forms of FDI. Firstly, the establishment of entirely new companies or organizations within the host country by individuals, businesses, or entities from a country other than their home country. Secondly, the expansion or acquisition of at least 10% ownership in pre-existing businesses situated in the host country.

Within the theory of economic growth, FDI is generally expected to have positive effects on economic growth through various channels. To name a few, it augments capital within the domestic economy. This then results in higher efficiency of labour which leads to increased productivity, more output, and overall economic growth. Secondly, increased capital generates employment since more labour is hired, and the main beneficiary is often domestic labour. This alleviates the unemployment problem, improves incomes, and reduces income inequality within the host country (Milanovic, 2016).

Despite the potential benefits of inward FDI on growth and the various theoretical justifications behind it, it is crucial to acknowledge that FDI can lead to unforeseen consequences for host countries. Different authors including Kurtishi-Kastrati (2013), Moosa (2002), and OECD (2002) have discussed these consequences. Some of them include, first, the displacement of domestic businesses. This occurs when market-seeking FDI use their technological privilege to drive out local competitors or use their privilege of operating at a large scale to set low prices on which domestic companies would make a loss and eventually seize operating (Borensztein et al., 1998).

Second, the inflow of FDI can result in profit repatriation by foreign firms. As firms repatriate their profits, a significant amount of capital earned locally is returned to the firm's home country. This reduces the amount of available capital for reinvestment in the host country, thus slowing down its economic growth. Additionally, large-scale profit repatriation can lead to a deterioration in the balance of payments in the host country, as more money leaves the domestic economy compared to the money that comes in through investment and exports.

Finally, an over-dependence on foreign funding for capital, among other factors can result in reduced national autonomy and sovereignty (Kentor, 1998). That is, foreign investors may acquire control over a great proportion of assets and jobs to the extent that they may influence political and economic decisions in the host country. For instance, to maintain profitability,

MNCs may compel the local government to enact policies that grant them excessive protection, tax cuts, investment allowances, social services, and cheap factory sites which may not be in favour of the host country's development.

The role of FDI in promoting growth can be viewed through two different theoretical lenses, the exogenous (neoclassical) growth theory, and the endogenous growth theory. Although both theoretical frameworks have a consensus on the importance of physical capital, human capital, and technology for economic growth, their points of disparity are accentuated by the assumptions that govern these factors that determine economic growth.

The neoclassical growth model was introduced by Robert Solow and has been a fundamental framework in the field of economics. It has served as a foundation for numerous empirical studies that investigate economic growth and the role of technological progress in driving it. According to this theory, economic growth is an end-product of a combination of capital accumulation, labour productivity, and technological progress (Solow, 1956).

Robert Solow also introduces the concept of technological progress, which is emphasized as a key driver of increased productivity and sustainable economic growth. The model further suggests that technological progress improves the efficiency of labour and increases labour productivity thus boosting the production of goods and services. This then leads to more output and more output leads to increased income which fuels further growth. However, under the neoclassical framework, technology is assumed to be exogenous or determined outside the economy. Thus, the model does not consider different factors that may lead to technological advancements other than the application of new knowledge alongside research and development.

Moreover, the level of investment in physical capital and human capital is believed to play an important role in development. First, an investment in physical capital (assets) such as machinery, equipment, and buildings, results in an increase in productivity, then an increase in output and income. This, in turn, attracts further investment, creating a positive feedback loop. Furthermore, it is assumed that there are diminishing returns to capital and that capital depreciates overtime. Diminishing marginal returns to capital means that as capital accumulates the marginal product of capital decreases, and depreciation of capital implies that capital loses value with time.

Secondly, human capital which is defined as a set of skills, education, and experience of labour is highlighted as one of the key drivers of economic growth. The concept of human capital was

introduced to the exogenous growth model by Mankiw Gregory et al. (1992), they argue that the incorporation of human capital can help explain the nature of the growth process at a theoretical level and cross-country differences at an empirical level. The labour's level of education and/or work experience can influence how receptive labour is to job training. Thus, more educated and skilled labour tends to be able to keep up with the changing technologies and advancing productivity within the manufacturing and services sectors (Becker, 1964, p. 25). This implies that such labour is often more efficient which can lead to higher productivity and greater output. Likewise, the neoclassical model assumes that human capital is exogenously given.

With that said, from a neoclassical perspective, the injection of capital caused by FDI does not impact long-run economic growth. Since there are diminishing marginal returns to capital, as the inflow of foreign investment surges, capital will be increased, but the marginal product of capital will decline. For this reason and that capital depreciates over time, the marginal product and output will be high in the short-run, however, in the long-run, the marginal product will approach zero and output will stagnate. Thus, the model implies that the long-run effects of FDI can only be experienced through technological progress and improvements in human capital. However, since the model does not account for the determinants of technological progress and human capital development, it does not explore the possibility that FDI itself can be a channel of technological transfer and human capital development.

Moving on, the endogenous growth model offers a modern and comprehensive view of economic growth. It suggests that economic growth is driven by more than external factors. It indicates that economic growth can also be propelled by endogenous factors, that is, factors that are caused or explained within the country itself. This contrasts the neo-classical ideology that technology is exogenous and cannot be influenced by policies or other internal factors.

Furthermore, human capital is seen as a crucial factor in the accumulation of knowledge and the creation of new ideas and technologies in the endogenous growth framework. Knowledge is regarded as one of the main drivers of economic growth, and technological progress is seen as a result of investments in knowledge creation and innovation (Aghion & Howitt, 1998). The model posits that the accrual of knowledge is subject to increasing returns to scale, meaning that as more investment is made towards knowledge creation and innovation, the rate of technological progress will accelerate (Jones, 2002; Lucas, 1988; Romer, 1986). Unlike the neo-classical theory, which assumes that the stock of human capital is fixed and exogenous,

the endogenous growth model suggests that it can be determined internally through investments in education and training.

Moreover, the endogenous growth theory claims that government involvement can play an essential role in growing the economy (Lucas, 1988; Romer, 1986). Government involvement can encourage the implementation of policies that support investments in education, research and development, and innovation, thus accelerating economic growth. This is in contrasts to the former framework which advocates for markets to be left free through the implementation of laissez-faire policies that involve limited government intervention in the economy.

In general, the endogenous growth theory highlights various channels through which FDI can positively impact economic growth other than capital injection. Firstly, it internalizes human capital by acknowledging that economies can determine their level of human capital and offers relevant policy recommendations. Foreign investors prefer to invest in countries with some level of human capital, so if an economy can determine its level of human capital, it can therefore indirectly determine the inflow of foreign investment and thus the level of capital.

Secondly, FDI can induce economic growth through spillover effects. For instance, FDI is associated with human capital development due to the training of the domestic labour force by foreign companies. Additionally, the managerial skills acquired by domestic labour in foreign firms can then be applied in domestic firms when the labour migrates from foreign to domestic firms (Borensztein et al., 1998). The same can also be true regarding technology. To stay competitive, domestic firms are induced to copy or emulate the technology used by foreign firms which aids technological progress within the domestic economy. This has serious implications for growth considering technology is a key factor for long-run growth (Solow, 1956). Lastly, FDI can help upgrade domestic industries and offer domestic companies or firms an opportunity to integrate into regional and global value chains thus, boosting the export capacity and tax revenues in the host country.

However, endogenous growth theory has not been without criticism. The framework is met with measurement criticism. It can be very challenging to quantify immaterial factors such as knowledge, human capital, and innovation and therefore attempting to do so may lead to complications in an empirical analysis and interpretation of the results. In addition to measurement issues, the policy recommendations suggested by the framework are too generic. That is, although the model stresses the importance of technological progress, investments in research and development, and human capital, the recommendations do not provide a clear

direction on how to ensure the efficient implementation of such policies. Also, the one-size-fits-all nature of these policy recommendations may be unhelpful as there always exists some degree of heterogeneity among different economies hence policy recommendations must always consider the idiosyncratic factors of each economy.

There is vast empirical literature within this discourse, however, there is no consensus regarding the relationship between FDI and economic growth. The disparity in the results can be due to whether the area of focus is developing or developed, the difference in the type of estimation technique used, the period of focus, or the difference in the methodology employed. A more common finding within the empirical literature focusing on middle-income or high-income countries is that FDI has a positive impact on growth (Azman-Saini et al., 2010; Berthélemy & Démurger, 2000; Iamsiraroj & Ulubaşoğlu, 2015; Nair-Reichert & Weinhold, 2001; Pegkas, 2015; Zhang, 2001). Various characteristics of developed countries and countries in the late stage of their development are responsible for FDI-led growth. For example, most studies find that countries or regions that are more open in trade tend to have higher inflows of FDI and higher FDI-led growth. Also, some studies suggest that economies with higher levels of human capital and financial development tend to experience more sustainable growth rates due to FDI. Finally, other authors find that the institutions and regulatory regimes in each country play a fundamental role in facilitating a positive relationship between FDI and economic growth (Adams & Opoku, 2015).

However, several authors have discovered that FDI has no significant long-run impact or that FDI can have a debilitating impact on economic growth (Adams & Opoku, 2015; Belloumi, 2014; Khaliq & Noy, 2007; Sharif et al., 2009). These studies are a mixture of cross-country panel studies and country-specific studies, but what they have in common is that the subjects are relatively less developed economies. Moreover, Makhetha & Rantaoleng (2017) find that there exists a bi-directional causality, wherein the causality link from growth to FDI is stronger than the reverse causality. However, Makhetha and Rantaoleng's (2017) reliance on Granger causality testing with limited grounding in economic theory introduces potential endogeneity issues. The present study mitigates this by drawing on formal economic theory, which significantly lowers the likelihood of endogeneity arising from omitted variable bias, measurement error, and other related factors.

The empirical literature within this discourse is comprised of studies based on formal theory of economic growth, Granger causality, or a combination of both. The studies employing cross-

data panels predominantly rely on formal theoretical frameworks while case studies predominantly utilize Granger causality.

Some of the empirical literature using Granger causality includes the cross-data panel study by Zhang (2001). Zhang (2001) studies the FDI and growth nexus in 11 East Asian and Latin American countries from 1960 to 1997, applying the Auto-Regressive distributed lag (ARDL) approach. This technique is particularly appropriate because it allows researchers to capture both the short-run and long-run relationship between variables of interest. Also, the approach generates lags of independent variables to address the problem of collinearity which can hamper the accuracy of the results. The findings suggest that the relationship between FDI and economic growth is very different between East Asia and Latin America. That is, the impact of FDI on growth is dependent on country-specific factors but generally tends to promote growth when countries adopt liberal trade policies, invest in education and human capital, encourage export-oriented FDI, and maintain macroeconomic stability.

The major contribution of Zhang's (2001) paper is that it studies the relationship between FDI and growth over a sufficiently long period to identify its nature in the long-run while simultaneously studying the short-run version. This is uncommon within empirical literature. Also, it identifies investment in education as one more important factor that can enhance the absorptive capacity for FDI. This finding adds to measures like human capital and trade openness that were proposed as absorptive capacity indicators by Borensztein et al. (1998) and Nair-Reichert & Weinhold (2001), respectively. These findings are in line with the theory of the endogenous framework.

Other studies employing Granger causality are case studies. Case studies are increasingly essential to capture the idiosyncratic dynamics of the relationship between FDI and growth in any given economy. Some of them include Belloumi (2014), who examines the causal relationship between trade openness, FDI, labour and capital investment, and economic growth in Tunisia covering the period 1970 to 2010. The paper also employs the ARDL to cointegration approach to determine if there is a long-term relationship among the variables and uses VECM to test for Granger causality and directionality between the variables.

Moreover, the results reveal that positive externalities or spillovers emanating from FDI might be elusive in the case of Tunisia given the absence of significant Granger causality from FDI to economic growth, or vice versa, in the short-run. Similarly, in the short term, there is no notable Granger causality between trade and economic growth in either direction. Furthermore,

Belloumi (2014) discovers that domestic investment[1] is a key determinant of economic growth in Tunisia and that it carries a more significant impact than that of FDI on growth.

Chakraborty & Nunnenkamp (2008) also contribute to the literature by using ARDL to cointegration and Granger causality tests to investigate the FDI-growth nexus in India from 1987 to 2000. Their findings reveal variations in the growth impact of FDI across different sectors. They find that FDI has a weak causal relationship with output growth within the services sector while the causal link within the manufacturing sector is much stronger. This is because the manufacturing sector in India is fueled by both the FDI from within the sector itself and spillover effects derived from the FDI in the services sector. However, there is insufficient evidence of a causal link between the two variables in India's primary sector. Although the limited time frame of the study is a matter of concern, the highlight of Chakraborty & Nunnenkamp's (2008) paper is that it confirms the notion by the endogenous growth framework that FDI can aid growth through spillover effects.

Similarly, Khaliq & Noy (2007) focus on the influence of FDI on economic growth across various economic sectors and use Indonesian data from 1997 to 2006. Although the FDI has an influence on economic growth at an aggregate level, they discover that, conversely, the relationship between the FDI in the mining and quarrying sector and economic growth is negative. The limitation of the paper is that it studies FDI over a period of 9 years which does not allow capturing of the long-run effects of FDI.

