AN ANALYSIS ON DRIVERS OF INTERNATIONAL INVESTMENT DECISIONS IN SOUTH AFRICA

by

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DECLARATION

I declare that **"AN ANALYSIS ON DRIVERS OF INTERNATIONAL INVESTMENT DECISIONS IN SOUTH AFRICA"** is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references and that this work has not been submitted before for any other degree at any other institution.

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Full names **Date**

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ABSTRACT

Many developing countries are trying to make their business environment more attractive to foreign investors. They try this by relaxing rules regarding market entry and foreign ownership; improving infrastructure and making other efforts to enhance their chances of becoming a destination country for foreign direct investment (FDI). Among the characteristics of globalisation is the unrestricted capital flow and access to world market. Global FDI stocks have been on the increase and many more African countries are becoming more open to FDI, even though it still remains low. Therefore, the main objective of this study is to provide an analysis of the driving factors towards foreign direct investment in South Africa. The ARDL approach is used to investigate drivers of international investment decisions in South Africa using quarterly data from 2007Q1 to 2017Q1. The bounds cointegration method was chosen to analyse the long and the short run relationship amongst the variables of interest. In addition, the Granger Causality test was used to determine causal relationships between FDI and other variables.

The study found that household income level had an effect in the stock of FDI. It also found that labour productivity increased the total output of goods and services and therefore impacted on the stock of FDI in the country. Public infrastructure investment and interest rates are also among the important factors that determine FDI inflow. Furthermore, the dummy variable has a significant negative effect and it shows that labour strikes and unrests affect FDI negatively.

Although South Africa has implemented strategies to attract more FDI, recent political instability and labour disputes has left investor weary of the future of the economy therefore a refinement of some of these policies is needed if the country is to be successful in this regard. The county should also focus on developing and maintaining quality infrastructures in terms of, roads, telephones, internet access, water and electricity supply.

KEY CONCEPTS:

Drivers of international investment, Investment Decisions, Foreign Direct Investment, Cointegration, South Africa

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CHAPTER 1

ORIENTATION TO THE STUDY

1.1 INTRODUCTION AND BACKGROUND

The opening up of a country's economy and integrating it into the global market through the process of globalisation often leads to a flow of foreign direct investment (FDI) into the host country. The role and importance of Foreign Direct Investments in the national economy is primarily visible in key macroeconomic moments, as explained by (Torado & Smith, 2003). They present one of the most positive way of engaging foreign private savings in the financing of economic development, and reducing the gap between local savings and the planned capital needs. Additionally, there is a significant contribution of FDI in overcoming the foreign trade gap of the country in which the investment is made. Subsequently, foreign investments effectively cover the discrepancy between the planned public revenue and tax collected, as well as other forms of revenue meant for public consumption. There are many benefits from foreign direct investments which can be through the transfer of managerial and entrepreneurial skills. In the current age FDI also represent a major channel for the transfer of modern technology between countries (Uwubanmwen & Ajoa, 2012). The existence of benefits of incoming foreign direct investment in the economy is evident in various studies that explore this subject, nevertheless there are also some opposing views.

As stated above, empirical literature produces divided views about the contribution of FDI to the economy. Some authors have argued that FDI has contributed positively to the growth in economy, while others determined that there is no positive effect of FDI on the rate of economic growth. Those who support the view that FDI has a positive impact on economic growth consider that there are different ways that produce positive contribution. Firstly the competition, where increased competition will lead to increased productivity, efficiency and investment in human or physical capital. Increased competition can lead to changes in the industrial structure through more competitive and more export-oriented activities. Secondly the training, which may lead to increased workforce training and managerial skills. Thirdly the connection, where foreign investments are often accompanied by technology transfer. Finally, the possibility for domestic firms mimic advanced technologies used by foreign firms. In this perspective, Ndiaye & Heleian (2016) found that FDI has a positive effect on economic growth. The conclusion was that FDI will facilitate trade, FDI liberalization, economic cooperation, improve the business environment and increase the labour cost.

On the other hand, some scholars have questioned the role of FDI in the host country's economy. A study by Sarisoy-Guerin (2003) argues that the deterioration external imbalances is one of the unfavourable effects of FDI inflows in developing countries. Other researchers such as Ram and Zhang (2002) and Ramirez (2006) postulate that the damaging and undesirable effects of FDI may be worsened if the technology transferred is inappropriate for developing countries and if the FDI crowds out local investors. Some studies have shown that the impact of FDI on economic growth can be limited by the local conditions existing in the host developing countries. Some of these local conditions include: the level of human capital; the level of financial development; the level of institutional quality; the technological gap; the level of economic development and trade openness.

Many countries seek to maximise the benefits of foreign direct investments. As a result, policy makers in many developed and developing countries have directed resources at incentives aimed at attracting FDI flows into the country (Nor et al. (2013), and (Görg & Greenaway (2004)), as it is believed that it significantly improves technology and management practices, as well as increases capital formation. South Africa (SA) as developing economy encourages foreign investment in both the public and private sectors. Foreign investment can enable the growth of businesses and creation of job opportunities that wouldn't arise if reliant only on domestic investment. In South Africa, unfortunately, the savings levels are rather low, which makes the country dependent on foreign investment to finance the capacity for future growth. The idea is that increase in foreign investment can have spill over effect on the domestic firms, stimulates the economy and positively impact on economic growth (Chopra & Schdeva, 2014). Therefore, attracting and encouraging FDI and domestic investments remains one of the priority goals of governments in most developing countries including South Africa.

Among the characteristics of globalisation is the unrestricted capital flow and access to world market. Global FDI stocks has been on the increase and many more African countries are becoming more open to FDI, however it still remains low (Agbloyor, Abor, Adjasi, & Yawson, 2013). Studies such as United Nations Conference on Trade and Development (UNCTAD) (2007); Waldkirch and Ofosu (2010); Stiebale and Reize, (2011) have confirmed increasing global FDI. The world investment report issued by UNCTAD (2007) also reports a significant (nearly two-third) increase in the share of services in the global FDI stocks during 2004 and 2005.

South Africa is among the top three countries within Sub-Sahara Africa taken as favourable destinations for FDI. Europe, Asia and the United States (US) are the main trading partners of South Africa. According to the draft report of the Department of Trade and Industry DTI (2009), China and Germany dominated the South African market, however China remains the biggest trading partner with South Africa, as the total trade between the two countries amounted to US$ 14.1 billion (ZAR 119.5 billion) in 2009. That been the case, the country continues to promote FDI through its various investment promotion strategies. One such initiative is the promotion and protection of investment Bill of 2013, which is the new effort to improve the quality of FDI flowing to South Africa.

1.2 PROBLEM STATEMENT

South Africa remains heavily dependent on foreign investment because of the lower domestic savings between 1994 and the first quarter of 1998 (Mahadea & Simson, 2010). A total net inflow of capital of R57, 4 billion was realised between 1994 and the first quarter of 1998 (Treasury, 1998). However, since then, the long term capital flows have slowed and short term capital has flowed out of the economy, contributing to the depression of rand. In 2007, the National Treasury stated that policy reforms would raise investment growth rates, pulling in higher FDI (Treasury, 2007). The goal of attracting and increasing FDI into South Africa seems to be far from being realised because government may not have done enough to promote FDI (Barbour, 2005). Despite efforts to attract more FDI into South Africa and other African countries, the UNCTAD, (2016) global investment trend monitor reports that FDI flow to Africa dropped significantly (31%) in 2015 to an estimated US$ 38 billion from US$53.9 billion in 2014. This was as a result, the largest decline in FDI seen by Sub-Sahara Africa, Central and Southern Africa. For instance, in 2015, the flow to Mozambique dropped by 21% to US$4.9 billion but notably remain at an estimated US$3.8 billion; Nigeria recorded a reduction by 27% hit by drop in oil price to an estimated US$3.4 billion from US$4.7 billion. South Africa, with its more diversified economy and reputation as an investor friendly business environment, achieved the highest FDI inflows in Africa during 2014 and 2013, although it should be noted that FDI inflows to South Africa declined by 33% in 2014 from US$8.3 billion during 2013 to US$5.7 billion during 2014. South Africa has experienced low projected GDP growth rates in the past few years and issues with prolonged industrial action, policy uncertainty relating to the mining industry and power shortages.

1.3 RESEARCH AIM AND OBJECTIVES

1.3.1 Aims of study

The aim of this study was to investigate drivers of international investment decisions in South Africa.

1.3.2 Objectives of the study

In order to address the research questions, the study pursued the following specific objectives:

- To identify drivers of international investment decisions.
- To determine the impact of investment drivers on FDI.

1.4 RESEARCH QUESTIONS

The following questions are addressed by the study:

- What are the drivers of investment in the South African economy?
- What are the impact of FDI inflows?

1.5 DEFINITION OF CONCEPTS

For the purpose of this study, the following terms were used as per the definitions given below:

- **Investment** has different definitions by different economist and authors. However, in 2008 the U.S - Rwanda Bilateral Investment Treaty (BIT) adopted a more detailed description of the characteristics of or what an investment should entail (U.S, 2008). The BIT spelt out that “investment” means every asset that an investor owns or controls, directly or indirectly. The asset should have characteristics of an investment, including such characteristics as the commitment of capital or other resources and the expectation of gain or profit or the assumption of risk. Accordingly, the forms that the investment may take include: an enterprise, shares, stock, and other forms of equity participation in an enterprise; bonds, debentures, other debts instruments and loans; futures, options, and other derivatives; turnkey, construction, management; production, concession, revenue-sharing, and other similar contracts. This also includes intellectual property rights, licenses, authorisations, permits conferred pursuant to domestic law; and other tangible or intangible, movable property, and related rights, such as leases, mortgages, liens and pledges (Kantor, 2004).

- **Foreign direct investment:** Bjornatn (2000) defines it as a type of investment made to acquire a long-term interest in a foreign enterprise with the purpose of having an effective voice in its management. Similarly, Mahembe (2014) sees it as a process whereby residents of one country (the home country) acquire ownership of foreign assets for controlling the production, distribution and other activities of a firm in another country (the host country).