Instead of Granger causality, Sharif et al., (2009) use the Toda-Yamamoto causality test to investigate the FDI and growth nexus in Malaysia from 1970 to 2005. The results suggest that there is no strong evidence of bi-directional causality between FDI and GDP in Malaysia, casting doubt on the assumption that FDI leads to growth and vice versa. However, the period of study is too brief to capture the long-run relationship between FDI and growth. Despite the limitations, the study adds to the literature by highlighting human capital, and infrastructure as factors that can boost the absorptive capacity for FDI and therefore should also be given more attention.

Granger causality tests are widely accepted for various reasons. Some of the qualities of Granger causality tests include their ability to determine whether the past values of one variable

[1] Belloumi (2014) uses 'domestic investment' interchangeably with 'capital investment' and measures it using the real value of gross fixed capital formation.

can predict the future values of another and their efficiency in evaluating the directionality of influence and timing of influence between variables.

Despite their wide utilization, these tests have several shortcomings. Firstly, relying on Granger causality tests without referring to any theoretical framework can be problematic because they are mainly statistical tools and only capture surface-level relationships. This means that they are unable to offer a more comprehensive and nuanced understanding of the dynamics of the interactions between variables. Secondly, the 'causality' in 'Granger causality' can be misleading because the tests do not necessarily show whether one variable causes the other but rather whether that one variable predicts the other. Thirdly, the tests are better suited for short-run predictive relationships than long-run relationships which are essential for studying long-run economic growth. Finally, Granger causality tests may not sufficiently address issues of endogeneity, where variables influence each other in a feedback loop. Employing formal growth models provides a more robust understanding of economic relationships because they are equipped to handle the complexities.

Moving on to studies based on formal growth models, a review of cross-data panel studies is provided. One of them is a study by Pegkas (2015), who studies the relationship between FDI and economic growth in the sampled countries of the eurozone. The study uses data from 2002-2012 and Fully Modified Ordinary Least Squares (FMOLS) and Dynamic Ordinary Least Squares (OLS) techniques to analyze this relationship. These techniques are particularly appropriate for this type of study because they account for both serial correlation and endogeneity within the explanatory variables which may arise from the presence of cointegration in the model. Also, FMOLS produces more reliable results when the data set is large which is good for the study since it samples 18 Eurozone countries.

Pegkas (2015) discovers that there prevails a positive relationship between FDI and growth in the long-run. This finding is not surprising because the eurozone is relatively more developed than the SSA region, implicitly suggesting better human capital, better institutions, and to some extent a more advanced financial development. This has been supported by other authors like Azman-Saini et al., (2010), Borensztein et al., (1998), and OECD, (2002). They claim that for host countries to fully take advantage of FDI stock, they need to have some level of financial development, education, or development in general. Due to the study's Eurocentric nature, the limitation of the study is that the results cannot be used to make inferences about developing

countries. This is because such countries are frequently far behind in terms of financial development.

Iamsiraroj & Ulubaşoğlu (2015) investigate the link between FDI and economic growth using a sample of 140 countries from 1970 to 2009, by analysing data from existing published studies. Since the study is a compilation of studies focusing on similar topics the authors use a meta-regression analysis (MRA). The findings reveal that FDI generates economic growth, and the authors identify financial development and trade openness as robust absorptive capacity variables that display non-linear behaviours in their absorptive capacity. The paper suggests that FDI's positive effect on growth diminishes at extremely high levels of financial development and trade openness, highlighting the significance of the economy's absorptive capacity for FDI's effectiveness.

One of the major contributions of Iamsiraroj & Ulubaşoğlu's (2015) paper is to provide results that can be used to infer the whole population. This is due to the adequately large sample size of 140 countries. Additionally, the technique used provides reliable results because it allows researchers to account for heterogeneity between the results and identifies publication bias. The technique also helps avoid the problem of the Simpson paradox. This occurs when the relationship between two variables fluctuates or vanishes when subpopulations are combined into a bigger population.

Borensztein et al. (1998) conduct a thorough examination of the link between FDI and economic growth focusing on 69 countries within the Latin America and Sub-Saharan Africa regions. The panel data study uses a mixed fixed and random effect panel data model which allows for heterogeneity across countries. Findings suggest that FDI can positively impact economic growth through various channels like the transfer of advanced technology. The authors postulate that the impact of FDI on growth is more through higher efficiency facilitated by technology transfer than the higher concentration of capital. However, the magnitude of this impact depends on various factors such as the level of human capital and the quality of institutions in the host country.

The findings further suggest that FDI has a stronger impact on growth than domestic investment and that foreign investment does not substitute domestic investment. One of the risks that can be posed by FDI is crowding out domestic investment. This occurs when local firms or enterprises cannot compete with market-seeking foreign counterparts. So, instead of crowding out domestic enterprises, the FDI within these countries on average is involved in

activities either downstream or upstream of the domestic activities thus complementing domestic enterprises.

The importance of this study by Borensztein et al. (1998) is that it focuses on the countries in developing regions and provides a generic outlook on the relationship between FDI and economic growth within the developing world. It also establishes that human capital can improve an economy's absorptive capacity. Human capital and FDI have a strong complementary relationship because human capital facilitates technological transfer which is believed to promote long-run economic growth. Therefore, it is essential that leaders in developing countries are aware of relevant measures to take to ensure sustainable development through FDI.

More evidence of the role played by human capital in facilitating FDI-led growth is provided by Li & Liu (2005). They sample 84 countries from 1970 to 1999 and use both the single equation and simultaneous equation estimation techniques to investigate the FDI growth nexus. Notably, the study discovers that FDI does not only boost economic growth through the injection of capital but also its interaction with other factors. The findings suggest that there is a strong positive impact of FDI on growth when there are higher levels of human capital and that there is a strong negative impact of FDI on growth for developing countries in the presence of technology gaps. This finding supports the findings by Borensztein et al. (1998).

Contributing to this discourse, Azman-Saini, et al., (2010) present empirical evidence regarding the role of financial market developments in facilitating the impact of Foreign Direct Investment (FDI) on growth. The authors utilize data from 91 countries from 1975 to 2005 and primarily apply a threshold regression model. This enables a thorough examination of the dynamic relationship between FDI, output growth, and financial markets. Furthermore, the technique also takes into account the heterogeneity across countries.

The results indicate that the positive influence of FDI on growth only manifests itself once financial market development surpasses a specific threshold level. Therefore, the paper adds to the literature by identifying financial market development as one of the factors that enhance absorptive capacity for FDI. However, a fundamental drawback of this study by Azman-Saini, et al. (2010) is that the 30-year timeline is too short to capture the long-run relationship between FDI and economic growth. Additionally, the paper does not provide a thorough discussion of the potential consequences of FDI on growth like crowding out of domestic investment and profit repatriation.

Nair-Reichert & Weinhold (2001) conduct a cross-country data analysis and use Mixed Fixed and Random (MRF) estimation to examine the causal link between FDI and economic focus on developing countries. This technique is suitable because of its ability to capture heterogeneity among subjects sampled which in this case are individual developing countries and its ability to provide estimates with minimum bias. The study uncovers that the causal relationship between FDI and growth is different from country to country. That is, countries with more open trade policies tend to experience a stronger causal relationship between foreign investment and growth. Additionally, their FDI-related growth tends to be more sustainable even though there exists some degree of heterogeneity for each country. However, the 25-year period of the study is not adequate to successfully capture the long-run relationship between FDI and growth to determine the sustainability of FDI-led growth. Lastly, the results cannot be generalized to the population of developing countries because the sample size is small.

Conversely, there is empirical evidence that contests the notion that having more absorptive capacity leads to higher FDI-led growth. Bende-Nabende et al. (2003) study the interactions between FDI, output, and spillover variables in four Asian countries over the period 1965-1999. Notably, the results suggest that the less developed countries, the Philippines, and Thailand, FDI promotes sustainable output growth, and its impact is statistically significant. However, for the more developed Taiwan and Japan, FDI has a negative association with output but for Japan, the impact is insignificant. Additionally, there is strong evidence of spillover effects in the less developed countries than the more advanced economies. Similar results are also discovered by Sjöholm (1999) that when domestic companies are far behind foreign companies in terms of technology, the spillover effects of FDI are more vigorous. These studies provide a much-needed contrasting view of the interaction between absorptive capacity and FDI-led growth.

Using data from 22 sub-Saharan Africa (SSA) countries over the period 1980 - 2011 and the General Methods of Moments (GMM) estimation technique, Adams & Opoku (2015) investigate the dynamics of FDI and economic growth. Their findings reveal that in the panel of selected SSA countries, FDI does not possess a positive significant impact on economic growth independently and so do all incorporated regulatory variables. For the specific case of the SSA region, these findings are expected because the majority of FDI in some countries is directed toward the extractive sector and therefore does not offer valuable linkages to sectors in the host countries. However, the results also show that regulation-FDI interactions have a positive and significant impact on growth. An important implication this makes is that in the

presence of efficient regulations through government intervention, FDI can accelerate economic growth.

Furthermore, inflation was found to have a significant debilitating effect on economic growth while other factors such as trade openness, population, and domestic investment were found to have a significant positive effect on growth. The authors argue that efficient regulations regarding business, credit markets, and labour are crucial for optimizing the benefits derived from FDI.

The major contribution by Adams & Opoku (2015) lies in underscoring the role of the regulatory framework in amplifying the effect of FDI on economic growth in SSA. This confirms the theoretical perspective of the endogenous framework, which suggests government intervention can fuel growth. However, the limitation of the study is that although Lesotho is included among other SSA countries in the study, the study is generic and does not offer findings and policy recommendations specific to Lesotho, which is rather not helpful for understanding the FDI-growth nexus in the case of Lesotho.

Although panel data studies aid a broad view of the FDI-growth relationship over several countries, their main shortcoming is failing to fully capture the country-specific nature of the FDI-growth relationship. To address this issue, researchers have also investigated the FDI-growth relationship by focusing on specific countries. The common name for this type of studies is case studies. The case studies relevant to the current research make use of time series methods with some relying on Granger causality while others are based on formal growth models.

Adding to the literature, Berthélemy & Démurger (2000) analyse FDI's relationship with economic growth in China over a period of 15 years (1985-1996). The authors use a simultaneous equation system to estimate the impact of FDI on economic growth and find that FDI positively impacts growth, especially in provinces with higher levels of human capital. They also discover that foreign investors tend to favour provinces with greater openness to international trade, where the industrial sector is less state-dominated, and where physical infrastructure is more advanced. These factors are associated with the economic success of the provinces. Although the authors confirm a positive FDI-growth relationship and discuss factors that improve the absorptive capacity for FDI in China, their findings do not examine FDI's influence in China over the long-run. This is because the period of study is too short, and the technique used does not facilitate long-run relationship tests.

To the best of the researcher's knowledge, only one study within this discourse solely focuses on Lesotho. Makhetha & Rantaoleng (2017) study FDI, trade openness, and economic growth in Lesotho. Using the data from 1980 to 2011, they employ a VAR Granger causality test to determine the long-run relationship between FDI, trade openness, and growth. Results show that FDI's impact on growth both in the short-run and the long-run is not statistically significant. Conversely, trade openness has a significant negative association with growth in the long-run but an insignificant impact in the short-run.

Although Makhetha & Rantaoleng (2017) contributed tremendously by pioneering this field of research in the case of Lesotho, the study has one major weakness. The paper lacks a theoretical foundation and is largely reliant on Granger Causality Tests. Employing formal growth models that are grounded in economic theory provides deeper insights into the mechanisms behind relationships between the variables of interest. Other issues that were previously discussed concerning the prioritization of Granger causality tests over theoretical groundwork also apply.

Moreover, Makhetha & Rantaoleng (2017) use data from 1980 – 2011, implying that their findings might be outdated especially since the government of Lesotho and the Central Bank of Lesotho (CBL) have adopted new policies and amended others which could have altered the FDI-growth nexus in the recent years. This highlights the need for a more recent investigation of the relationship between FDI and economic growth, a gap to be filled by the current study. Furthermore, the present study addresses potential endogeneity issues identified in Makhetha & Rantaoleng (2017) by employing a formal growth model rooted in economic theory to guide the empirical analysis. This approach minimizes the likelihood of omitted variable bias, measurement error, and other sources of endogeneity, yielding results that are both economically interpretable and reliable. Additionally, by examining the relationship over a 43-year period (1977–2020), this study provides a comprehensive analysis of the long-run interaction between FDI and economic growth in Lesotho

Lesotho has been neglected within the empirical literature in the investigation of the FDI-growth dynamics. This can be crippling not only to the already sluggish economic growth of the country but also to policymakers in the country who need the most recent empirical research to formulate policies that can adequately address the socio-economic challenges of the nation. Fortunately, the current study offers updated empirical findings and some policy recommendations for the optimization of the relationship between FDI and economic growth in Lesotho.

# 3. The Overview of Lesotho

Geographically, Lesotho is a small southern Sub-Saharan African country sized 30, 355 square kilometres and encircled by South Africa. It is among the three independent countries or independent states in the world that are landlocked within the borders of one country alongside Vatican City and San Marino (both landlocked by Italy). This forces the country to rely on South Africa to gain access to the rest of the world.

As a former Britain protectorate, the country achieved independence in October 1966. During this time Lesotho was recognized by the colonial name Basutoland. It had already established a democratic political regime in 1965 which aided the transition to independence (Letsie, 2022). Today the prime minister, the head of the government, rules alongside a constitutional monarch who is the head of State (World Bank, 2023).

From an economic standpoint, Lesotho is generally a poor country. It is currently classified as a lower-middle-income country. To put this into perspective, out of the population of about 2.3 million, roughly 45% live below the poverty line[2] (World Bank, 2023), while 75% are either living in poverty or vulnerable to poverty (World Bank, 2019). Due to this among other factors, life expectancy at birth remains one of the lowest in the world, positioned at just 53.1.

As of 2022, the country ranks number 168[3] out of 191 countries in the world in terms of human development which is a significant decline in the rank from 132 in 2002 (Conceição & UNDP, 2022). However, although there has been a depreciation in the rank since 2002, the World Bank (2023) reports that Lesotho has experienced a nearly 6.9% fall in the poverty rate from 2002 to 2017. In 2002, around 56.6% of Basotho was living in poverty while only 49.7% was found to live in poverty in 2017.

Lesotho has witnessed slow growth of GDP between the years 1980 and 2019. Varying levels of decade average GDP growth rates have been experienced in the country with the highest being 4.406% in the 1990 – 1999 decade (see Table 3.1). The decade average per capita income,

[2] 45% of Lesotho's population survives on less than $2.15 per person a day in terms of the 2017 purchasing power parity (PPP).
[3] In this rank, being number 1 means that an economy is most developed while 191 indicates the least development.

similarly, has steadily risen over the same period, peaking at M9852.21[4]. Although this is the highest decade average per capita income that has ever been seen in Lesotho, when divided by 365 for the number of days in a standard year it yields M26.99 a day. This value converted into US Dollars is evidently below the poverty line of $2.15 (in 2017 PPP) a day, which aligns with the claims that a substantial proportion of Basotho struggle with poverty.

Furthermore, the public sector and low-skill manufacturing are the biggest sources of employment in Lesotho. South Africa used to be a fundamental source of employment for Lesotho's labour force from the late 1900s, mainly within the domestic services sector and the mining sector. However, the South African government has recently amended its policy to prioritize local labour (Damane & Sekantsi, 2018), leaving the Lesotho public sector with a burden to provide employment. Despite this, South Africa remains the biggest source of remittance in the country.

Table 3.1 shows that the average decade unemployment[5] remained relatively stable ranging between 17% in 1991 to 16.9% in 2019. The most affected population is the youth[6] whose recorded unemployment rate was recorded as high as 25.12% in 2019 which has grown steadily from 23.65% in 1991. As would be expected, the overall unemployment rate was later worsened by the major loss of employment due to the Covid-19 pandemic in 2020 leading to a peak of 18.5%. Damane et al. (2018) found that some of the factors contributing to the country's high unemployment include labour market deficiency, lack of market diversification, and the small private sector.

Less frequently discussed is the high income disparity which also poses a serious challenge in Lesotho. As reported by the data from the World Bank, the nation's Gini coefficient[7] at 44.6 which is among the top 20% of countries with the highest. This figure is as per the 2017 country assessment which is the most recent one. Although the figure is high, it still marks a significant decline from 51.6 in 2002.

Several factors could be credited for the decline in the Gini coefficient. Factors such as the increase in the formal wage of a less privileged population and the increased accessibility of basic education. Mahler (2020) also found that the key driver of the fall in inequality is due to

[4] Lesotho's local currency is the Loti (singular) or Maloti (plural), denoted by the symbol 'M'.
[5] Expressed as a percentage of the total labour force.
[6] Youth in this context refers to the population in the age range 15-24
[7] A Gini coefficient indicates income disparity within an economy. The bigger the coefficient, the wider is the income disparity between the richest and the poorest people in the population.

the investment in social protection programs that were developed in the early 2000s and continue to be operational. The government of Lesotho extends nearly 4.5% of GDP towards these social protection programs which is relatively higher than the 2% in an average lower middle-income country or an average SSA country. Fortunately, the distribution of income by these programs is extensive. Not only do they impact the urban areas but the rural area population as well.

Moreover, Lesotho has been a frequent recipient of external assistance given the nature of its economic status. This assistance includes foreign aid from international financial institutions such as the International Monetary Fund (IMF) and the World Bank, and aid from relatively well-off countries such as the United States of America (US)[8], and China[9].

*Table 3.1* Economic Indicators

| **ECONOMIC INDICATORS** | **1980-1989** | **1990-1999** | **2000-2009** | **2010-2019** |
|---|---|---|---|---|
| GDP growth (%) | 3.235 | 4.406 | 3.056 | 2.107 |
| GDP per capita (Constant, Loti) | 4332.12 | 5855.58 | 7714.98 | 9852.21 |
| FDI (% of GDP) | 1.642 | 2.593 | 3.174 | 2.847 |
| Inflation (GDP deflator, %) | 15.046 | 10.872 | 7.164 | 6.978 |
| Unemployment (% of total labour force) | - | 17.029 | 16.980 | 16.883 |

Source: World Development Indicators by the World Bank

Fortunately, Lesotho sustains a currency peg with the South African Rand which was established in 1980 between the Central Bank of Lesotho (CBL) and the South African Reserve

[8] The US has aided healthcare by funding HIV/AIDS programs and supported education by funding developments in school infrastructure and teacher training.
[9] China has provided support in the construction of infrastructure such as roads, dams and bridges and financial assistance in the form of grants and loans.

Bank (SARB). One of the ways that the currency peg furthers Lesotho is that since it fixates the exchange rate between the two economies at a 1:1 ratio, the CBL is compelled to inherit the monetary policies used by the SARB. This limits the disproportionate creation of money and reduces the risk of inflation, thus offering Lesotho a degree of monetary stability. Table 3.1 displays that over the four decades within the years 1980 to 2019, Lesotho managed to successfully lower the inflation rate from a decade average of 15.046% in 1980-1989 to an impressive 6.978% average in the 2010-2019 decade. Additionally, among other benefits, the fixed exchange rate opens channels for foreign investment and trade. It gives traders and investors a sense of security and confidence to bring business by eliminating investment risk and therefore boosts capital flows.

In terms of trade, Lesotho is characterized by a negative trade balance also known as a trade deficit which means that the country imports more than it exports. Most of the country's imports are from South Africa and China while most of its exports are directed to the US and South Africa. Lesotho primarily exports apparel, textiles, and automotive products while it imports a much wider variety of goods.

Moreover, the country receives royalties for its water that flows into South Africa through the Senqu/Orange River. The two countries partner in a long-term agreement named the Lesotho Highland Water Project (LHWP). This is a multi-phased project which commenced in 1986 and managed to successfully secure funding from the World Bank and the European Union (EU). It is primarily focused on optimizing the flow of water to South Africa by building dams, and tunnels and improving water channels. One of the great advantages this has is that the surrounding infrastructure is also improved.

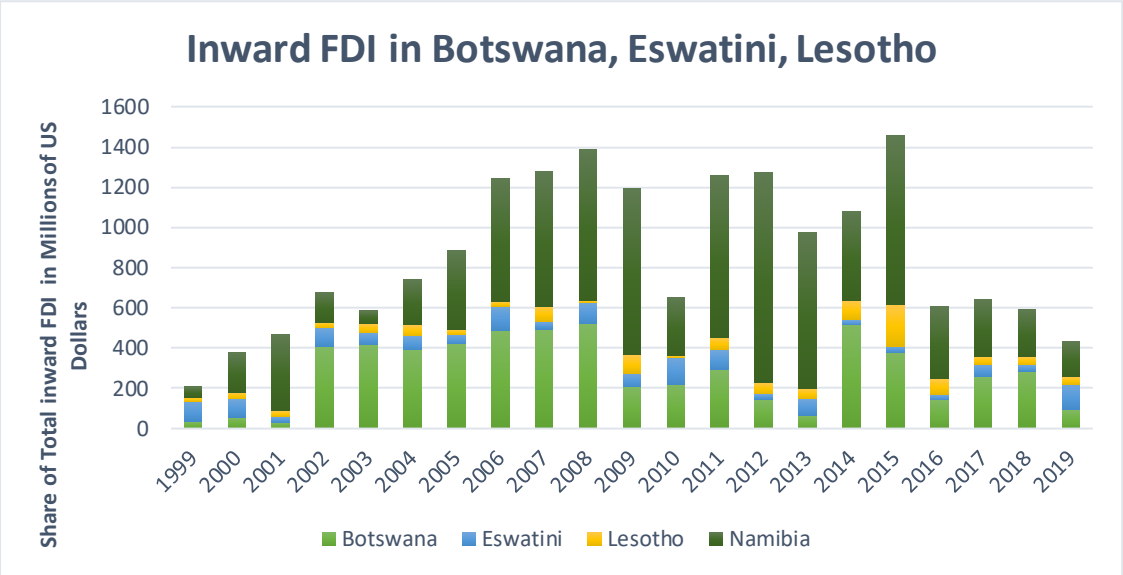
**Trends in inward FDI**

Generally, Lesotho's FDI inflow is relatively low compared to its neighbouring countries (See Fig 3.1). Apart from the country not offering any incentives tailor-made for foreign investment, some of the challenges that the country faces in attracting FDI include first, Lesotho is at a geographic disadvantage[10]. This means that when shipping to their distant markets, producers will have to incur more costs in the transportation of output to the nearest

[10] As explained previously, the nation is entirely landlocked in south Africa.

port. Secondly, there is a lot of room for development in terms of infrastructure in Lesotho (Malefane, 2007), for example, there are currently no export processing zones in the country. Well-established infrastructure makes the experience of doing business smoother and can therefore aid in attracting FDI. Thirdly, investors value political stability. Although Lesotho is not far off in terms of political stability, the country is governed by a coalition government which in the recent past has proven to be prone to collapsing when members of the coalition grow indifferent.

*Fig 3.1* Botswana, Eswatini, Lesotho and Namibia




Source: The World Development Indicators by the World Bank

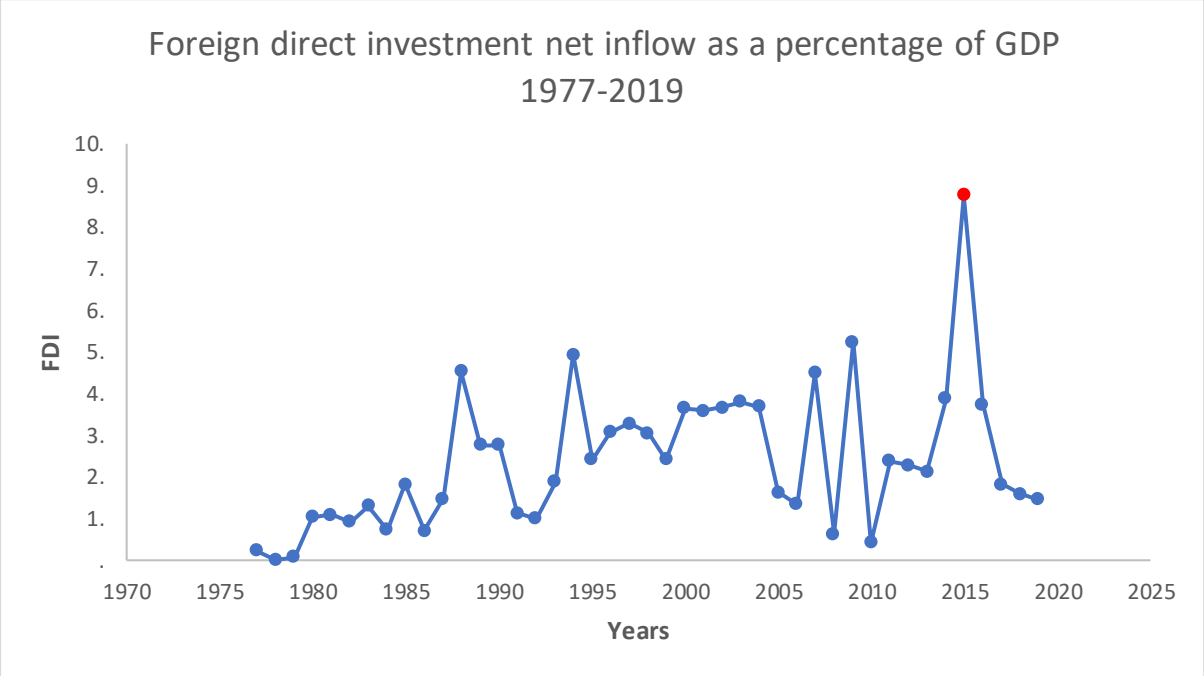
From a different point of view, Lesotho is an ideal destination for FDI. For instance, labour in Lesotho is relatively cheap compared to its immediate neighbour, South Africa. Multinational corporations prefer to outsource production of labour-intensive goods or services to economies with cheap labour because in doing so, they can maximize their profits by lowering the costs of production. Additionally, Lesotho manages to keep inflation on a leash due to the currency peg with South Africa and the financial stability the investors feel secure and more comfortable doing business in the country.