3.3.1 Drivers of international investment decisions: It is operationally defined to mean “investment-related factors” either in prospective investor’s home country or abroad which is considered while making investment decisions as well as those factors that can directly or indirectly affect the investment (Chilton, 2013). There are many factors which determines FDI flows into a country some of which are, market size, infrastructure quality, trade openness, labour quality and cost, economic and political stability and interests.

1.6 ETHICAL CONSIDERATIONS

The basic principles of ethics were observed. The researcher acknowledged all the sources and take into account the rules of the University of Limpopo in conducting this research. The aspects of plagiarism were eliminated in appreciation of intellectual rights of other authors.

1.7 SIGNIFICANCE OF THE STUDY

Based on literature review, it appears that many studies such as (Fedderke, Perkins, & Luiz (2006); Gelb (2010); Wentzel & Steyn (2014) have focused mainly on the relationship between investment and economic growth in South Africa. Therefore, very little seems to be known about the drivers of international investment decisions and their impact on economic growth in the South African context. Apart from contributing to the existing body of knowledge by contributing to this research gap, this study might benefit several stake holders such entrepreneurs, small and medium enterprises (SMEs), financial institutions, foreign investors; government institutions and the policy makers. The findings of this study can go a long way in providing information and also enabling policy makers to plan and formulate both short and long term policies. For a third world and a country like South Africa, attracting FDI is of paramount importance if the country needs to grow, given its positive benefits. Furthermore, the recommendations made might also be useful for decision-making and may serve as input into South African government investment promotion strategies.

1.8 ORGANISATION OF THE STUDY

This dissertation is composed of five chapters, and they are organised as follows: Chapter one presents the introduction, objectives, hypotheses and significance of the study. Chapter two reviews the theoretical background on investment decision, empirical literature as well as the analysis of drivers on foreign direct investment. This chapter also defines FDI in detail. Chapter three presents the empirical model specification and estimation technique; which includes unit roots, cointegration and Granger causality tests. Chapter four discusses empirical results. Lastly, Chapter five concludes the study by giving an overall summary of the study, policy implications, and limitations of the study.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This section focuses on both the theoretical background of investment and the empirical evidence of determinants of international investment decisions.

2.2 Theoretical background of investment decisions

Investment decisions must be critically taken as there can be huge costs associated with the reversal of wrong the decisions. Therefore, investors will usually consider many factors/drivers or determinants of investments before making such decisions. According to Otto (2006), as cited by Vivoda (2011) such factors will not only be industry/sector specific but also firm specific as the criteria applied by one firm in deciding whether to invest in a country will definitely not be entirely the same for another firm.

2.2.1 Investment decisions, from the Keynesian view point

Two important foundations namely; the Marginal Efficiency of Capital and the Liquidity Preference inform it. The investors' expectations of return and the cost against which that return must be measured must be considered before decisions to commit capital funds are taken. Explaining the inducements to invest, Keynes (1936) states that the scale of investment depends on the relation between the rate of interest and the schedule of the marginal efficiency of capital corresponding to different scales of current investment, whilst the marginal efficiency of capital depends on the relation between the supply price of a capital-asset and its prospective yield. However, investment decision is wider in scope as it entails more factors.

2.2.2 International Product Life Cycle Theory

The international product life cycle theory by Vernon (1966) explains why U.S manufacturers shift from export of their product manufactured for the U.S home market to investing in other countries where production levels are relatively lower. Decisions are taking at different stages in the life of the product. According to Vernon 1966, when a product is at the new production stage, the U.S manufacturer will concentrate production in the local market. As it grows and standardises, they will shift and invest in a company with large export potential in a foreign country and thereby preventing loss of export market to the local producers. A different strategy will be adopted as the product gets to maturity stage. At this stage as intense competition and imitation of the product sets in, the manufacturer will shift production from country of initial FDI to another lower cost country so that the new product would sustain the old subsidiary.

2.2.3 Monopoly Advantage Theory

The Hymer (1976)'s theory holds that Multi-National Enterprises (MNE) possess monopolistic advantages that enables them to invest and operate subsidiaries abroad more profitably than local competing firms. Hymer identifies two sources of monopolistic advantages namely; technological knowledge that are specific to the MNE and not available to other firm operating in a given country and the monopolistic advantage of the economies of scale arising from their horizontal and vertical FDI. Consequently, the MNE will operate at lower cost than local competitive manufacturers.

2.2.4 Internalisation Theory

Buckley and Casson (1981) developed this theory and it posits that available external market fails to provide an efficient environment in which the firm can profit by using technology or productive resources. Therefore, the firm tend to produce an internal market via investment in multiple countries and thus create the need market to achieve its objectives. MNE internalises its globally dispersed foreign operations through a unified governance structure and common ownership. According to Buckley and Casson, internalisation helps MNE to compete not as individual national companies but as a collection of companies and subsidiaries, linking their activities across geographic locations and this will result in transaction gains.

2.2.5 The Eclectic Paradigm

The eclectic paradigm theory is also known as OLI framework based on its three main variables the Ownership-specific (O), Location–specific (L) and Internalisation (I). The idea is that all these factors are important in determining the extent and pattern of FDI.

The Ownership-specific variables include tangible assets such as natural endowment, work force and capital as well as the intangible ones such as technology, information, managerial, marketing and entrepreneurial skills and organisational systems. On the other hand, the Location-specific (country-specific) variables refer to factor endowment such as market structure, government legislation and policies. It also includes political, legal, and cultural environment in which FDI is undertaken. Finally, Internalisation refers to the firm's inherent flexibility and capacity to produce and market through its own internal subsidiaries (Dunning, 1980).

2.3 Empirical literature

Uwubanmwen and Ajoa (2012) explored the determinants and impacts of FDI in Nigeria for the period 1970 through 2009 and found that interest rate is among the major and important factors that determine the inflow of FDI into the country. Hooda (2011) studied the effect of FDI on the Indian economy between 1991 and 2008 and the findings showed that the significant factors that determine FDI in developing countries are corporate include interest rates, stable political environment and infrastructural facilities. Chingarande; Machiva-Bindura; Karambakuwa; Denhere; Tafirei; Zivanai; Muchingami and Mudavanhu (2012) on the other hand, studied the effect of interest rates on foreign direct investment in Zimbabwe. They studied the determinants of FDI which includes interest rates and other factors which affect rate of return on investment such as inflation, exchange rates, labour cost, GDP and risk factors (Chingarande, et al., 2012). The study noted that there was no significant relationship between interest rates and foreign direct investment inflow, coming to the conclusion that interest rates should not be considered when making key policies regarding FDI (Chingarande, et al., 2012). The study noted that some of the major risk factors that impacted on foreign direct investment in Zimbabwe included political campaigns, campaigns to promote peace, transparency in institutions and efforts to end corruption in government institutions. Infrastructure is one of the variable which is captured in many studies which impacts positively on FDI, (Moolman, Roos, Le Roux, & Du Toit, 2006); (Kariuki, 2015); (Alaya, 2004). Tampakoudis, Subeniotis, Kroustalis, and Skouloudakis, (2017), investigated the effects of the determinants of FDI inflows to middle-income countries with the explanatory variables including, trade openness, GDP, Population growth, inflation and infrastructure among others. Results of the study indicated that trade openness, GDP, population growth are significant, while infrastructure, inflation, financial development and fuel export were found to be insignificant. Other authors who found similar results are (Siddiqui & Aumebonnsuke, 2014) and (Faroh & Shen, 2015).

2.3.1 FDI in developed nations

There has been a significant increase in the flow of FDI into the economy since the 20th century in the US. Realising the huge benefit that it can contribute to economic growth including job creation and wage gains, the government continues to encourage foreign investors to invest in the US business operations (Alhakim & Peoples, 2009). However, as noted by Bode, Nunnenkamp and Waldkirch (2012) the flow of FDI into the US economy is largely into the relatively more advanced states where agglomeration economies can be reaped.

In contrast, FDI into Canadian economy is mostly from the technologically advanced countries with the US accounting for about 70% of the total shipments produced by all foreign firms in Canada (Wang, 2010). Breau and Brown (2011) found out that foreign-owned companies in Canada have contributed significantly higher amount of export trade of the manufacturing sector as well as contributing to higher domestic wage as foreign-owned firms pay higher wages than the locally owned. In order to attempt to diversify, the Canadian government like many other governments have implemented various policies that seek to promote investment in various sectors of the economy. According to Anderson and Sutherland (2015) with the establishment of Investment Promotion Agencies (IPA) the government aims to promote domestic market, build domestic good investment image and attract Emerging Markets (EM) and Multi-National Enterprises to invest in the country. The IPA has also been credited with nurturing good bilateral relationship between the governments of the two countries.

Finally, as one of the developed economies, Australia has a strong policy regime characterised with openness towards FDI in its resource industry, with credits of having perhaps the most efficient mining sector in the world. According to Drysdale and Findlay (2009), this type of policy is known to have many benefits in the Australian economy. The resource industry of has attracted a large amount of FDI and according to Gao (2014), China’s investment in Australia is huge, accounting for nearly 70% in the mining, energy and agricultural sector. However, China’s non-resource investment in Australia remains small.

2.3.2 FDI in developing nations

Of all the FDI flows into the Asian nations, China and India remain the two countries with the highest inflows. However, majority of these investments are non-fuel mineral industries despite efforts in the form of changes to the mining Laws of both countries (Vivoda, 2011). FDI has been one of the engines that have driven China towards a market-oriented economy receiving billions of US Dollars to become the largest recipient of FDI (Broadman & Sun, 1997). According to Quazi (2007), various countries in the South–East Asia which have attracted considerable levels by generally pursuing an “open door” policy towards foreign capital, have not realised the benefits of FDI since the early 80’s.

Numerous studies such as Asiedu (2006); Agbloyor, et al., (2013); Dupasquier and Osakwe (2006) pointed out that African countries are becoming more open to FDI. The concern is that it is not as much when compared to other developed countries of the world despite improvements in the policy environments. According to Agbloyor, et al. (2013), the share of Africa in the global stock of FDI is still small relative to the share of the rest of the world. Furthermore, Dupasquier and Osakwe (2006) identified reasons for the long history of the low rate of FDI flow into Africa. They are attributing it to factors such as political and macroeconomic instability, low growth, weak infrastructure, poor governance, inhospitable regulatory environments and ill-conceived investment promotion strategies. However, Kolstad and Wiig (2011) identified Europe, the US and Chine as the leading trading partners of Africa. It is well a known fact that FDI is largely driven by natural resources and market size within Sub-Sahara Africa, (Asiedu, 2006). Three major countries Angola, Nigeria and South Africa are the largest (65%) recipient of FDI in 2000-2002, due to their rich natural resources and market size (Asiedu, 2006).

2.3.3 Analysis of literature on drivers

The underlying drivers of FDI differ according to locations. However, it is evident that a minimum set of the factors must be present in the location for FDI to flow (Ngowi, 2001). It could be assumed that investors would select an economy where profitability is expected to be high. However, in an extensive study on the factors influencing FDI, Ajayi (2006) posits that investors not only consider profitability when making investment decisions, other critical factors are taken into consideration such as; availability of natural resources, institution environment, country risk, infrastructure availability, costs and the skills of workers. Empirical studies have tested various variables that can potentially attract or repel foreign direct investment. Such variables include market-driven variables such as rate of return, labour cost; structural variables, such as infrastructure development and political stability; and macroeconomic policies formulated to achieve economic growth, taxation and price stability.

Hoonda (2011) studied the effect of FDI on the Indian economy between 1991 and 2008 using multiple regression models. The results indicated that the significant factors that determine FDI in developing countries are corporate taxes, labour costs, interest rates, stable political environment, exchange rates, infrastructural facilities and inflation. A study by Bende (2002), found that FDI liberalization is among the factors that affect FDI in Africa especially in the long term. Asiedu (2006), argued that a good investment framework contributes to higher FDI for African countries. This study will be interested in investigating the following variables namely; income level, productivity of labour, infrastructure investment, interest rate and labour unrest represented by the dummy variable as some of determinants of FDI in South Africa.

2.3.3.1 Income levels

Increase in household income level increases aggregate demand and consequently may attract FDI; therefore, the expected a priori sign is positive. However, a decrease in household income level might have a negative effect in the stock of FDI. The effects of FDI on income in the host country have been widely discussed in FDI literature (Herzer & Nunnenkamp, 2013). In their study of inward and outward FDI in eight European countries from 1980 -2000, Herzer and Nunnenkamp (2013) found that while the long run effect of inward and outward FDI on income inequality is clearly negative, their short run effect appears to be positive. More so they observed that long run causality runs in opposite directions, suggesting that an increase in inward and outward FDI reduces income inequality in the long run, and that, in turn, a reduction in inequality leads to an increase in inwards and outward FDI. A similar study in the U.S also confirms a negative effect of FDI on income inequality in the long run (Chintrakarn et al., 2012). Herzer et al., (2014) conducted similar study in Latin America and revealed that FDI has a significant and positive effect on income inequality, however there was no evidence for reverse causality from inequality to FDI. Ge (2006) argued however that the presence of FDI impact on urban real wages of the host country stating that both physical capital and human capital accumulation tend to raise urban wage levels.

2.3.3.2 Productivity of labour

An increase in labour productivity increases total output of goods and services and therefore increases the stock of FDI in the country. The expected priori sign is positive and a decrease in labour productivity will have a negative effect in the stock of FDI. FDI flows have a strong impact on labour productivity growth, but the growth of productivity is not the same in different areas of economic activities (Barkauskaite & Naraskeviciute, 2016). Das, et al., (2009) attribute differences in productivity levels to FDI, noting in their study that productivity differences seem to be decreasing among middle income developing and developed countries while productivity differences seem to be widening among low and high income developing countries.

In Alam and Shah (2013)'s study of 19 Organisation for Economic Co-operation and Development (OECD) member countries over a period of 1980-2009, FDI was observed to improve the labour productivity of the host country. It was found that it has a positive impact on economic growth of the country, both in the short run and the long run. A study in Ghana by Waldkirch and Ofosu (2010) shows that the presence of foreign firms in a sector has a negative effect on the labour productivity of domestically owned firms. Comparing labour productivity of foreign firms to those of domestically owned firms, Mebratie and Bedi (2013) showed that in South Africa foreign owned firms were more productive than their domestic counterparts. However, Popescu (2010) argued that national companies generally increase their labour productivity due to the technological and managerial competences that they borrow from foreign companies established in their country. Popescu therefore concluded that the impact of FDI on labour productivity differs from one country to another due to the different stage of economic development. However, the more the economy is better developed, the more the country is ready to benefit from FDI.

2.3.3.3 Infrastructure investment

It is mainly made up of total annual government expenditure on infrastructural development. Increase in Infrastructure investment increases the stock of FDI in the country. The expected priori sign is positive. However, a decrease in infrastructure investment will have a negative effect in the stock of FDI. Public infrastructural investment in a host country has a positive relationship with FDI as these investments contributes to reducing the cost of doing business in the host country and thereby increases FDI's profit margin (Ndikumana & Verick, 2008). Moreover the study have also shown that FDI has a spillover effect on the domestic economy in terms of stimulating both the utilisation of domestic factors of production and private investment (Ankilo, 2003).

Kinda (2010) states that the physical infrastructure problems in developing countries particularly Sub-Sahara African countries discourages FDI. Tran (2009) provides evidence of the effect of FDI's impact on the host country infrastructural development. The new massive inflow of FDI in Vietnam brought an explosion to the infrastructural development in the form of office buildings, hotels, industrial zones, residence parks and ports. Infrastructural quality is an important determinant of FDI flow to least developed countries (Wheeler & Mody, 1992). Availability of good quality physical infrastructure could improve the investment climate for FDI by subsidizing the cost of total investment by foreign investors and thus raising the rate of return (Mody & Srinivasan, 1998). The quality of physical infrastructure could be an important consideration for MNE's in their location choices for FDI in general and for efficient-seeking production in particular (Yinusa, 2013). Nunnenkamp et.al., (2007) in their study of the distribution effects of FDI in Bolivia enumerated public investment in infrastructure as one of the important factors that may shape the distributional effects of FDI in developing countries. According to Nourzad et al., (2014) the size of a host country's infrastructure base help to improve the marginal effect of FDI on real income.

2.3.3.4 Interest rate

The economic theory which describes capital movement in the global economy insist that capital tends to flow to countries that have a higher return on investment as compared to countries with higher interest rates (Pholphirul, 2002). Betz and Kerner (2016) show that interest rate ruling at a particular time in the home country has direct impact on the emerging markets economies. They establish that during periods of high interest rates in the U.S, the emerging markets economies are affected negatively. This will result in reduced access to capital, higher capital outflows in the form of interest payment made to foreign creditors, economic slowdowns abroad leading to reduced export receipts, or a combination of all three and perhaps other factors. Furthermore, interest rate is regarded as an important determinant of FDI Siddiqui & Aumebonnsuke (2014) since when it is adjusted for inflation it becomes a good measure and important valuable of FDI inflows (Singhania & Gupta, 2011). This is based on the notion that investors consider the cost of funding and prefers lower rates source of funding but investing in higher return or higher interest rates consequently, capital will flow from a low rate country to high rate country (Chakrabarti, 2001). In addition, a study by Siddiqui and Aumeboonsuke (2014) established an empirical linkage between FDI inflow and interest rates for the economies of Thailand, Philippine and Indonesia; however their finding for Singapore and Malaysia does not support the ideas that low interest rates attract the FDI inflow. Similar study by Faro and Shen (2015) showed that high interest rate has no effect on FDI flow in Sierra Leone. Chingarande, et al., (2012) concur with Faroh and Shen (2015) that interest rate has no significant impact on FDI flows in Zimbabwe and hence cannot be used for policy making purpose.

2.4 Summary

This chapter has focused on providing a review of FDI trend in developed and developing nations, as well as the theoretical background on investment decisions. The trends reveal that developing countries have over the years, been struggling to gain a fair share of global investments. However, lately developing regions, within Sub-Saharan Africa have been due to their natural resources receiving a major chunk of FDI in Africa. Analysing FDI trends also reveals that South Africa started to experience positive growth after 1994, with the end of the apartheid system. Countries like Germany, the USA and the UK have been a source of FDI in South Africa across a broad spectrum of key sectors of the economy. The following chapter presents the methods to be used.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents the estimation techniques used to empirically analyse the long run relationships and interactions among the variable. First the Augmented Dickey-Fuller unit root test, to determine the order of integration was done before proceeding with the ARDL bound test. Furthermore, a layout of cointegration analysis, granger causality, diagnostic and stability testing is presented.

3.2 Data and model specification

In this study, quarterly time-series data covers the period 2007 to 2017 for South Africa. The sources of data for all the variables are the South African Reserve Bank (SARB) and Quantec Easy data. FDI is net foreign direct investment as a percentage of GDP, IL is disposable income of households, PL is measured by the manufacturing labour productivity, Infrastructure investment is measured by the gross fixed capital formation and Interest is the prime lending rates. Also D is the dummy variable that is 0 for the years from 2007 to 2011 and 1 from 2012 (upward trend in industrial action).

The model is developed based on six variables, FDI, IL, PL, InfInv, Intr, and D. It is assumed that FDI (Foreign Direct Investment) is a function of IL (Income Levels), PL (Productivity of Labour), InfInv (Infrastructure Investment), Intr (Interest rate) and D (Dummy variable representing industrial action). In other words, FDI is the dependent variable and the remaining five variables are explanatory variables.

The study will therefore employ the following regression model represented in a functional form as follows as follows:

$$FDI = f(IL, PL, InfInv, Intr, D) \quad (3.1)$$

where:

FDI = Foreign direct investment
IL = Income levels
PL = Productivity of labour
InfInv = Infrastructure investment

Intr = Interest rate

D = Dummy Variable

A dummy variable is introduced in the system in order to capture the effects of Labour unrests (strikes) which is common phenomenon in South Africa. Before 2012 the dummy variable will have a value of 0 and after 2012 a value of 1 due to the rise in the number of industrial action which occurred during that period. There has been an increase in strike incidents from 67 in 2011 to 99 in 2012 (Labour, 2013). This represents about 48% increase in strikes from the previous year. The assumption is that foreign investors are sceptical to invest in nations where there is widespread industrial action.