Another important factor aiding Lesotho's attractiveness to foreign investment is related to its preferential access to international consumers. For instance, the country is a member of the regional block Southern African Development Community (SADC) and the Southern African Customs Union (SACU), both of which advocate for free trade among member states.

Additionally, the small open economy also is allowed to export various goods to the US market through the African Growth Opportunity Act (AGOA), and the European Union (EU) through the Economic Partnership Agreement (EPA) among others.

To observe the trend in FDI through a panoramic lens we refer to Fig 3.2, which plots FDI inflow as a share of GDP from 1977 to 2019. The diagram depicts how volatile the flow of inward FDI has been in the country. The next paragraphs of this section explore the events that may have resulted in the high fluctuation of inward FDI in each of the four decades presented in Table 3.1.

*Fig 3.2* Trends in FDI, Lesotho




Source: World Banks's World Development indicators

The fundamental step the government of Lesotho has taken towards bringing more investment within the borders of the country is the establishment of the Lesotho National Development Corporation (LNDC). This is a parastatal given the responsibility to implement Lesotho's industrial policies by an act of the parliament in 1967. However, LNDC is not provided any budgetary support by the government and operates on its own earnings. Following the

establishment of LNDC, the inflow of FDI was relatively low throughout the late 1970s and then gradually increased in the early 1980s.

LWHP launched its first project in 1986, the construction of Katse Dam which would be completed in 1997. This project is associated with large investment in water projects. After the IMF financial assistance program of 1988, FDI inflow reached a new peak of 4.5% but then declined for the next two years. The decade average annual FDI's share of GDP was 1.642% (see Table 3.1).

Subsequently, the flow of FDI continued to fall from 1990 but was maintained at levels higher than in the years before 1988. It then took an upward inflection in 1994 to a new peak of 4.93%. This surge in FDI inflow was mainly driven by great investment in export-oriented garment manufacturing (UNCTAD, 2003). This relatively high inflow of FDI was maintained through most of the decade until the infamous political crisis of 1998. This is an uproar by the public associated with the 1998 elections. Some of the disruptions stemming from this civil unrest included severe vandalization of private and government property, and damage to infrastructure within the capital city of Lesotho, Maseru. This posed a significant threat to existing and potential investors whilst forcing others to relocate. Despite this crisis, the average FDI inflow share of GDP for the 1990 -1999 decade is 2.59% which is nearly double that of the previous decade.

Moving on to the 2000-2009 decade, Lesotho fortunately became one of the enlisted beneficiaries of the AGOA in 2000. This is an agreement that allows selected countries to export to the US duty-free for a range of over 6000 different products. It played a substantial role in attracting textile and apparel processing firms whose management wished to take advantage of the large US markets. Soon after Lesotho was granted preferential access to the US it became the biggest exporter of apparel to the US through AGOA in the SSA region (Morris & Staritz, 2016). AGOA played a big role in boosting their export capacity specifically within the apparel and textile industry in Lesotho and its counterpart Eswatini. Although both nations were already participating in the South African value chain because of their proximity to the South African market, being exposed to a larger market through AGOA has exhibited even more tremendous economic benefits (Morris et al., 2011).

In 2003, the Investment Policy Review (IPR) of Lesotho was completed. The IPR is a process carried out by UNCTAD to evaluate the investment policies and practices in any given economy. The rationale behind this was to provide an extensive analysis of the economy's

investment climate and give recommendations on how to improve it. Some of the key recommendations were made with the awareness that the AGOA trade preferences would expire soon, which made addressing uncompetitive of Lesotho's investment climate a matter of urgency (UNCTAD, 2014).

The 2000-2009 decade is also associated with the growth of the mining industry. The year 2004 marked the commercial reopening of Lets'eng Diamond Mine which was later acquired by Gem diamonds in 2006 through a highly lucrative deal. This mine has unearthed five of the world's largest diamonds. By 2005, Kao Diamond Mine was ready to begin operations while the Liqhobong Diamond Mine was still under construction. In all these mines the government of Lesotho owns between 25% and 30% while the majority share is owned by foreign corporations.

The biggest fall in the inflow of FDI this decade was recorded in 2008 when it dropped to 0.62%. This dent in the graph (see Fig 3.2) is attributed to the infamous global financial crisis. The financial crisis induced a fall in the global demand for exports and thus forced potential investors to withhold their investments. As the global economy recovered from the crisis there was a surge in FDI to 5.24% in 2009 which is also the peak of the decade (2000-2009). This followed the opening of a manufacturing firm by Philips South Africa which produces energy-saving fluorescent bulbs targeted to the market in Southern Africa. The average annual FDI inflow of this decade was 3.17% which is notably higher than the previous 2.59% (see Table 3.1).

The 2010 – 2019 decade began at the lowest point since 1980 when the inflow of FDI as a share of GDP was 0.42%. Nonetheless, it was quickly revived leading up to the record-breaking peak of 8.75% in 2015.

Fig 3.2 shows the lowest dip in FDI in 2010, this occurred after Lesotho introduced a land act that was intended to protect local markets from the entry of small foreign businesses. This act brought about a partnership requirement for foreign investors looking to acquire a direct lease title from the government (UNCTAD, 2014). This requirement is defined such that for a foreign company/individual to hold a lease; a Lesotho citizen must have a 20% share of the deed. The partnership requirement applies to all sectors, not just the small enterprises, and is highly foreign investment.

The year 2012 involved several events that enhanced the investment climate of Lesotho. For instance. The nation further proved itself politically stable in 2012 after having smooth

elections free from chaos like that of 1998. Also, the country's preferential access to the US was extended with AGOA in 2012 after expiry and would expire in 2015. The government of Lesotho established the National Strategic Development Plan, a plan indicating actions to be undertaken by the government in the following years in considering the developmental challenges faced by the country. The plan also involves policy suggestions which are mostly in line with the IPR recommendations (UNCTAD, 2014).

The inflow of FDI took a sharp upward turn in 2013 to a never-before-seen peak of 8.75% in 2015. This surge in the inflow of FDI was led by the launching of the second phase of the LHWP in 2014. This phase includes the construction of the Polihali Dam, a transfer tunnel, and the Mokhotlong Hydro-power station. Additionally, in 2015, the US extended Lesotho's preferential access to the US textile and apparel market through AGOA for ten more years. This meant that textile and apparel manufacturing firms that were facing a potential shutdown upon no extension could continue being operational.

Furthermore, the Lesotho government published the 2015 National Investment Policy of Lesotho which was constructed with the assistance of UNCTAD and was intended to serve as an overarching investment policy. The objective of the statement is to clarify the state of the country's investment environment and highlight existing policies regulating investment. Some of the highlights include the fact that the country offers no special benefits to foreign investors different from those of local investors and that the Land Act of 2011 (which was previously discussed) remains active.

Unexpectedly, the government was dissolved in 2016 after a vote of no confidence against the then-prime minister. The reason the political tensions of 2016 were of such great concern is that the nation had been trying to establish itself as a politically stable state since the 1998 crisis. Fig 3.2 shows a sharp downward inflection in the value of FDI, which was likely influenced by the aforementioned political tensions that indicate a lack of political stability. For the rest of the 2010-2019 decade, the FDI proportion of FDI was maintained at lower levels. Despite Lesotho experiencing the highest inflows of FDI in 2015, the average percentage of FDI this decade is 2.85% which is a significant decline from the previous decade's 3.17.% (see Table 3.1).

# 4. Data and Methodology

## 4.1. Model Specification

To examine the connection between foreign direct investment (FDI) and economic growth in Lesotho, the current study estimates three variations of the widely accepted exogenous growth model. All three versions of the model are augmented by FDI to capture the isolated impact of FDI on economic growth and to ensure consistency in the result across the three models. Model 1 follows the baseline model introduced by Solow (1956), model 2 follows Mankiw Gregory et al. (1992) and model 3 introduces an additional variable as proposed by the extension of the exogenous growth model presented by World Bank (1990). This approach has also been used by Chirwa & Odhiambo (2019). The three estimated equations are presented as follows:

**Model 1** (Solow, 1956)

$$Y_t = f(FDI_t, INV_t, POP_t) \quad (1)$$

**Model 2** (Mankiw Gregory et al., 1992)

$$Y_t = f(FDI_t, INV_t, HC_t, POP_t) \quad (2)$$

**Model 3** (World Bank, 1990)

$$Y_t = f(FDI_t, INV_t, HC_t, POP_t, TO_t) \quad (3)$$

Where traditional factors are, Y, the real GDP per capita; FDI, the inflow of foreign direct investment; INV, investment or physical capital; HC, human capital; and POP, population growth. TO is the trade openness ratio and is an efficiency factor. t represents the time trend.

## 4.2. Data

This study uses Lesotho's annual time series data from 1977 to 2020. The choice of indicators used to investigate the FDI and growth nexus is informed by both the theoretical and the empirical literature. This section outlines the variables used, their definitions, and reasons for inclusion, and provides their summary statistics.

Gross domestic product (GDP) per capita, denoted by Y, is the aggregate value of goods and services produced within Lesotho divided by the population, including taxes and excluding subsidies. Expressed in constant local currency (Loti)[11], GDP per capita's annual increase reflects economic growth by capturing changes in output or productivity.

FDI data represents net investment inflows as a percentage of GDP where foreign investors hold at least 10% voting power in domestic companies. It includes equity capital, reinvested earnings, and long- and short-term capital.

Gross fixed capital formation (GFCF) expressed as a share of GDP is used as an indicator for investment in physical capital denoted by INV. It is comprised of fixed assets and changes in the aggregate level of inventories in the economy. The fixed assets encompass plant machinery, purchases of equipment, land improvements, and the construction of public infrastructure such as offices, schools, hospitals, bridges, roads, industrial zones, etc. GFCF is theoretically expected to drive growth in the real GDP per capita, holding all else equal.

Secondary school enrolment (% gross) is the total population of students enrolled in secondary education as a share of the total population that is within the age range in correspondence with the secondary level of education. This level of education complements the basic education that is offered in primary education. Its objective is to provide fundamental tools through an array of subjects and skill-based learning instructed by specialized teachers to aid the future learning and human development of students. Secondary school enrolment proxies human capital denoted by HC and is theoretically expected to have a positive influence on growth.

The working age population is data on the population aged 15 to 64 and is denoted by POP. Due to the unavailability of data for the case of Lesotho, this variable is used as an indicator of the labour force.

The trade openness ratio denoted by TO is calculated as a sum of net exports and net imports divided by the real GDP (Alotaibi & Mishra, 2014; Belloumi, 2014; Steiner, 2016). This indicator represents how open Lesotho's economy is in terms of trade.

The data on GDP, secondary school enrolment, and GFCF was sourced from the World Bank database and OECD national accounts data files. The IMF, International Financial Statistics,

[11] A reminder that Lesotho's local currency is the Loti (singular) or Maloti (plural), denoted by the symbol 'M'.

and Balance of Payments databases provide data on the inflow of FDI (% of GDP). Finally, the data on secondary school enrolment is sourced from the UNESCO Institute for Statistics (UIS).

The summary statistics of all variables are presented in Table 4.1.

*Table 4.1* Summary Statistics

| Variable | Mean | Std. Dev | Min | Max |
|---|---|---|---|---|
| **Y** | 6802.53 | 2182.77 | 3888.51 | 10498.74 |
| **FDI** | .024 | .017 | .000075 | .087515 |
| **INV** | .187 | .111 | .011 | .359 |
| **HC** | .348 | .167 | .134 | .654 |
| **POP** | 1064875 | 190365.8 | 706773 | 1387660 |
| **TO** | .818 | .570 | .054 | 1.533 |

Table 4.1 shows that over the study period, the average annual per capita real GDP in Lesotho is M6802.53. Additionally, annual inward FDI is 2.4% of the real GDP on average, with a maximum value of 8.7% recorded in 2015. Generally, the minimum values of each variable were recorded in the early years of the timeline while maximum values were recorded in the recent years, signalling growth in each variable over the years.

### 4.2.1.Data Transformation

Significant transformations in this study include the computation of Gross Fixed Capital Formation (GFCF) as a percentage of GDP, achieved by dividing real GFCF by real GDP, both are measured in Maloti. The trade openness ratio is computed by summing net imports and net exports and dividing the sum by the real GDP. Other key indicators, such as secondary school enrolment as a percentage of the school-going age population, Foreign Direct Investment (FDI) as a percentage of GDP, and domestic credit to the private sector as a percentage of GDP, were also converted to decimal form by dividing by 100.

Furthermore, all variables underwent a logarithmic transformation. The reason for this is to minimize and stabilize the variance of each indicator by dampening the impact of extreme values or outliers. This is critical because the key assumption in time series analyses such as this is the stationarity of the variables, which entails a constant mean and variance over time. Also, log transformation can linearize variable interactions that were non-linear before being transformed[12].