Furthermore, the model is expressed in a linear form as follows:

$$FDI_t = \alpha + \beta_1 IL_t + \beta_2 PL_t + \beta_3 InfInv_t + \beta_4 Intr_t + \beta_5 D_t + \varepsilon_t \qquad (3.2)$$

where:

α is a constant, β_1 to β_4 are the coefficients to be estimated and ε_t is the error term representing the influence of the omitted variables in the model.

3.3 Justification of explanatory variables

3.3.1 Income Levels (IL)

A framework for analysing income effects of foreign direct investment under different environments and to contrast them with balance-of-payments effects was presented by (Vo, 2004). The results indicated that it is institutional environment rather than the distributive share of product value that is responsible for adverse income effects for host countries. The study used national household income to analyse impact to FDI.

3.3.2 Productivity of Labour (PL)

The expected relationship between the productivity of labour and FDI is positive. Kien (2008) examined spill over effect of FDI to labour productivity in Vietnam using firm level data in 2005 found a positive impact but indicted that the impact is dependent on other factors namely; skills, capital intensity, and scale gaps between FDI and domestic firms. For this study manufacturing labour productivity data was used.

3.3.3 Infrastructure Investment (InfInv)

Quality infrastructure may help to increase the productivity in investment. There are different proxies used by researchers for infrastructure. Telephone mainlines and government expenditure on transportation and communication are some of the commonly used proxies Alaya, (2004) and Asiedu, (2002). For this study gross fixed capital formation was used to represent infrastructure investment.

3.3.4 Interest rate (Intr)

Gross and Trvino (1996) posit that high interest rate in the host country have a positive impact on FDI. Its impact can either be inward or in reverse. The direction of FDI flow is determined by the host countries capital market structure and motives for attracting FDI. The study used prime lending rates since investors can be borrowers or lenders.

3.4 Estimation techniques

The study employed the the bounds testing autoregressive distribution lag (ARDL) approach proposed by (Pesaran, Shin, & Smith, 2001). The estimation technique follows a three step modelling procedure namely, testing for order of integration by means of unit root testing, the bounds cointegration test and Granger causality analysis. In addition, the model will be taken through a battery of diagnostic and stability tests also known as stability testing to assist in deciding whether or not has been correctly specified.

3.4.1 Descriptive statistics

The study uses statistical measures such as frequency distribution, measures of central tendency like mean, median and mode. Measures of dispersion such as range and standard deviation will also be used to describe quantitative variables. Summary of the data using frequency distribution will be provided. Mode was used to measure the central tendency. The adoption of Jarque-Bera, Jarque & Bera (1980) test statistic to test the distribution normality in the series was used. This statistic is used to measure the difference of the skewness from the normal distribution and the difference of the kurtosis from the normal distribution. Skewness is the slope of distribution and for a series that is normally distributed it ranges between -2 and +2. Kurtosis measures the flatness of the series and it ranges between -3 and +3 for a normally distributed series.

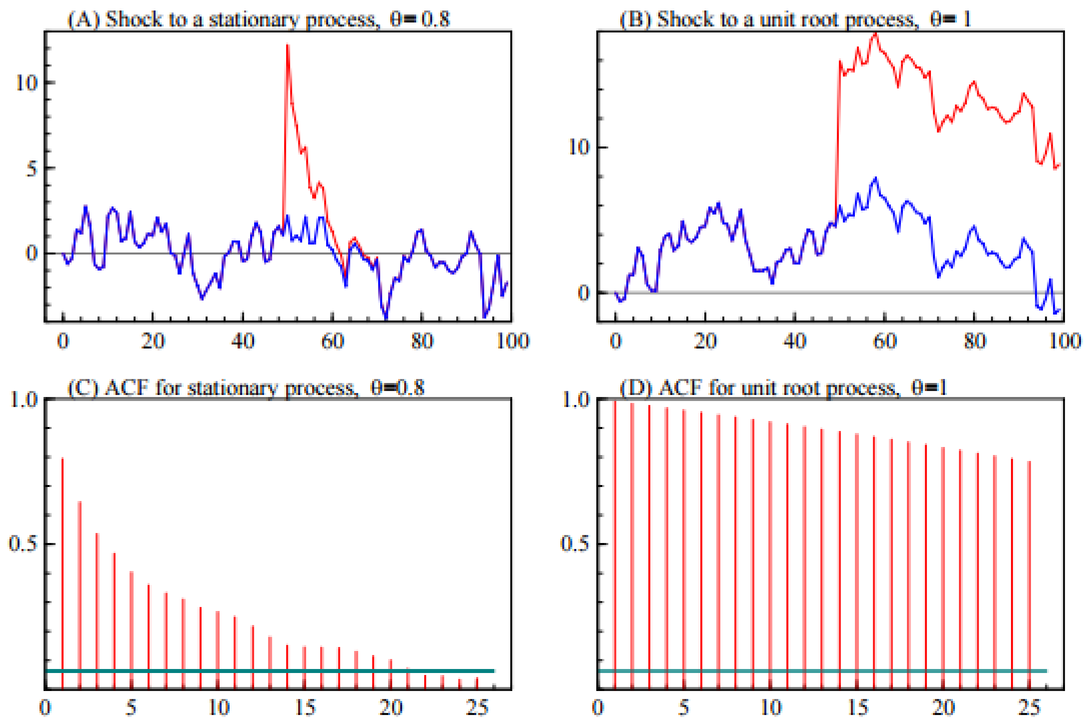
3.4.2 Stationarity/Unit root test

The study will employ the unit root test procedures to examine the order of integration of variables. The purpose is to determine their order of integration which is crucial for setting up an econometric model and to do inference. The stationarity or otherwise of a series can strongly influence its behaviour and property. A time series data is stationary if it has a constant mean, constant variance and constant auto-variance for each given lag (Casson & Hashimzade, 2013). This will be achieved by applying both the informal or the visual inspection by means of graphical analysis and the formal tests by means of Augmented Dickey-Fuller (ADF) and Dickey-Fuller Generalized Least Squares (DF-GLS) tests. The ADF method will test for correlation between the time series at time *t* and the time series at time *t-1* and the DF-GLS test will mainly be confirmatory test.

3.4.2.1 Visual inspection

The weakness in Dickey-Fuller test is that it does not take account of possible autocorrelation in the error process U_t. If μ_t is autocorrelated, then the OLS estimates of the equations and its variants are inefficient. Hence the solution is to apply ADF by using the difference lagged dependent variable as explanatory variables to take care of autocorrelation. The choice of the number of lags to be included in the unit root test is based on the significant lag of the autocorrelation function (ACF) and the partial autocorrelation function (PACF) plots of the correlogram and partial correlogram. ACF and PACF are computed up to one third to one quarter of the length of time series. The ACF and PACF show different lags that are correlated and compared with the confidence bounds, mostly at 95 percent level. This will lead to AR process in cognizance of the properties of the residual (Uko & Nkoro, 2012).

Figure 3.1: Stationary and non-stationary time series



Source: Nielsen (2007)

Figures 3.1A and B show one realisation of a stationary and non-stationary time series respectively and they illustrate the temporary and permanent impact of the shocks. Figures 3.1 C and D show the autocorrelation functions respectively.

When conducting visual inspection, the plotted graph of the residuals would give an idea that the estimates are stationary or not. The autocorrelation function describes the autocorrelation of the series for various lags. The correlation coefficient between X_t and X_{t-1} is called the lag *i* autocorrelation. For non-stationary variables, the lag *I* autocorrelation coefficient should be very close to one and decay slowly as the lag increases. Thus, examining the autocorrelation function allows researcher to determine a variable's stationarity. That been the case, the informal method has its limitations. For stationary series that are very close to unit root processes, the autocorrelation function may exhibit the slow-fading behaviour as lag length increases (Fabozzi, Focardi, Rachev, & Arshanapalli, 2014). Therefore, this means that final conclusion of stationarity analysis will be based on the formal tests results.

3.4.2.2 Augmented Dickey-Fuller test

The Augmented Dickey-Fuller (ADF) test was developed to eliminate the presence of serial correlation in the residual of the Dickey-Fuller test which biases the results. In conducting the ADF test, the idea is to include enough lagged dependent variable to rid residual of serial correlation. The researcher will use one of the selection criteria that EViews automatically calculates, starting with a reasonable large number of lags and test down until they are significant. Selecting the Schwartz criterion, the researcher would begin with four (4) lags for the quarterly data used. Serial correlation will be eliminated by adding the lagged values to the dependent variable, ∆Yt.

$$\Delta Y_t = \alpha_0 + \mu_1 Y_{t-1} + \alpha_1 T + \Sigma_{i=1}^{m} \beta \Delta Y_t - i + \varepsilon_t \qquad (3.3)$$

where ε_t is a white noise, α_0 is an intercept (constant) and μ, β_i and α_1 are coefficients.

Using quarterly data, the study can set m = 4 such that there are 4 lagged differenced variables (to correct for possible serial correlation).

The test will test the significance of Y_{t-1} . The reason for augmenting is to remove the possible autocorrelation among the error term. If the given values are greater than the critical values, reject the null hypothesis and state that the variable is stationary. There are weaknesses with ADF test, and these are not being able to determine whether to include exogenous variables in the test regression or to include more than one lag. ADF may find unit root even when none exists and it may not detect structural breaks in a times series (Chinhamu and Chikobvu, 2010). According to Asteriou (2011), the ADF test also does not consider the case of heteroskedasticity and non-normality frequently revealed in the raw data of economic time-series variable.

$$\Delta Y_t = \alpha_0 + \mu Y_{t-1} + \alpha_1 t + \beta_1 \Delta Y_{t-1} + \beta_2 \Delta Y_{t-2} + \beta_3 \Delta Y_{t-3} + \beta_4 \Delta Y_{t-4} + \varepsilon_t \qquad (3.4)$$

Using equation 3.2, the hypothesis tested for stationary.

$H_0 : \mu = 0(Y_t$ is non-stationary)

$H_1 : \mu < 0(Y_t$ is non-stationary)

This will be evaluated using the t_ratio for µ:

$$t_{\mu} = \mu'$$

$$(Se(\mu')) \quad (3.5)$$

Where μ' is the estimator of μ and $(Se(\mu'))$ is the coefficient of standard error.

The DF test will be performed using three types of regression analysis as indicated in the equations below:

The Dickey Fuller adds lagged differences to these models:

No constant, no trend: $\Delta y_t = Yy_{t-1} + \sum_{s=1}^{m} a_s \Delta y_{t-s} + V_t$ (3.6)

Constant, no trend: $\Delta y_t = \alpha + Yy_{t-1} + \sum_{s=1}^{m} a_s \Delta y_{t-s} + V_t$ (3.7)

Constant and trend: $\Delta y_t = \alpha + Yy_{t-1} + \lambda_t + \sum_{s=1}^{m} a_s \Delta y_{t-s} + V_t$ (3.8)

3.4.2.3 Dickey-Fuller Generalized Least Squares (DF-GLS)

The DG-GLS test is a modification of the Augmented Dickey-Fuller test. The model transforms the time series such that the trend is removed. DF-GLS is a two-step process, in which the time series is estimated by generalized least squares in the first step before a normal Dickey-Fuller test is used to test for a unit root in the second step. This process improves the power of a regular ADF test when the autoregressive parameter is near one. The ARDL bounds test is based on the assumption that the variables are I(0) or I(1). So, before applying this test, the study determines the order of integration of all variables using the unit root tests. The objective is to ensure that the variables are not I(2) so as to avoid spurious results. In the presence of variables integrated of order two, interpret the values of F statistics provided by Pesaran et al., (2001) cannot be done.

3.4.3 ARDL Bounds Cointegration test

Cointegration tests are done to model the long run relationship between sets of variables. The idea of cointegration was fist formalised by Granger (1981), and Engle and Granger (1987) by providing estimation procedures to establish such relationships. Several tests exist for cointegration other than the Engle and Granger (1987) procedure, one of which is the ARDL which this study will use. The study will analyse the long run relationships and dynamic interactions of the variables by using the ARDL bound cointegration test model developed by Pesaran et al., (2001). This procedure was adopted due to the following reasons. The Johansen and Juselius (1990) cointegration procedure cannot be applied when series have different orders of integration. The ARDL procedure can be applied in cases where the regressors are either I(0) or I(1) or mutually co integrated. Following Pesaran et al., (2001) a summary by Choong et al., (2005), bound test procedure is applied by modelling the long-run equation as a general vector autoregressive (VAR) model of order p, in Zt :

$$Z_t = c_0 + B_t + \sum_{i=1}^{p} \Phi_i Z_{t-i} + \varepsilon_t t = 1,2,3...,T \qquad (3.9)$$

With c_0 representing a (k+1)-vector of intercepts (drift), and β denoting a (K+1)-vector of trend coefficients. Persana et. Al., (2005) derived the following VECM model corresponding to (above):

$$\Delta Z_t = c_0 + B_t + \Pi z_{t-1} + \sum_{i=1}^{p} \Gamma_i \Delta z_{t-1} + \varepsilon_t, t = 1,2,...,T \qquad (3.10)$$

where the (k+1) x (k+1)-matrices

$$\Pi = I_{k+1} + \sum_{i=1}^{p} \Psi_i \quad \text{and} \quad \Gamma_i = -\sum_{j=i+1}^{p} \Psi_j, i = 1,2,3,..., p-1 \qquad (3.11)$$

contain the log run multipliers and short run dynamic coefficient of VECM. z_t is the vector of variables y_t and x_t. Y_t is an I(1) dependent variable defined as FDI and $x_t = [IL_t, PL_t, INFINV_t, INTR_t, D_t]$ is a vector matrix of 'forcing' I(0) and I(1). Assuming that a unique long run relationship exists among the variables, the conditional VECM can be specifies as follows:

$$\Delta y_t = c_{y0} + B_t + \delta_{yy} y_{t-1} + \delta_{xx} x_{t-1} + \sum_{i=1}^{p=1} \lambda_i \Delta y_{t-1} + \sum_{i=0}^{p-1} \xi_i \Delta x_{t-1} + \varepsilon_{yt} \qquad (3.12)$$

On the basis of equation 3.14, the conditional VECM of the interest can be specified as:

$$\Delta FDI_t = c_0 + \delta_1 FDI_{t-1} + \delta_2 InIL_{t-1} + \delta_3 InPL_{t-1} + \delta_4 InfInv_{t-1} + \delta_5 Intr_{t-1} + \qquad (3.13)$$

$$\sum_{i=1}^{p} \phi_i \Delta FDI_{t-i} + \sum_{j=1}^{q} \varpi_j \Delta InIL_{t-j} + \sum_{l=1\varphi1}^{q} \Delta InPL_{t-1} + \sum_{m=1}^{q} \gamma_m \Delta InINFINV_{t-m} +$$

$$\sum_{o=1}^{q} \lambda_o \Delta Intr_{t-o} + \eta DE_t + \varepsilon_t$$

where δ_i is the long run multiplier, c_o is the drift, and ε_t is the white noise error.

3.4.4 Granger causality test

The granger causality test was developed by Granger (1969), to detect the cause and effect relationship among the variables. According to this test variable y_t Granger-causes x_t if x_t can be predicted by using past values of y_t (Asteriou & Hall, 2007). The test for causality in the Granger sense is commonly based on the following equation:

$$y_t = a_1 + \sum_{i=1}^{n} \beta_i x_{t-1} + \sum_{j=1}^{m} \gamma_j y_{t-j} + e_{1t} \qquad (3.14)$$

$$x_t = a_2 + \sum_{i-1}^{n} \theta_i x_{t-i} + \sum_{j=1}^{m} \delta_j y_{t-j} + e_{2t} \qquad (3.15)$$

It is assumed in both that ε_{yt} and ε_{xt} are uncorrelated white-noise error terms. If the lagged x term in (3.9) is statistically different from zero as a group, and the lagged y term in (3.19) is not statistically different from zero. Then x_t causes y_t. If the lagged

y term in (3.10) is statistically different from zero as a group, and the lagged x term in (3.9) is not statistically different from zero. Then y_t causes x_t. If both x and y terms are statistically different from zero in (3.9) and (3.10), then there is two way direction causality. If both x and y terms are not statistically different from zero in (3.9) and (3.10), then x_t if independent of y_t (Asteriou & Hall, 2007).

3.4.5 Diagnostic tests

The purpose of diagnostic testing to determine whether any of the assumptions of the classical normal linear regression model are violated, in other words to examine the goodness of fit of the model. The study will engage a battery of residual tests such as Normality test, Serial correlation, ARCH LM test and Ramsey reset test.

3.4.5.1 Normality test

The normality tests are commonly used to estimate the difference between an empirical distribution and the normal distribution. In statistical analysis, the assumption that empirical and normal distribution are asymptotic, is widely used to natural populations study. Jarque-Bera test is one of most popular normality test based on the skewness and the kurtosis statistical coefficients (Thadewald & Buning, 2007); (Jarque & Bera, 1980). The Jarque-Bera test is emphasized especially in econometrics to test normality and is defined as:

$$JB = \frac{N}{6}\left(W^2 + \frac{(K-3)^2}{4}\right) \qquad (3.16)$$

Where:

$$W = \frac{\mu_3}{\mu_2^{3/2}} \quad \text{is skewness} \qquad (3.17)$$

$$K = \frac{\mu_4}{\mu_2^2} \quad \text{is kurtosis} \qquad (3.18)$$

$$\forall j > 0; \quad \mu_j = \frac{1}{N}\sum_i (-x_j - \mu_0)^j \quad \text{is the moment of order j} \qquad (3.19)$$

$\mu_0 = \frac{1}{N}\sum_i x_j$ is the average (3.20)

3.4.5.2 Serial correlation

Usually in using time series regressions there is a problem that the estimated residuals tend to be correlated across time. The presence of serial correlation in OLS regressions leads to estimated that have small standard errors, insufficient, biased and inconsistent especially when lagged dependent variable are included on the right hand side of the test equation. This study tests for the presence of autocorrelation using the Breusch–Godfrey test. The Breusch-Godfrey serial correlation test is used to test for autocorrelation among the errors and is applicable whether or not there are lagged dependent variables (Greene, 2000). The null hypothesis is that there no serial correlation up to a pre-specified lag order against the alternative of the presence of serial correlation.

3.4.5.3 Heteroskedasticity

An assumption of the OLS is that the variance of the error term is constant. If the variance of the error term is not constant then they are said to be heteroskedastic (Richard, 2017). The study will test:

H_0: Var (e|x1,x2,…, xk) = s^2, which is equivalent to:

H_0: E (e 2|x1, x2,…, xk) = E(e^2) = s^2

If we assume the relationship between e^2 and xj will be linear, can test as a linear restriction. So, for e^2= *d*0 + *d*1x1 +…+ *d*k xk + v) this means testing H0: *d*1= *d*2= … = *d*k = 0

The study used also the Breusch–Pagan test, which is dependent on the goodness of fit measure called, LM statistic.

Breusch–Pagan test do not observe the error, but can estimate it with the residuals from the OLS regression. After regressing the residuals squared on all of the x's, we can use the R^2 to form a LM test statist ic is LM = nR^2, which is distributed □^{2}k

Consider a regression mode $Y_i = \lambda_1 + \lambda_2 X_i + v_{1i}$ (3.21)

Obtaining the estimate of Y_i and Y_i by OLS regression. The study ran

$$Y_i = \beta_1 + \beta_2 X_{2i} + \beta_3 Y^2 i + \beta_4 Y^3 i + u_i \quad (3.22)$$

Let R^2 obtained from the first equation is R^2 old and that obtained from new equation is R new . Then we can use the test statistic:

The null hypothesis for this test is stated bellow:

$$\mathrm{H}_0 : \mathrm{E}(\mu_t \mu_{t-g}) = 0 \text{ for t \$ } q, q = 1,2,..., p \quad (3.23)$$

If the test shows non-constant parameters over the entire period, then it confirms the existence of heteroskedasticity and the result invalid (Greene, 2000).

$$F = \frac{R^2 new - R^2 old / numberofnewregressors}{(-R^2 new)/(-numberofparameter \sin thenew \mathrm{mod}\, el)} \quad (3.24)$$

If the computed F-value is significance at the *α%* level, one can accept the hypothesis that the model is miss-specified.