## 4.3. Steps in Econometric Approach

To investigate the relationship between the inflow of foreign investment and economic growth in Lesotho, this paper uses the Autoregressive Distributed Lag (ARDL) approach. This technique was developed by Pesaran & Shin (1999) and further improved by Pesaran et al. (2001). ARDL models capture the dynamic relationship between variables over a long term rather than at a point in time by fusing both the autoregressive and distributed lag apparatuses. This approach has been largely used in time series literature for its various advantages. One of the benefits associated with the technique is its flexibility regarding variable integration. It can accommodate variables with mixed order of integration in one model, that is, variables integrated of order zero 'I (0)', order one 'I (1)', or fractionally integrated variables (Pesaran and Shin, 1999). Thus, serving as an upgrade from traditional methods which entailed a uniform order of integration among the incorporated variables. The feature is especially useful for analysing datasets that have a mix of stationary and non-stationary variables.

Furthermore, the ARDL technique offers a comprehensive examination of the relationship between variables. It can estimate both short-run and long-run coefficients to help the researcher determine the nature of the relationship between the variables of interest both in the short- and long-run. Additionally, the approach includes an error correction term which indicates the speed it takes for a variable to bounce back to its long-run equilibrium after a short-run shock. This term is displayed in the error correction model (ECM), a component of the ARDL approach that allows capturing of the dynamic relationship between the variables through the incorporation of variables in their current form and their lags.

[12] Microsoft Excel, Stata 17, and Microfit 5 were used to perform variable transformations and model estimation. Microsoft Excel was used to change data from percentage to decimal format and to compute the trade openness ratio, Stata 17 was used to generate the summary statistics while Microfit 5 was used to perform log transformation of the indicators.

Finally, the technique is beneficial for cases where the data is limited. Data availability is an extensively common challenge within the empirical literature. However, the ARDL approach employs the maximum likelihood estimation and Monte Carlo simulations which are known to be efficient and robust in providing reliable parameter estimates and minimizing bias for small and finite samples. Conversely, although the ARDL models utilize lagged variables and can handle both stationary and non-stationary variables, they only address certain types of endogeneity. However, since the ARDL approach assumes that all variables belong to either I (0) or I (1) classifications, it is important to put each series through a unit root test before applying the technique to ensure that no variable is integrated of order 2 or I (2).

There is a caution to be taken when applying this approach because one of the shortcomings of the ARDL models is linked to their advantage. That is, an analyst may incorporate lagged levels which help safeguard the validity and consistency of the model, however, doing so may result in a loss of observations which can threaten the meaningfulness and reliability of the results if the data is limited (Pesaran et al., 2001). To solve this problem, it is important to find a balance between the number of lags and the available data. This means that the number of lags must be limited more for small data sets than for larger data sets.

The estimated equations corresponding to the three previously stated models are given by:

**Model 1**

$$\Delta \mathrm{L}\, Y_t = \beta_0 + \beta_1 T_t + \sum_{i=0}^{n} \beta_2\, \Delta \mathrm{L}\, Y_{t-i} + \sum_{i=0}^{n} \beta_3\, \Delta \mathrm{L}\, FDI_{t-i} + \sum_{i=0}^{n} \beta_4\, \Delta \mathrm{L}\, INV_{t-i} + \sum_{i=0}^{n} \beta_5\, \Delta \mathrm{L}\, POP_{t-i} + \delta_1 LHWP_t + \delta_2 COV_t + \alpha_1\, \mathrm{L}\, Y_{t-1} + \alpha_2\, \mathrm{L}\, FDI_{t-1} + \alpha_3\, \mathrm{L}\, INV_{t-1} + \alpha_4\, \mathrm{L}\, POP_{t-1} + \alpha_6\, \mathrm{L}\, TO_{t-1} + \theta_1 LHWP + \theta_2 COV_t + \varepsilon_t \quad (4)$$

**Model 2**

$$\Delta \mathrm{L}\, Y_t = \beta_0 + \beta_1 T_t + \sum_{i=0}^{n} \beta_2\, \Delta \mathrm{L}\, Y_{t-i} + \sum_{i=0}^{n} \beta_3\, \Delta \mathrm{L}\, FDI_{t-i} + \sum_{i=0}^{n} \beta_4\, \Delta \mathrm{L}\, INV_{t-i} + \sum_{i=0}^{n} \beta_5\, \Delta \mathrm{L}\, HC_{t-i} + \sum_{i=0}^{n} \beta_6\, \Delta \mathrm{L}\, POP_{t-i} + \delta_1 LHWP + \alpha_1\, \mathrm{L}\, Y_{t-1} + \alpha_2\, \mathrm{L}\, FDI_{t-1} + \alpha_3\, \mathrm{L}\, INV_{t-1} + \alpha_4\, \mathrm{L}\, HC_{t-1} + \alpha_5\, \mathrm{L}\, POP_{t-1} + \theta_1 LHWP + \varepsilon_t \quad (5)$$

**Model 3**

$$\Delta \mathrm{L}\, Y_t = \beta_0 + \beta_1 T_t + \sum_{i=0}^{n} \beta_2\, \Delta \mathrm{L}\, Y_{t-i} + \sum_{i=0}^{n} \beta_3\, \Delta \mathrm{L}\, FDI_{t-i} + \sum_{i=0}^{n} \beta_4\, \Delta \mathrm{L}\, INV_{t-i} + \sum_{i=0}^{n} \beta_5\, \Delta \mathrm{L}\, HC_{t-i} + \sum_{i=0}^{n} \beta_6\, \Delta \mathrm{L}\, POP_{t-i} + \sum_{i=0}^{n} \beta_7\, \Delta \mathrm{L}\, TO_{t-i} + \delta_1 LHWP + \alpha_1\, \mathrm{L}\, Y_{t-1} + \alpha_2\, \mathrm{L}\, FDI_{t-1} + \alpha_3\, \mathrm{L}\, INV_{t-1} + \alpha_4\, \mathrm{L}\, HC_{t-1} + \alpha_5\, \mathrm{L}\, POP_{t-1} + \alpha_6\, \mathrm{L}\, TO_{t-1} + \theta_1 LHWP + \varepsilon_t \quad (6)$$

Where the variables in equations 4 – 6 are as described before. $\beta_2, \beta_3, \ldots \beta_k$ and represent coefficients associated with the short-run effects of the regressors in logarithm on the dependent variable along with $\delta_1$and $\delta_2$ for dummy variables. $\alpha_2, \alpha_3, \ldots \alpha_k$ capture the long-run effects of the regressors on the dependent variable along with $\theta_1$ and $\theta_2$ for the dummy variables. The deterministic terms a denoted by $\beta_0$, the constant term, and $T_t$ the time trend. $\Delta$ represents first difference.

LHWP is a dummy variable for the beginning of a large investment in phase 1 of Highlands water project in Lesotho in 1988. COV is a dummy variable capturing the structural breaks brought about by the COVID-19 pandemic in 2020.

### 4.3.1.Unit Root Tests

The unit root test, also known as a stationarity test, is applied to all variables in the regression model. The absence of a unit root indicates stationarity, while the presence of a unit root indicates non-stationarity. The importance of the test is to determine what variable to include in the ARDL approach test. This is because variables that exhibit two unit roots can contaminate the regression and lead to spurious results which would then undermine the reliability of the results (Pesaran et al., 2001). The study specifically conducts the Augmented Dickey-Fuller (ADF) unit root test. The ADF test uses a parametric auto-regression to test for stability in a series and thus is robust to higher-order serial correlation and heteroskedasticity which may be present in the data. The test also follows maximum likelihood estimation and therefore offers results with minimal residual sum of squares indicating the efficiency of the parameter estimates (Dickey & Fuller, 1981).

### 4.3.2.Bounds Tests

This test sequels the unit root test because it assumes that all the variables are either I (1) or I (0). The main purpose of the bounds test is to detect cointegration within the specified model. To carry out this test, first, OLS regression is used to estimate the model which also involves lagged variables and first differences. A test statistic (F or Wald statistic) is then calculated for

the joint significance of variables to test a hypothesis. In this case, the null hypothesis is 'no levels' which also means 'no long-run relationship' or 'no cointegration'. Critical bounds, that is, lower bound and upper bound are then established and form rejection region. The rejection of the null hypothesis implies the existence of a long-run relationship between the variables and failure to reject indicates insufficient evidence of cointegration in the specified model (Pesaran et al., 2001). However, to reach this verdict the test statistic must be compared to the critical values. After having confirmed cointegration in the given model, the study refers to long-run estimates provided by the long-run model.

### 4.3.3.Long-Run and Short-Run (ECM) Estimates

Once the bounds tests are conducted, the study moves on to present the long-run estimates of the three versions of the exogenous growth model. These estimates capture the long-run impact of the regressors on the dependent variable in each model. The study then continues with the short-run estimates provided by the error correction model (ECM). Likewise, these estimates indicate the nature of the relationship between the regressors and the dependent variable in the short-run.

The primary objective of the ECM is to simulate and understand the short- and long-term dynamics of these variables, especially in cases of cointegration. The key concept within the ECM is the error correction term (ECT). The ECT plays a central role in this model by identifying the speed at which the variables return to their long-run equilibrium following short-term deviations. It should be negative and statistically significant. A negative, significant coefficient indicates a robust and effective adjustment process, emphasizing the system's efficiency in self-correction. The higher the magnitude of this term, the higher the adjustment speed, and the lower the magnitude, the lower the adjustment speed. The error correction models associated with equations 4 – 6 are presented as follows:

**Model 1**

$$\Delta \mathrm{L}\, Y_t = \beta_0 + \beta_1 T_t + \sum_{i=0}^{n} \beta_2\, \Delta \mathrm{L}\, Y_{t-i} + \sum_{i=0}^{n} \beta_3\, \Delta \mathrm{L}\, FDI_{t-i} + \sum_{i=0}^{n} \beta_4\, \Delta \mathrm{L}\, INV_{t-i} + \sum_{i=0}^{n} \beta_5\, \Delta \mathrm{L}\, POP_{t-i} + \delta_1 LHWP_t + \delta_2 COV_t + \rho ECM_{t-1} + \varepsilon_t$$

**Model 2**

$$\Delta \mathrm{L}\, Y_t = \beta_0 + \beta_1 T_t + \sum_{i=0}^{n} \beta_2\, \Delta \mathrm{L}\, Y_{t-i} + \sum_{i=0}^{n} \beta_3\, \Delta \mathrm{L}\, FDI_{t-i} + \sum_{i=0}^{n} \beta_4\, \Delta \mathrm{L}\, INV_{t-i} + \sum_{i=0}^{n} \beta_5\, \Delta \mathrm{L}\, HC_{t-i} + \sum_{i=0}^{n} \beta_6\, \Delta \mathrm{L}\, POP_{t-i} + \delta_1 LHWP_t + \rho ECM_{t-1} + \varepsilon_t$$

**Model 3**

$$\Delta \mathrm{L}\, Y_t = \beta_0 + \beta_1 T_t + \sum_{i=0}^{n} \beta_2\, \Delta \mathrm{L}\, Y_{t-i} + \sum_{i=0}^{n} \beta_3\, \Delta \mathrm{L}\, FDI_{t-i} + \sum_{i=0}^{n} \beta_4\, \Delta \mathrm{L}\, INV_{t-i} + \sum_{i=0}^{n} \beta_5\, \Delta \mathrm{L}\, HC_{t-i} + \sum_{i=0}^{n} \beta_6\, \Delta \mathrm{L}\, POP_{t-i} + \sum_{i=0}^{n} \beta_7\, \Delta \mathrm{L}\, TO_{t-i} + \delta_1 LHWP_t + \rho ECM_{t-1} + \varepsilon_t$$

### 4.3.4.Diagnostics

To ensure the accuracy of the findings, the current study conducts diagnostic tests. These tests serve several key purposes. These include verifying that the model is correctly specified in terms of the number of lags and the relevance of the included variables. Additionally, these tests assess whether the ARDL model meets certain assumptions, such as normality, absence of serial correlation, and absence of heteroskedasticity.

The diagnostic tests consist of several components. First, Durbin's h-statistic is employed to examine whether there is evidence of serial correlation. Second, the R-squared value is used to evaluate how well the model fits the data. Third, Ramsey's RESET test is employed to assess the functional form of the model. Fourth, skewness and kurtosis tests are performed on the residuals to check for normality. Fifth, a test for heteroskedasticity is conducted.

The Cumulative Sum (CUSUM) tests are included as part of the diagnostic checks and consist of two components: the CUSUM of recursive residuals test and the CUSUM of squares of recursive residuals test. Although these tests follow different procedures, their primary purpose is to detect structural changes within the model. The CUSUM of recursive residuals test identifies shifts in the residual mean over time by examining whether the cumulative sum of recursive residuals significantly deviates from zero, signalling potential changes in model parameters. Meanwhile, the CUSUM of squares test assesses variance stability, identifying changes in residual variance (heteroskedasticity) over time.