H_0: Variance of the residuals is constant.

Acceptance of the null hypothesis indicates homoscedasticity and the rejection indicates heteroskedasticity.

3.4.6 Stability test

When a model is estimated, it is usually assumed that the parameters *β* are constant over the entire sample period. The study will test hypothesis using F- test for coefficient of stability.

3.4.6.1 Ramsey's "Regression Specification Test" (RESET)

The Ramsey's "Regression Specification Test" (RESET) to test for misspecification of the functional form. This test help in investigating the possibility that the dependent variable may be of a non-linear form (Christopher, 2011). If we consider the following mode:

$$\hat{y} = \mathrm{E}\{y|x\} = \beta x \quad (3.25)$$

Ramsey tests whether $(\beta x)^2, (\beta x)^3, ..., (\beta x)^k$, has any power in explaining y by estimating:

$$y = \alpha x + \gamma, \hat{y}^2 + ... + \gamma k - 1\hat{y} + \varepsilon \quad (3.26)$$

followed by testing using F-test if γ_1 through $\gamma k - 1$ is equal to zero.

If the null hypothesis that the coefficients of γ are equal to zero is rejected, then the model has misspecification.

3.4.6.2 CUSUM and CUSUMSQ test

The cumulative sum (CUSUM) and cumulative sum of squares (CUSUMSQ) tests for parameter stability was first introduced into the statistics and econometrics literatures by (Brown, Durbin, & Evan, 1975). The test is based on the analysis of the scaled recursive residuals and have the significant advantage over the Chow tests for not requiring prior knowledge of the point at which the hypothesized structural break takes place (Chow, 1960). The motivation behind these tests was initially to provide a diagnostic tool for the detection of unknown structural breaks rather than a formal testing procedure. The CUSUM tests in this study were used in a formal manner for the testing of parameter constancy.

3.6 Summary

The study constructed the model that was employed to examine the drivers of FDI in South Africa. The unit root test was applied in the chapter to test the stationarity of time series variables and the ADF and DG-GLS test was selected to determine the integration order of variables of interest. To check the long-term relationship between variables of interest, the ARDL test was chosen over the Johansen cointegration test and other types of cointegration models due to its ability to take care of any order of integration between I(0) and I(1). The Granger causality test will be constructed to identify the causal relationship between variables of interest. A diagnostic test will be applied on the check fitness of the model.

CHAPTER 4

DISCUSSION / PRESENTATION / INTERPRETATION OF FINDINGS

4.1 Introduction

This chapter presents the empirical results and their interpretation. The analysis includes stationary tests and cointegration analysis. The discussion of diagnostic and stability tests results which include serial correlation and Ramsey RESET test will also be presented.

4.2 Empirical tests results

4.2.1 Descriptive statistics

The table that follows presents the descriptive statistics.

Table 4.1: Descriptive statistics

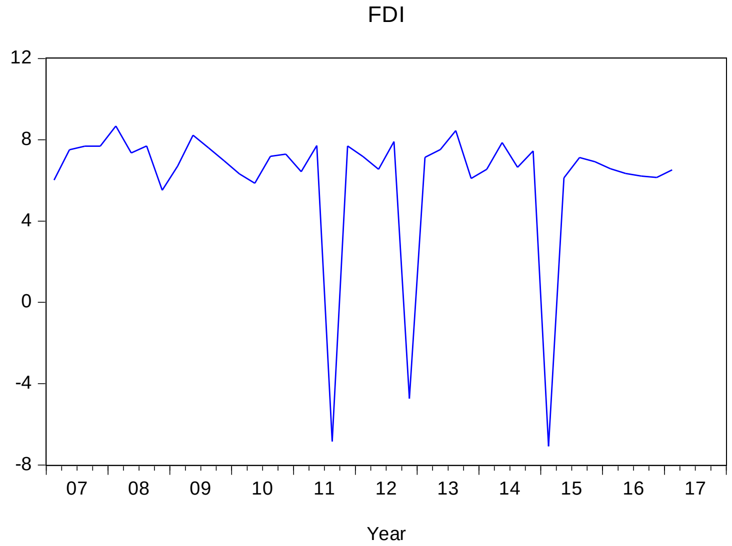
	FDI	IL	PL	InfInv	INTR	DUMMY
Mean	6.069030	13.03781	4.647428	11.98093	10.50813	0.512195
Median	6.965741	13.06455	4.661551	11.95447	9.666670	1.000000
Maximum	8.679482	13.45195	4.734443	12.28546	15.50000	1.000000
Minimum	-7.078089	12.56467	4.496471	11.54355	8.500000	0.000000
Std. Dev.	3.583449	0.245485	0.062076	0.222544	2.135499	0.506061
Skewness	-3.074928	-0.110182	-0.701920	-0.126501	1.160659	-0.048795
Kurtosis	11.11604	1.874589	2.774608	1.837169	3.046808	1.002381
Jarque-Bera	177.1386	2.246646	3.453513	2.478327	9.209120	6.833343
Probability	0.000000	0.325197	0.177860	0.289626	0.010006	0.032821
Sum	248.8302	534.5501	190.5445	503.1990	430.8334	21.00000
Sum Sq. Dev.	513.6443	2.410521	0.154140	2.030553	182.4142	10.24390
Observations	41	41	41	42	41	41

From table 4.1 FDI in South Africa had a mean of 6.07 and a standard deviation of 3.58 with a minimum and maximum values of -7.08 and 8.68 respectively. Income levels had a mean of 13.04 and a standard deviation of 0.25 with a minimum and maximum values of 12.56 and 13.45 respectively. Productivity of labour had a mean of 4.65 and a standard deviation of 0.06 with a minimum and maximum values of 4.50 and 4.73 respectively. Infrastructure investment had a mean of 11.98 and a standard deviation of 0.22 with a minimum and maximum values of 11.54 and 11.28 respectively. Interest rates had a mean of 10.51 and a standard deviation of 2.14 with a minimum and maximum values of 8.50 and 15.50 respectively. The minimum and maximum value of FDI highlight the level of instability. Intr seem to be the e only variable that is right skewed (Skewness>0). All the other variables are left skewed (Skewness<0). FDI and interest are the only variables with a kurtosis statistic smaller tha3.0, indicating that FDI and Intr are more widely spread around the mean, whereas the other variables indicate a high probability of extreme values.

4.2.2 Visual inspection

All variables were tested for visual inspection and the results showed variables are stationary at either level or first difference. The results are presented below.

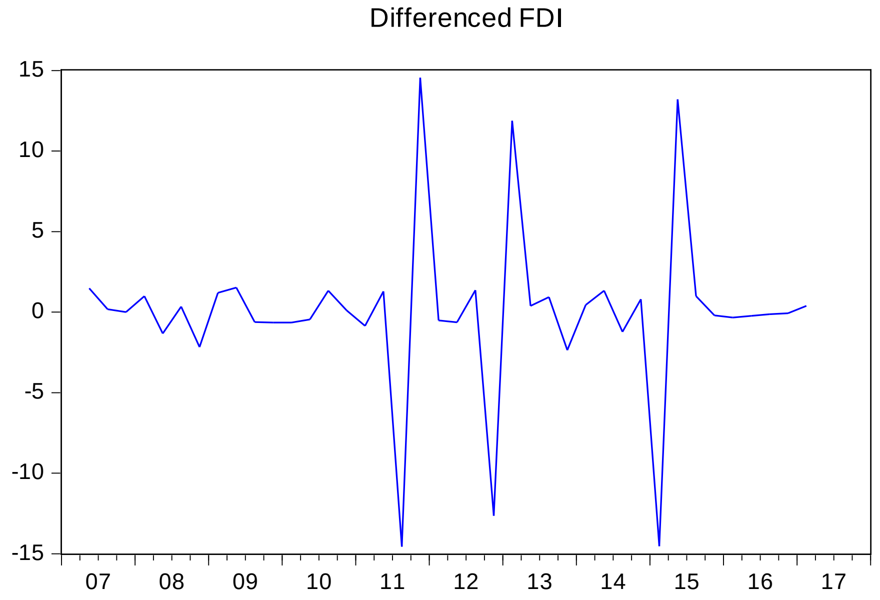
Figure 4.1: FDI at level



Source: Authors calculation

According to the graphical presentation on figure 4.1, FDI seems stationary at level because visually variances seems to be time-invariant.

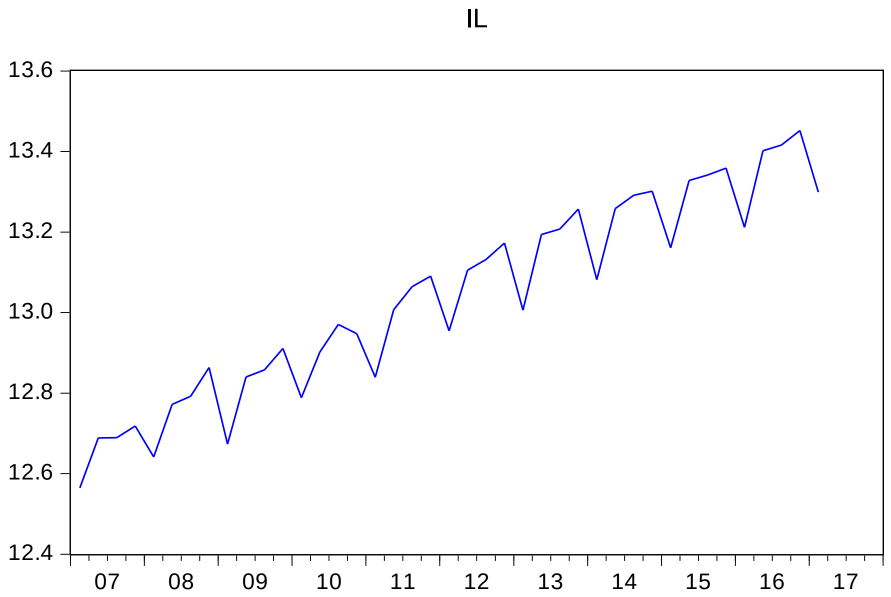
Figure 4.2: FDI at first difference



Source: Authors calculation

Based on figure 4.2 it seems that FDI is stationary at first difference over time.

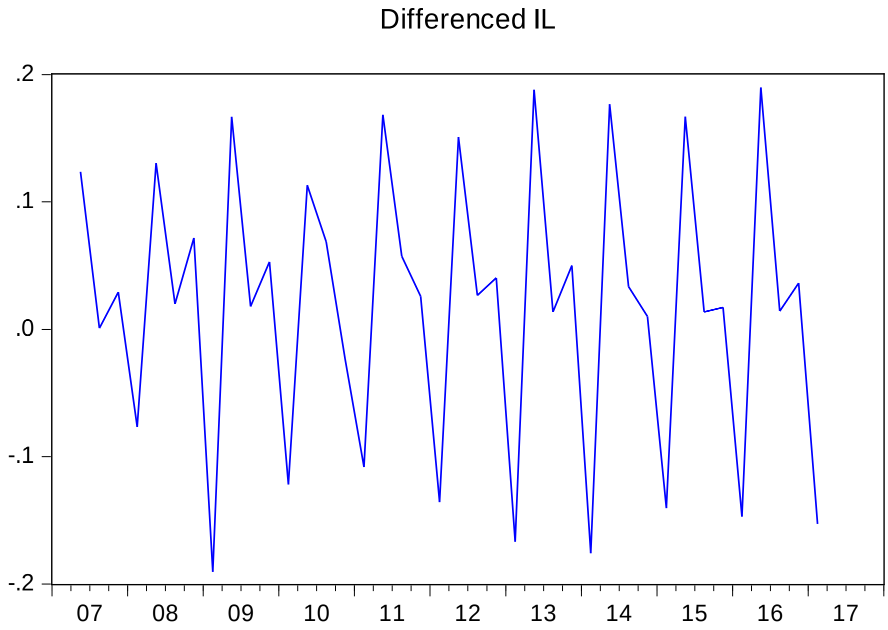
Figure 4.3: IL at level



Source: Authors calculation

According to the graphical presentation on figure 4.3 IL seems to be non-stationary at level because of the upward trend over time. This gives the impression that IL is controlled by time and is growing continuously over the years without declining.

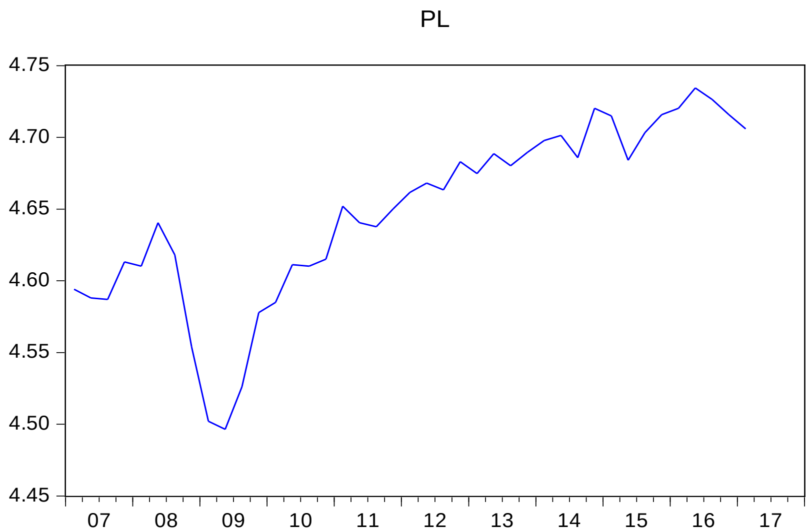
Figure 4.4: IL at first difference



Source: Authors calculation

Figure 4.4 shows that IL is stationary at first difference. The impression is that stationarity has been achieved at first difference because variances seems to be time-invariant visually.

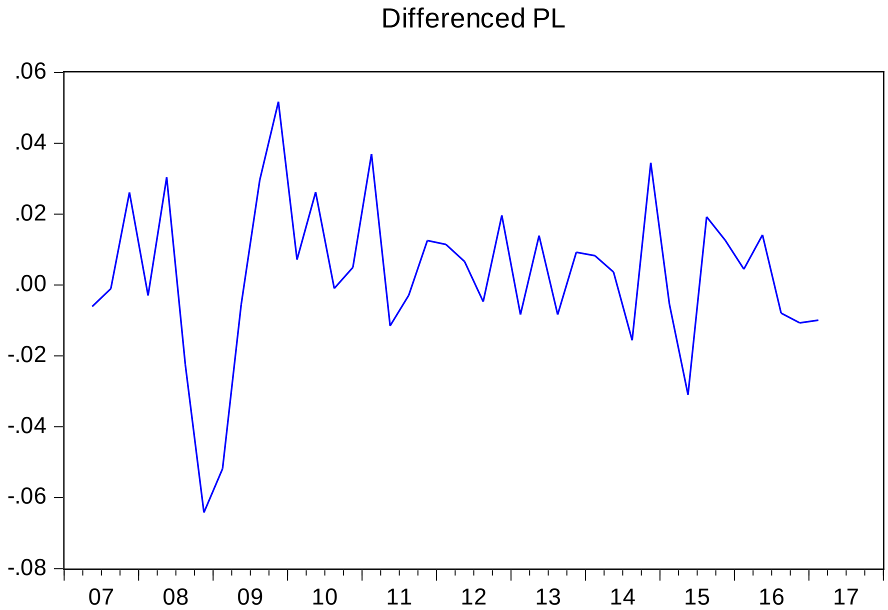
Figure 4.5: Graphical presentation of PL at level



Source: Authors calculation

According to the graphical presentation on figure 4.5 PL seems to be non-stationary at level because of the upward trend over time. This gives the impression that PL is controlled by time and is growing continuously over the years without declining.

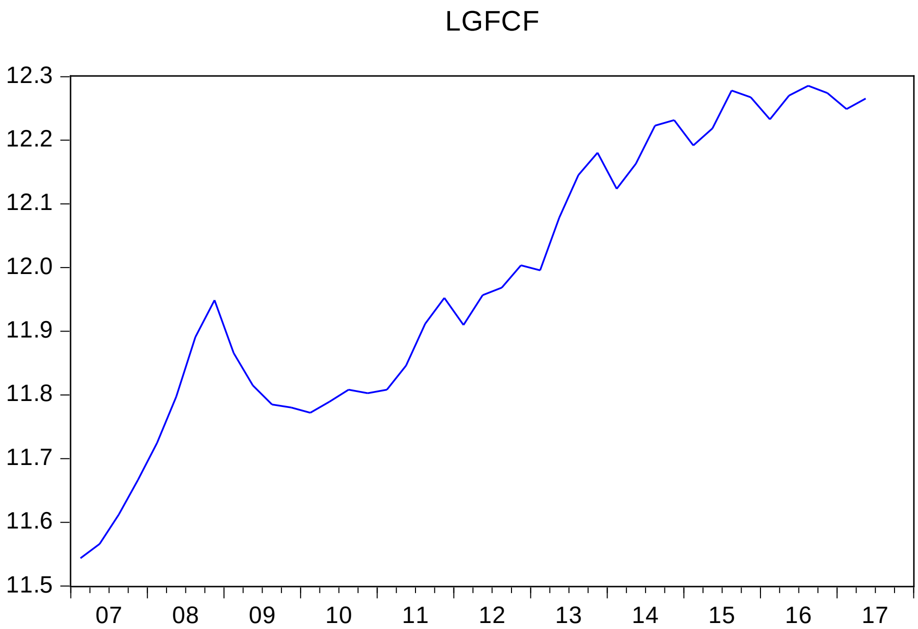
Figure 4.6: PL at level first difference



Source: Authors calculation

Similarly, figure 4.6 suggests that PL is stationary at first difference. The impression is that stationary has been achieved at first difference because visually variances seems to be time-invariant.

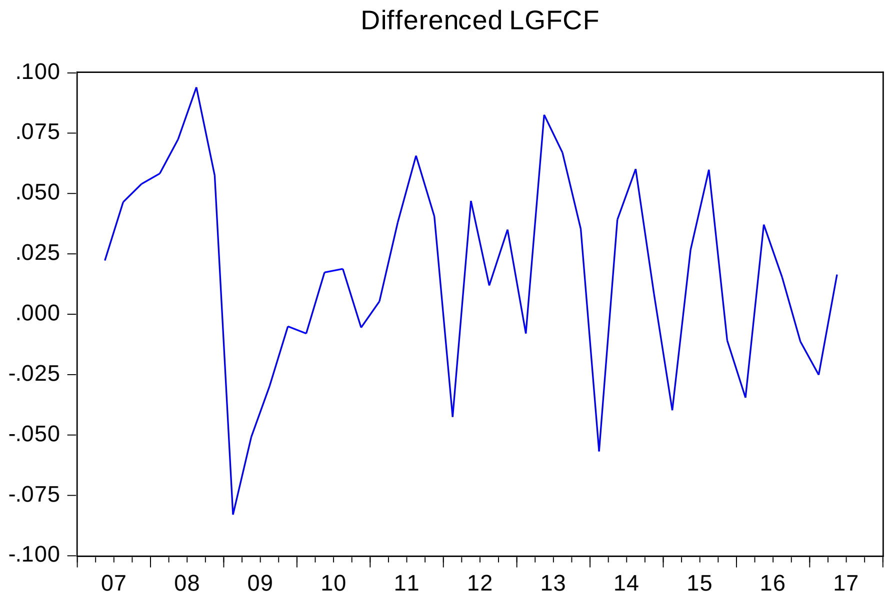
Figure 4.7: InfInv at level



Source: Authors calculation

According to the graphical presentation on figure 4.7 InfInv seems to be non-stationary at level because of the upward trend over time. This gives the impression that InfInv is controlled by time and is growing continuously over the years without declining.