The test results are presented through two CUSUM plots, each displaying cumulative sums over time with a reference line at zero and critical bounds (at the 5% significance level) indicated by two straight lines. If the CUSUM of recursive residuals plot crosses these bounds,

it suggests structural breaks or shifts in model parameters, indicating that relationships between variables may evolve over time and potentially affect model reliability. Similarly, if the CUSUM of squares plot crosses the bounds, it points to instability in residual variance, indicating potential heteroskedasticity that could undermine the model's reliability.

These diagnostic tests are crucial because any violation of these assumptions can undermine the reliability of the results and lead to biased parameter estimates.

# 5. Empirical Findings

This section builds up on the previous section in the following ways. It presents and discusses the results of the unit root tests for stationarity of the variables, bounds test for cointegration. This paper subsequently presents long-run- and short-run- estimates for the assessment of the dynamic relationship among the variables in the model.

## 5.2. Unit Root Test Results

In the course of this study, the stationarity properties of the variables included in the model were rigorously assessed. To achieve this, the Augmented Dickey-Fuller Test (ADF) was employed after the variables underwent relevant transformations. More detailed results of these are presented in the appendix segment of this paper.

Akaike Information Criterion (AIC) was used to determine the appropriate number of lags for the ADF unit root test. The rationale behind opting for this criterion lies in its ability to strike a balance between model complexity and goodness of fit. That is, AIC takes into account that including more variables in the model can improve the fit, but it penalizes excessively complex models and therefore discourages the willingness to include more variables.

Table 5.1, indicates that among the variables analyzed, only LFDI and LPOP are stationary at level, denoted as I (0). In contrast, the other variables are integrated of order one, I (1), meaning they each possess a single unit root. A variable with a unit root becomes stationary only after taking the first difference.

During the initial Augmented Dickey-Fuller (ADF) unit root test, LPOP exhibited indications of being integrated of order two, or I (2), which would pose analytical challenges. To address this, the study employed Breakpoint ADF unit root testing. This method adjusts for potential structural breaks within the data. Structural breaks can significantly influence the time series, and by accounting for these, Breakpoint ADF tests provide a more reliable assessment of a variable's stationarity. They help avoid making wrong conclusions that might arise from using standard unit root tests in the presence of structural breaks.

Moreover, the results present a green light to proceed with the ARDL approach to cointegration. For a comprehensive view of the unit root test results, refer to Appendices A and B.

*Table 5.1* Unit Root Test Results

| Variable | Variable name | Level of integration |
|---|---|---|
| Real GDP per capita | Log (Y) / LY | I (1) |
| FDI (% of GDP) | Log (FDI) / LFDI | I (0) |
| Secondary school enrolment (% of gross) | Log (HC) / LHC | I (1) |
| Gross Fixed Capital Formation (% of GDP) | Log (INV) / LINV | I (1) |
| Population aged 15 - 64 | Log (POP) / LPOP | I (0) |
| Trade Openness Ratio | Log (TO) / LTO | I (1) |

## 5.3. Bounds Test Results

The core idea behind this section is to examine whether there exists cointegration between the variables in the specified model. Based on the specified model an F-statistic is calculated and critical bounds are computed at 95% and 90% significance levels. The null hypothesis of no cointegration is rejected if the estimated F-statistic is higher than the upper bound at any given significance level, indicating the existence of a long-term relationship between the variables. In contrast, if the estimated F-statistic is less than the critical lower bound, the null hypothesis of no level cannot be rejected, meaning there is insufficient evidence to indicate cointegration in the model. Furthermore, the test is rendered inconclusive if the calculated F-statistic lies between the critical lower and upper bound. Tables 5.2 – 5.4 show the results of this test.

*Table 5.2* Bounds Test Results for Model 1

| F-Statistic | 95% Lower Bound | 95% Upper Bound | 90% Lower Bound | 90% Upper Bound |
|---|---|---|---|---|
| 5.507 | 4.414 | 5.583 | 3.685 | 4.717 |
| W-Statistic | 95% Lower Bound | 95% Upper Bound | 90% Lower Bound | 90% Upper Bound |
| 22.027 | 17.657 | 22.332 | 14.738 | 18.869 |

*Table 5.3* Bounds Test Results for Model 2

| F-Statistic | 95% Lower Bound | 95% Upper Bound | 90% Lower Bound | 90% Upper Bound |
|---|---|---|---|---|
| 9.513 | 3.865 | 5.116 | 3.270 | 4.369 |
| W-Statistic | 95% Lower Bound | 95% Upper Bound | 90% Lower Bound | 90% Upper Bound |
| 47.563 | 19.323 | 25.578 | 16.348 | 21.846 |

*Table 5.4* Bounds Test Results for Model 3

| F-Statistic | 95% Lower Bound | 95% Upper Bound | 90% Lower Bound | 90% Upper Bound |
|---|---|---|---|---|
| 14.393 | 3.566 | 4.836 | 3.024 | 4.167 |
| W-Statistic | 95% Lower Bound | 95% Upper Bound | 90% Lower Bound | 90% Upper Bound |
| 86.360 | 21.398 | 29.016 | 18.141 | 24.999 |

Tables 5.2 – 5.4 provide the results of the bounds test which include both the F-statistic and W-statistic, along with their respective critical values at 95% and 90% significance levels. For Model 1, the F and Wald statistics fall between the critical lower and upper bounds at 95% confidence level but are greater than the critical upper bounds at 90% confidence level (see Table 5.2). This means the hypothesis of no level can only be rejected at 10% significance level. For models 2 and 3, the obtained F- and Wald Statistics are greater than the critical upper bounds at both 95% and 90% confidence levels, leading up to the rejection of the null hypothesis in both cases. This indicates a clear presence of cointegration within the model 2 and 3 (see Table 5.3 and Table 5.4)

Given the confirmation of cointegration in the three models, the study confidently progresses to analysing the long-run regression results displayed in Table 5.5. This step is crucial as it allows for a deeper understanding of the long-term relationships between the variables in the model.

## 5.4. Long-Run Estimates

It is important to highlight that the datasets employed in models 2 and 3 span from 1977 to 2019. The limitation in the temporal scope is primarily due to the unavailability of updated data beyond 2019 for school enrolment, represented as LHC. This lack of recent data precludes the inclusion of the year 2020 in the models that account for LHC. Additionally, the dummy variable 'COV', which is designed to capture the effects of the COVID-19 pandemic in 2020, has been intentionally excluded from both models 2 and 3 due to this constraint. This also applies to the short-run model.

*Table 5.5* ARDL Long-Run Regression Output

**Long-run regression results**
**The dependent variable is the *Log of real GDP***
ARDL based on Schwarz Bayesian Criterion

| | ***Model 1***<br>1977 - 2020 | ***Model 2***<br>1977 - 2019 | ***Model 3***<br>1977 - 2019 |
|---|---|---|---|
| **Selected Model** | (1,1,0,2) | (1,1,0,0,2) | (1,1,1,1,0,3) |
| **LFDI** | .028<br>(.029) | .033<br>(.029) | .024<br>(.018) |
| **LINV** | .256***<br>(.078) | .217***<br>(.066) | .231***<br>(.045) |
| **LHC** | - | .603*<br>(.299) | .022<br>(.137) |
| **LPOP** | -2.267***<br>(.049) | -.995<br>(.911) | -3.524***<br>(.626) |
| **LTO** | - | - | .216***<br>(.055) |
| **LHWP** | .268<br>(.164) | .226<br>(.144) | .083<br>(.064) |
| **COV** | -.285**<br>(.106) | - | - |

| | | | |
|---|---|---|---|
| **T** | .037***<br>(.008) | -.001<br>(.022) | .039***<br>(.010) |
| **C** | 40.168***<br>(11.050) | 24.110*<br>(12.106) | 57.546***<br>(8.638) |

Notes: Decimal numbers in parentheses () are standard errors. Asterisks (*, **, ***) highlight the significance levels of the coefficients. That is, *, **, and *** indicate the statistical significance of the coefficients at 10%, 5%, and 1% significance levels, respectively.

The long-run estimates in Table 5.5 show that LFDI has a statistically insignificant coefficient regardless of the different augmentations of the baseline Solow model. This means that the evidence supports that FDI does not impact economic growth in the long-run in Lesotho. Similar discoveries were made by other studies including Adams & Opoku (2015), Khaliq & Noy (2007), and Sharif et al., 2009. They find that in the respective less developed countries under study, FDI has a statistically insignificant impact on economic growth. Makhetha & Rantaoleng (2017) also found that in the case of Lesotho, there is no significant long-run causal relationship between FDI and growth. The commonly discussed reason behind this is that there needs to be some threshold of financial development, human capital, or overall development for an economy to fully experience the spillover effects of FDI (Azman-Saini et al., 2010; Borensztein et al., 1998; OECD, 2002). These factors determine the business environment in an economy but unfortunately, developing countries often lack in that aspect. These current findings agree with the neoclassical framework which implies that inward FDI does not impact economic growth in the long-run.

As far as other variables are concerned, the results are in accordance with the theoretical expectations. LINV, which represents investment in physical capital, has a positive and highly significant coefficient in all three models. As shown in Table 5.5, the coefficients are 0.256, 0.217, and 0.231 for models 1 – 3, respectively. This means that in model 1, a 1% increase in investment leads to a 0.256% increase in the real GDP per capita on average in the long-run, holding all else equal. In the same manner, in model 2, on average, a 1% increase in investment leads to a 0.217% increase in the real GDP per capita in the long-run, holding all else equal. Also, in model 3, a 1% increase in investment leads to a 0.2% increase in the real GDP per capita on average in the long-run, holding all else equal. This relationship between capital and growth is expected since it is regarded as one of the major determinants of growth in the Solow growth model (Solow, 1956). The model suggests that countries whose initial levels of capital per worker are low converge or catch up with the countries with higher levels of capital per

worker. This notion is supported by the assumption of diminishing returns by exogenous growth models.

LHC, an indicator of human capital as introduced by Mankiw Gregory et al. (1992), presents a positive coefficient of 0.603 in model 2, significant at 10% level (see Table 5.5). The implication made by this is that in the long-run, a percentage increase in secondary enrolment is associated with a 0.603% increment in the real GDP per capita in model 2, on average, and holding everything else constant. However, the coefficient corresponding to LHC in model 3 is statistically insignificant. Belloumi (2014) also found that human capital has a positive long-run effect on growth in Tunisia. Borensztein et al. (1998), Li & Liu (2005), and Zhang (2001) uncover that investment in human capital directly boosts how receptive labour is to job training and therefore enhances the productivity of labour. This is also advocated by the neo-classical growth framework. Higher levels of human capital do not only boost labour productivity but foster technology diffusion (Mankiw Gregory et al., 1992) and hence induce long-run economic growth.

LPOP only exhibits a statistically significant coefficient in models 1 and 3, and both are negative and robustly significant. The coefficient in model 1 is -2.267 which indicates that a 1% rise in the working-age population results in a 2.267% decline in the real per capita income in the long-run, ceteris paribus. The corresponding value in model 3 is -3.524. At a greater magnitude than the previous coefficient, this coefficient shows that a 1% rise in population is associated with a 3.524% decrease in the real GDP per capita, holding all else equal. This relationship is no surprise since as a developing country Lesotho has lower levels of capital per worker. If the working-age population increases at a faster rate than the level of capital, more workers will be unproductive (unemployed). This means the population would be growing faster than the real GDP, which would then lower the real GDP per capita.

A variable unique to model 3, LTO, has a 1% level significant coefficient of 0.216. This means that on average, a 1% boost in trade openness ratio leads to a 0.216% boost in the real per capita GDP, ceteris paribus. The finding contrasts Makhetha & Rantaoleng (2017), who found a significant negative association between trade openness and economic growth in the long-run. The exogenous growth theory, however, supports that trade can be a channel for the efficient allocation of resources and transfer of technology and can therefore aid long-run economic growth.

The dummy variable LHWP represents the beginning of a series of large investments in water projects through the Lesotho Highlands Water Project and Lesotho Highlands Development Authority (LHDA), in the late 1980s. This variable presents statistically insignificant coefficients in all the 3 models, meaning there is insufficient evidence to support that the initial investment in the water projects influenced economic growth in the long-run, holding everything constant.

The other dummy variable COV captures structural change in LINV, LFDI, and LY change caused by the Covid-19 pandemic in 2020. The variable exhibits a negative coefficient of -0.285 significant at a 5% significance level. This means that, in the long-run, the pandemic in 2020 is associated with a decline of 0.285 units in LY which equates to a 24.8%[13] decline in the real GDP per capita, holding all else constants. Vitenu-Sackey & Barfi (2021) also found the pandemic to have significant adverse impacts on poverty alleviation and economic growth.

For short-run relationships in the model, the current study refers to the output displayed in Table 5.6.

## 5.5 Short-Run Estimates

*Table 5.6* The Short-Run Estimates

**Error Correction Representation for the Selected ARDL Model**
**The dependent variable is the differenced *Log of real GDP***
ARDL based on Schwarz Bayesian Criterion

| | 1977 - 2020 | 1977-2019 | 1977- 2019 |
|---|---|---|---|
| **Selected Model** | (1,1,0,2) | (1,1,0,0,2) | (1,1,1,1,0,3) |
| **dLFDI** | -.001<br>(.006) | -.001<br>(.005) | -.3709E-3<br>(.005) |
| **dLINV** | .068***<br>(.019) | . 053***<br>(.017) | .045**<br>(.022) |
| **dLHC** | - | .147***<br>(.046) | -.147*<br>(.085) |

[13] Calculated by $(e^{-0.285} - 1) * 100 = 24.8\%$

| | | | |
|---|---|---|---|
| **dLPOP** | 3.511<br>(2.111) | 2.998<br>(1.852) | -1.309***<br>(.321) |
| **dLPOP1** | -6.607***<br>(2.002) | -6.499***<br>(1.750) | - |
| **dLTO** | - | - | .008<br>(.040) |
| **dLTO1** | - | - | -.081**<br>(.034) |
| **dLTO2** | - | - | -.110***<br>(.035) |
| **dLHWP** | .071***<br>(.025) | .055**<br>(.023) | .031<br>(.020) |
| **dCOV** | -.075***<br>(.024) | - | - |
| **dT** | .010*<br>(.005) | -.318E-3<br>(.005) | .015**<br>(.006) |
| **ecm (-1)** | -.264**<br>(.062) | -.243***<br>(.088) | -.372***<br>(.095) |
| $\boldsymbol{R^2}$ | .742 | .762 | .822 |
| $\boldsymbol{\bar{R}^2}$ | .656 | .680 | .723 |

Notes: Decimal numbers in parentheses () are standard errors. Asterisks (*, **, ***) highlight the significance levels of the coefficients. That is, *, **, and *** indicate the statistical significance of the coefficients at 10%, 5%, and 1% significance levels, respectively.

In general, the core findings obtained for the short-run model mimic the long-run findings. Table 5.6 presents that dLFDI has an insignificant coefficient in all three specified models, which implies that FDI does not exhibit a significant influence on economic growth in Lesotho in the short-run. Makhetha & Rantaoleng (2017) also uncovered that there is no significant association between FDI and real GDP per capita in Lesotho. However, the exogenous growth theory perceives FDI to positively impact short-run economic growth through its direct effect on the level of capital.

Most of the other variables maintain a similar influence on economic growth in the short-run to their long-run influence as well. The first one is dLINV. It has a coefficient of 0.068, 0.053, and 0.045 in models 1 – 3 respectively. All three coefficients are statistically significant at the 1% level. Implying that in the short term, a 1% increment in the level of investment induces a 0.068% increment in the real GDP per capita in model 1 on average, holding everything constant. The corresponding effects of investment on the dependent variable in models 2 and 3 are 0.053% and 0.045%, respectively. The finding is per the exogenous growth theory, which posits that investment in physical capital induces growth in the short-run through higher efficiency.

dLHC also maintains a positive and significant coefficient in the short-run (see Table 5.6). On average, a 1% rise in secondary enrolment is associated with a 0.147% rise in the real GDP per capita in model 2, holding everything else constant. This makes sense because the accumulation of human capital enhances the productivity of labour and higher productivity leads to more growth (Mankiw Gregory et al., 1992). Human capital is also believed to facilitate technological diffusion and other spillover effects.

However, the inclusion of trade openness in model 3 alters the sign of the coefficient exhibited by dLHC. This new coefficient is -0.147 which implies that an increment in human capital reduces the real GDP per capita. The negative coefficient hints that in the context of trade openness, the role of FDI in driving economic growth is not linear and may be counteracted by other factors associated with trade openness. For instance, it is likely that in the case of Lesotho, trade openness redistributes economic activities towards sectors that are less dependent on conventional traditional forms of human capital which can diminish the contribution of human capital to the real GDP.

While the coefficients of dLPOP are statistically insignificant in models 1 and 2, the first lags of population dLPOP1 have negative a robustly significant coefficient. Meaning in the short-run, a percentage increment in the working-age population is associated with a 6.607%, and 6.499% decline in the real GDP per capita on average according to models 1 and 2, respectively, ceteris paribus. Model 3 estimates show that growth in the working-age population has an immediate negative effect on the real GDP per capita in the presence of trade openness. The magnitude of the decline in the real GDP corresponding to a 1% increase in the working population is 1.309%. These findings are expected because the Solow growth theory suggests that if the labour market is unable to absorb the growing population effectively, it may lead to

underemployment or lower productivity, which can negatively impact per capita real GDP (Solow, 1956).

Trade openness shows a delayed negative impact on economic growth in the short-run and no immediate influence. This is hinted by the statistical significance of the coefficients corresponding to dLTO1 and dLTO2. Implying those negative effects of growing trade openness manifest after both one and two time periods. However, Makhetha & Rantaoleng (2017) discovered that there is no bi-directional Granger causality between trade openness and economic growth in Lesotho. The current study's findings contrast the theoretical framework which posits that trade openness promotes specialization, efficiency, and hence economic growth. In the case of Lesotho, increased trade openness may expose domestic industries to greater international competition, potentially leading to short-run negative impacts before long-run benefits are realized.

Taking a closer look at the dummy variables, dLHWP presents coefficients that are statistically significant at a 1% level in model 1 and a 5% level in model 2 while it is insignificant in model 3. The coefficients are 0.071 and 0.055 in models 1 and 2 respectively. This means that in the short-run, the commencement of the first phase of the water project in 1988 is associated with a 7.36%[14], and 5.65%[15] increments in the per capita real GDP in the respective models, holding everything constant. As discussed previously, this relationship is unsurprising because investment in the water projects induced a positive shock in aggregate investment which is expected to exert a positive influence on economic growth.

dCOV in model 1, has a robustly significant coefficient of 0.075. This means that the evidence supports that covid-19 pandemic in 2020, resulted in a 7.23%[16] decline in the real GDP per capita in the short-run, holding everything constant. Among other things, the pandemic disrupted the education sector (Tarkar, 2020), and put a huge strain on poverty alleviation (Vitenu-Sackey & Barfi, 2021) which collectively had adverse effects on the global economy, especially less developed countries such as Lesotho.

The coefficient of ECM (-1) remains negative and significant at 5% level in model 1 and 1% level in models 2 and 3. The magnitude is very important as it represents the speed of adjustment after short-term shocks. For instance, the coefficient of ECM (-1) in model 1, is -

[14] Calculated by $(e^{-0.071} - 1) * 100 = 7.36\%$
[15] Calculated by $(e^{-0.055} - 1) * 100 = 5.65\%$
[16] Calculated by $(e^{-0.075} - 1) * 100 = 7.23\%$

0.264 meaning that approximately 26.4% of deviations that arise from the shock in the previous year get corrected toward the long-run equilibrium in the current year. The corresponding values for models 2 and 3 are 24.3% and 37.2% of variation, respectively. These findings solidify the claims that there is cointegration in the model as suggested by the bounds test earlier.

## 5.6. Diagnostics

As mentioned before, the diagnostic test is aimed at examining the validity of the model and its underlying assumptions. Firstly, the test for serial correlation suggests that there is no compelling evidence of the presence of serial correlation in the residuals. This means that the residuals do not show patterns of correlation over time and is shown by the relatively high p-values for both LM and F versions of the tests in all three models (see Table 5.7). The LM and F test version of the test respectively present the p-values of 0.192 and 0.271 in model 1; 0.237 and 0.322 in model 2; and 0.072 and 0.159 in model 3.

*Table 5.7* Diagnostic Test Results

| Test Statistic | Model | | | | | |
|---|---|---|---|---|---|---|
| | Model 1 | | Model 2 | | Model 3 | |
| *Version* | *LM* | *F* | *LM* | *F* | *LM* | *F* |
| Lagrange multiplier test: Serial Correlation | 1.71 [.192] | 1.26 [.271] | 1.40 [.237] | 1.02 [.322] | 3.23 [.072] | 2.11 [.159] |
| Ramsey's RESET Test: Functional Form | - | - | 3.62 [.057] | 2.79 [.106] | .09 [.768] | .05 [.821] |
| Normality: CHSQ (2) | .50 [.779] | - | .46 [.793] | - | 1.31 [.519] | - |
| Heteroscedasticity | 2.58 [.108] | 2.61 [.114] | 2.05 [.152] | 2.05 [.160] | 3.69 [.055] | 3.87 [.057] |

Notes: Decimal numbers in parentheses [ ] are p-values associated with the given test statistic.

The second part of the diagnostic test is Ramsey's RESET test[17] for model specification. It evaluates the significance of the relationship between the squared fitted values and the residuals. Table 5.7 reveals that the p-values associated with the LM and F versions of the tests are respectively 0.057 and 0.106 for model 2, and 0.768 and 0.821 for model 3. Although model 2's LM test statistic has a p-value very close to the threshold of 0.05[18], the evidence is insufficient to suggest misspecification in model 2. Since all the presented p-values are relatively high, it can be concluded that both models 2 and 3 are free from functional form misspecification.

Thirdly, the normality test yields p-values of 0.779 associated with the test statistic CHSQ (2) = 0.50 in model 1; 0.793 associated with the test statistic CHSQ (2) = 0.46 in model 2; and 0.519 associated with the test statistic CHSQ (2) = 1.31 in model 3. The three p-values are larger than the conventional significance level of 0.05, thus, implying that there is no evidence indicating that the residuals do not follow a normal distribution in each model. These results therefore confirm that the normality assumption indeed holds in both models.

Fourthly, the heteroskedasticity test which evaluates whether the variance of the residuals is constant or varies across different values of the explanatory variables follows. The LM and F versions of the test respectively provide the p-values 0.108 and 0.114 in model 1; 0.152 and 0.160 in model 2; and 0.055 and 0.057 in model 3[19]. These p-values are also relatively higher than the conventional 0.05 significance level, which means that the evidence suggests a constant variance of the residuals. Thus, confirming that all three models meet the assumption of no heteroscedasticity.

Moving on to the goodness-of-fit, the $R^2$ is 0.742, 0.762, and 0.822 in models 1 – 3, respectively (see Table 5.6). The $R^2$ describes the explanatory power of the model. The amount of variation in the model explained by the regressors is 74.2% in Model 1, 76.2% in Model 2 and 0.822 in Model 3. The increment of $R^2$ from model 1 to 3 implies each progressive model fits the data better than the previous model.

Similar conclusions can be made regarding the adjusted R-squared. $\bar{R}^2$ is 0.656 in model 1, 0.680 in model 2, and 0.723 in model 3 (see Table 5.6). $\bar{R}^2$ is a modified version of the $R^2$ which considers potential overfitting that can take place when more explanatory variables are

[17] The Ramsey's RESET Test statistics for model 1 were not published.
[18] A p-value lower than 0.05 would indicate functional form misspecification in the model.
[19] In this case, a p-value lower than 0.05 would be an indication of heteroskedasticity in the model.

added to the model. Again, model 3 (72.3%) outperforms model 2 (68%) which outperforms model 1 (65.6%) in terms of the amount of variation in the dependent variable captured by the regressors. Meaning that each progressive model retains a comparatively higher degree of explanatory power than the previous model even after accounting for model complexity.

Finally, the CUSUM tests, aimed at detecting structural changes or parameter stability, indicate relative stability across all three models. The results presented in Appendix C, reveal that the CUSUM of recursive residuals plots for each model remain within the 5% significance critical bounds, suggesting stability with no significant structural breaks. Similarly, the CUSUM of squares of recursive residuals plots stay within the same critical bounds, affirming constant residual variance over time and indicating no heteroskedasticity in any of the models.

# 6. Conclusion

In this study, the focus was to uncover the dynamics of the relationship between FDI and economic growth in the case of Lesotho from 1977 to 2020. Distinct from previous studies that focused on Lesotho and relied on Granger causality, the current study adopts the theory of economic growth and employs formal growth models, particularly the exogenous growth model. The three variations of the exogenous growth models are inspired by Solow (1956), Mankiw Gregory et al. (1992), and World Bank (1990). The study employs the Auto-Regressive Distributed Lag approach for empirical analysis. Key findings indicate a lack of significant interaction between FDI and economic growth in both the short- and long-run. However, investment in physical and human capital shows a substantial positive impact on economic growth in both periods while trade openness exhibits positive effects on economic growth only in the long-run. Population growth, on the other hand, negatively influences economic growth. This is sensible because overpopulation leads to lower capital per worker which then leads to lower levels of GDP-to-population ratio.

Lesotho's primary challenge in attracting foreign investment lies in its unsuitable business environment, which remains inadequately addressed. The key attractions for Foreign Direct Investment (FDI) in the country are its access to global markets through temporary agreements and its low-cost labor force which are insufficient for sustained growth of inward FDI. In addition to Lesotho not offering specific incentives tailored for foreign investors, it enacted the Land Act of 2010. This law mandates foreign investors to form partnerships with locals to obtain lease agreements. The government could improve land allocation by permitting foreign businesses to lease land for fixed periods with options for renewal or revocation. Additionally, Lesotho's investment promotion agency, the LNDC, lacks government funding, relying instead on income from renting out industrial estates and factory shells. This funding model limits the agency's capability for investment promotion due to a restricted number of staff designated for this purpose. Enhanced budgetary support from the government could significantly bolster the LNDC's investment promotion efforts.

For effective adaptation to the rapidly evolving technological landscape, policymakers must prioritize the regular update of the school curricula. This continuous revision is necessary to ensure that educational content remains relevant and keeps pace with the latest advancements in technology. Such updates will help equip students with current knowledge and skills,

preparing them for the demands of the modern workforce. It is also important for policymakers to create better avenues for the dissemination of new technologies by promoting trade, particularly in tech-intensive sectors. Through these combined efforts in education and trade policy, policymakers can create a more technologically adept workforce and an economy that is better positioned to harness the benefits of technological innovations.

A significant limitation in the scope of this study is that the current study focuses on the general effects of FDI on growth rather than sector-specific dynamics which may overlook crucial nuances. Understanding how FDI in different sectors influences economic growth is crucial for nuanced economic analysis and effective policymaking. For instance, FDI in technology might have different growth implications compared to FDI in manufacturing or agriculture. This limitation not only points to a gap in the current research but also opens an important avenue for future studies. Future research could explore these sectoral differences in-depth, offering more tailored policy recommendations and contributing to a more refined understanding of the relationship between FDI and economic growth. This would enable policymakers to identify which forms of FDI present higher economic growth prospects and deserve prioritization in economic strategies.

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# 8. Appendix

## *A* ADF Standard Unit Root Test Results

| Variable | 1st Difference | Intercept & No Trend | Intercept & Trend | Conclusion |
|---|---|---|---|---|
| LY | DLY | 3.462** | 3.519** | I (1) |
| LFDI | - | 5.451*** | 3.888** | I (0) |
| LINV | DLINV | 4.634*** | 5.498*** | I (1) |
| LHC | DLHC | 4.773*** | 4.835*** | I (1) |
| LTO | DLTO | 4.932*** | 7.312*** | I (1) |

Notes: *, **, and *** indicate that the given statistic is greater than the published asymptotic critical value at 10%, 5%, and 1% significance level, respectively.

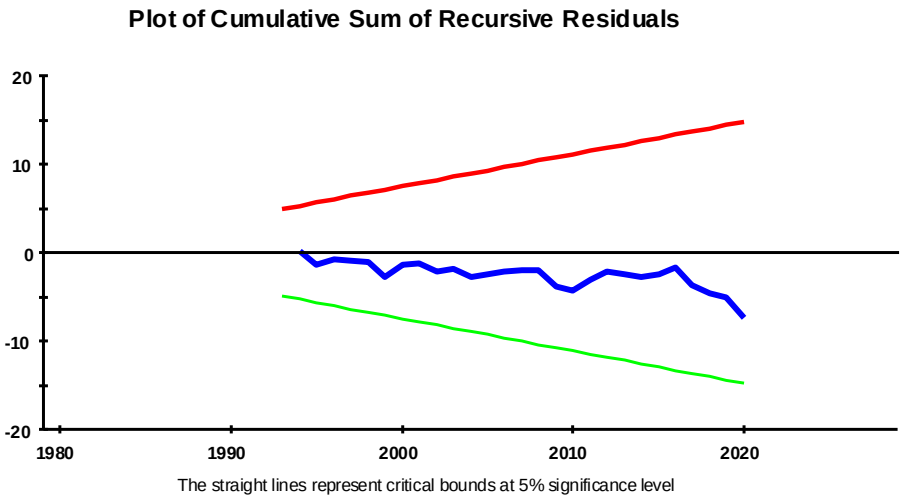
## *B* ADF Unit Root Test Results for LPOP with and without Breakpoint

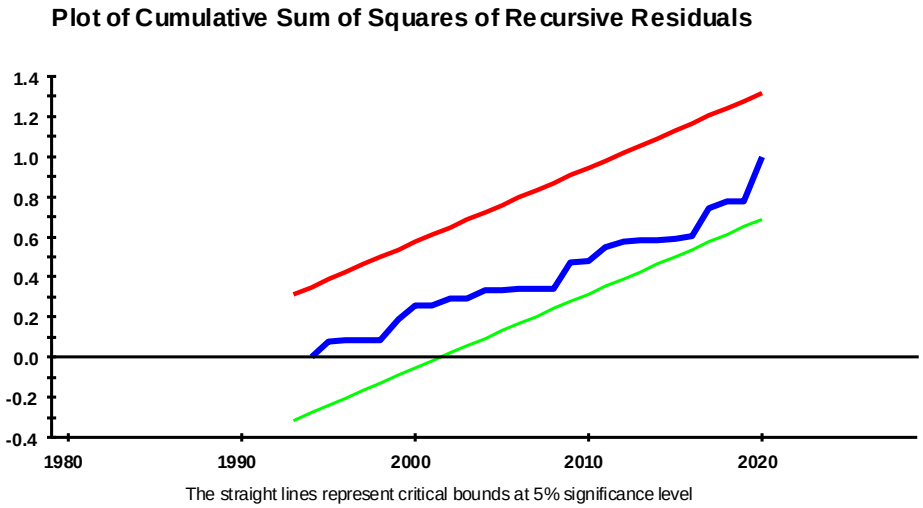
| STANDARD ADF UNIT ROOT TEST RESULTS | | | | |
|---|---|---|---|---|
| **Variable: *LPOP*** | **Intercept** | **Intercept & Trend** | | **Conclusion** |
| Level | 1.483 | 3.284* | | |
| 1st difference | 1.714 | 1.829 | | I (2) |
| BREAKPOINT ADF UNIT ROOT TEST RESULTS | | | | |
| **Variable: *LPOP*** | **Intercept** | **Intercept & Trend** | **Intercept & Trend** | **Conclusion** |
| Break Specification: | Intercept only | Intercept & Trend | Trend only | |
| Level | 5.780*** | 4.974* | 4.439* | I (0) |

Notes: *, **, and *** indicate that the given statistic is greater than the published asymptotic critical value at 10%, 5%, and 1% significance level, respectively.

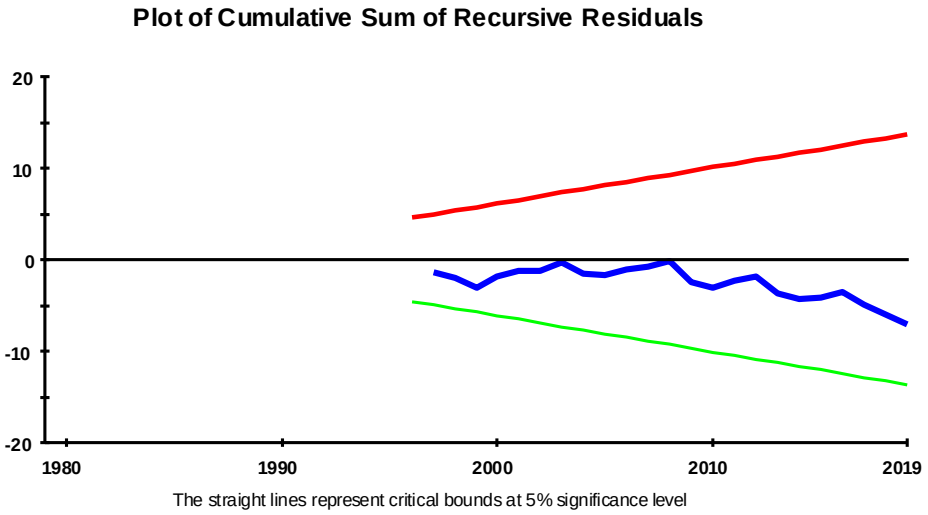
*C* The Cumulative Sum (CUSUM) Test Plots

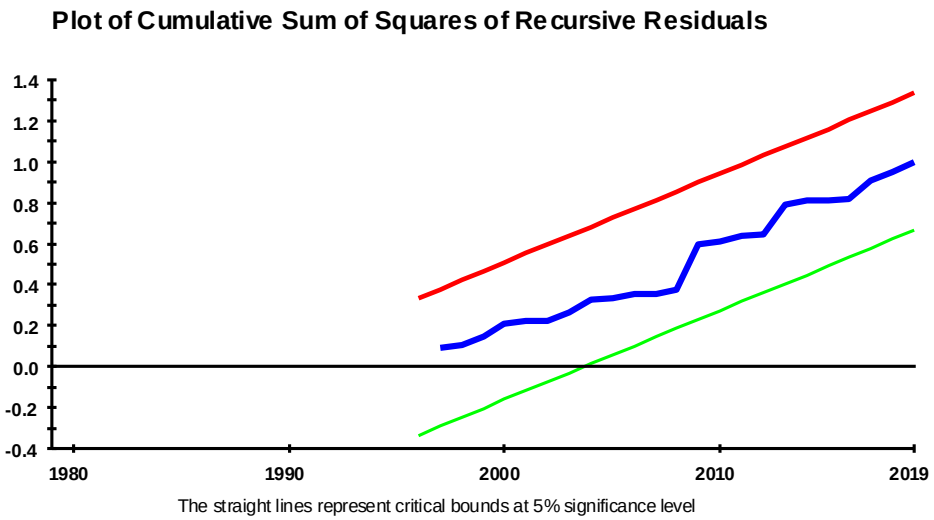
**Model 1**



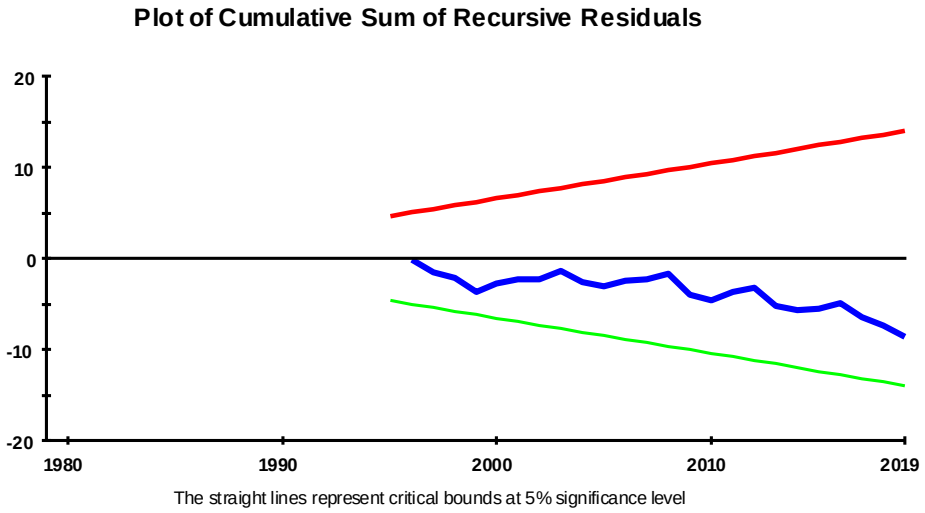



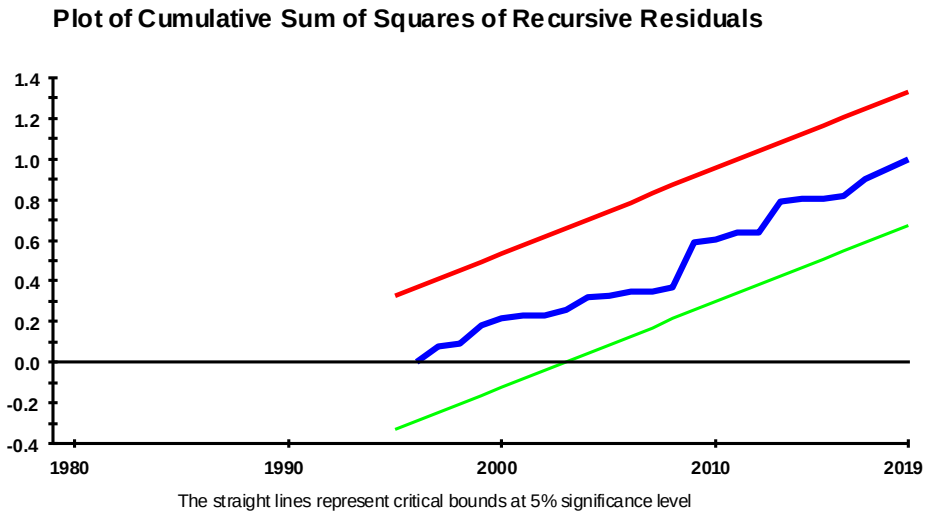
## Model 2


Plot of Cumulative Sum of Recursive Residuals
20
10
0
-10
-20
1980
1990
2000
2010
2019
The straight lines represent critical bounds at 5% significance level


Plot of Cumulative Sum of Squares of Recursive Residuals
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-0.2
-0.4
1980
1990
2000
2010
2019
The straight lines represent critical bounds at 5% significance level

## Model 3


Plot of Cumulative Sum of Recursive Residuals
20
10
0
-10
-20
1980
1990
2000
2010
2019
The straight lines represent critical bounds at 5% significance level


Plot of Cumulative Sum of Squares of Recursive Residuals
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-0.2
-0.4
1980
1990
2000
2010
2019
The straight lines represent critical bounds at 5% significance level