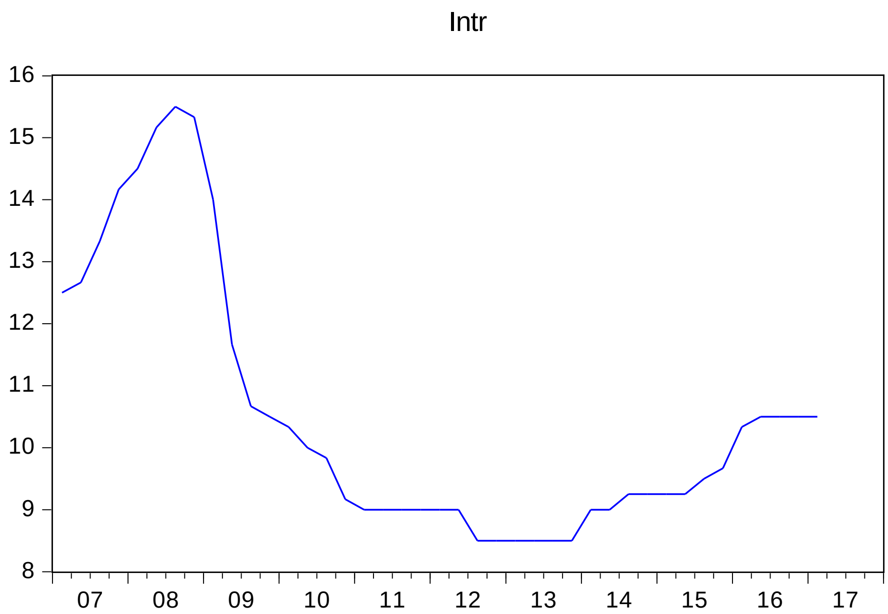
Figure 4.8: InfInv at first difference



Source: Authors calculation

Figure 4.8 shows that InfInv is stationary at first difference. The impression is that stationary has been achieved at first difference because visually variances seems to be time-invariant.

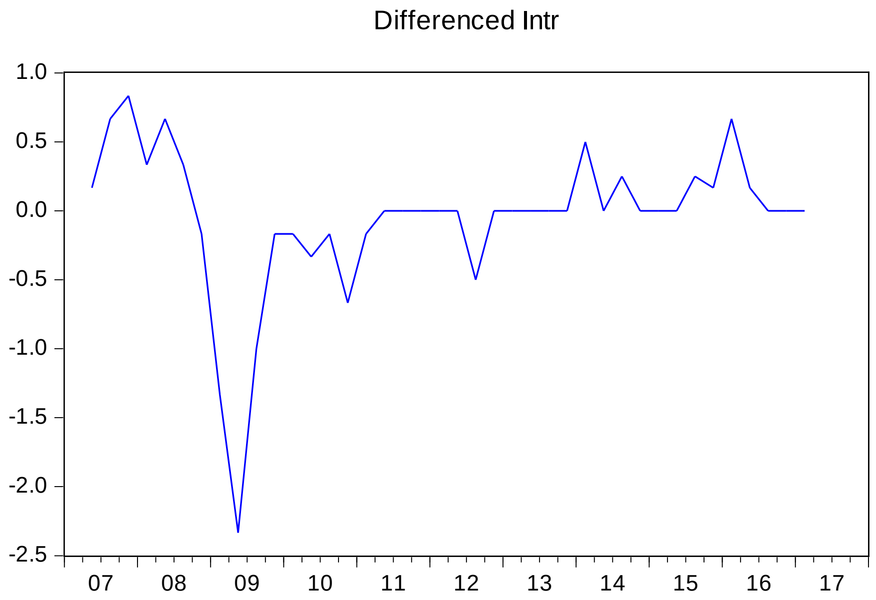
Figure 4.9: Intr at level



Source: Authors calculation

According to the graphical presentation on figure 4.9 Intr there is a downward movement overtime. This gives the impression that Intr is controlled by time and is declining continuously over the years.

Figure 4.10: Intr at first difference



Source: Authors calculation

Figure 4.10 shows that Intr becomes stationary at first difference because visually variances seem to be time-invariant.

4.2.2 Stationarity/Unit root tests results

The following section presents the results of the formal testing of unit root, which is regarded as the first step in the model estimation. Though the ARDL bound testing approach does not require all variables to be integrated in the same order, it is not applied to variables whose order of integration is greater than two I(2). As such, the test for the order of integration will be done to ensure that no variable is integrated to the order of two I(2). This is done because variables with integration of order two I(2) in the ARDL approach would produce spurious results (Gujarati, 2003).This process involved all the specified variables specified in the model. Time series quarterly data from 2007Q1 to 2017Q1 was used. In testing for the unit roots, the study used the Augmented Dickey Fuller (ADF) and the DF-GLS as a confirmatory test. The model levels tested were Trends, followed by Trend and Intercept to confirm stationarity and the results are presented in table 4.2 and 4.3.

Table 4.2: Augmented of Dickey-Fuller (ADF) test results

	Model level		Lag length	First difference		Lag length	Order of integration
LFDI	INTERCEPT	-6.909021 (-2.936942)**	0	$\Delta LFDI$	-7.057306 (-2.945842)**	3	I(0)
	TREND & INTERCEPT	-7.043838 (-3.526609)**	0		-7.002356 (-3.540328)**	3	I(0)
LiL	INTERCEPT	-1.120168 (-2.943427)**	3	ΔLiL	-30.03733 (-2.943427)**	2	I(1)
	TREND & INTERCEPT	-8.034730 (-3.526609)**	0		-10.15469 (-3.529758)**	0	I(0)
LPL	INTERCEPT	-1.082079 (-2.936942)**	0	ΔLPL	-4.785870 (-2.938987)**	0	I(1)
	TREND & INTERCEPT	-2.231444 (-3.526609)**	0		-4.023586 (-3.540328)**	3	I(1)
LInfInv	INTERCEPT	-1.560054 (-2.936942)**	1	$\Delta LInfINV$	-4.655331 (-2.938987)**	1	I(1)
	TREND & INTERCEPT	-2.937899 (-3.526609)**	1		-4.680027 (-3.529758)**	1	I(1)
Intr	INTERCEPT	-1.371077 (-2.960411)**	9	$\Delta Intr$	-2.973615 (-2.963972)**	9	I(1)
	TREND & INTERCEPT	-2.730505 (-3.562882)**	9		-5.798381 (-3.552973)**	6	I(1)
LD	INTERCEPT	-1.000000 (-2.936942)**	0	ΔLD	-6.244998 (-2.938987)**	0	I(1)
	TREND & INTERCEPT	-1.973010 (-3.526609)**	0		-6.160669 (-3.529758)**	0	I(1)

Notes: The values in brackets are the t-statistics of corresponding estimated coefficients, and ***, ** and * denote significance at 1%, 5% and 10%, respectively.
I(1) Indicates unit root at first difference being stationary
I(0) Indicates unit root in level being stationary
Δ Indicates changes in first difference
** Indicates critical value at 5% significance level
Source: Authors calculation

The ADF test results presented in table 4.2 indicate that some variables are non-stationary at level but become stationary at first difference. They are I(1) showing their stationarity at first difference. FDI is the only variable which is stationary at I(0). One variable which is showing integration I(0) and I(1) is IL. According to the results IL is integrated to I(1) at Intercept and I(0) at trend and intercept.

Table 4.3: DF-GLS test results

Variables at level	Model level		Lag length	Variables at 1st difference		Lag length	Order of integration
LFDI	INTERCEPT	-6.999282 (-1.949319)	0	$\Delta LFDI$	-10.79083 (-1.949609)	0	I(0)
	TREND & INTERCEPT	-7.175184 (-3.190000)	0		-6.586869 (-3.190000)	3	I(0)
LiL	INTERCEPT	2.785887 (-1.950117)	3	ΔLiL	-9.199986 (-1.949609)	0	I(0)
	TREND & INTERCEPT	-7.575781 (-3.190000)	0		-9.286632 (-3.190000)	0	I(0)
LPL	INTERCEPT	-0.858614 (-1.949319)	0	ΔLPL	-4.703556 (-1.949609)	0	I(1)
	TREND & INTERCEPT	-2.165694 (-3.190000)	0		-4.820031 (-3.190000)	0	I(1)
LInfInv	INTERCEPT	-0.061236 (-1.949609)	1	$\Delta LInfINV$	-3.288102 (-1.949609)	0	I(1)
	TREND & INTERCEPT	-2.597313 (-3.190000)	1		-3.338763 (-3.190000)	0	I(1)
Intr	INTERCEPT	-1.965218 (-1.950687)	5	$\Delta Intr$	-2.271893 (-1.951000)	5	I(0)
	TREND & INTERCEPT	-2.177860 (-3.190000)	5		-3.319023 (-3.190000)	2	I(1)
LD	INTERCEPT	-0.661165 (-1.949319)	0	ΔLD	-6.293601 (-1.949609)	0	I(1)
	TREND & INTERCEPT	-1.964948 (-3.190000)	0		-6.321490 (-3.190000)	0	I(1)

Notes: The values in brackets are the t-statistics of corresponding estimated coefficients, and ***, ** and * denote significance at 1%, 5% and 10%, respectively.
I(1) Indicates unit root at first difference being stationary
I(0) Indicates unit root in level being stationary
Δ Indicates changes in first difference
** Indicates critical value at 5% significance level
Source: Authors calculation

The results of DF-GLS on table 4.3 are a confirmation that FDI is stationary at level. IL is also stationary at level. All the other variables are non-stationary at level, but become stationary at first difference. Intr is showing integration with stationarity at level under Intercept and stationarity at first difference under Trends and Intercept.

4.2.3 Bounds Cointegration test results

Since all the variables fall within I(0) and I(1), bounds test to cointegration test can be performed and the results are presented in table 4.4

Table 4.4: Bound test results

F-statistic	Lower bound I(0)	Upper bound I(1)	Results
9.10	2.39	3.38	Cointegration

According to Pesaran et al., (2001), significant levels for lower bound and upper bound are shown as follows:

Table 4.5: Lower bound and Upper bounds

Significant level	I(0) or lower bound	I(1) of upper bound
5%	2.39	3.38

Source: Pesaran et al., (2001)

Tables 4.4 and 4.5 are the results of the bound test. The details of this test are obtainable in Appendix B. The number of independent variables in this study is 5, hence k=5. All the lower bound and upper bound critical values were obtained from Case II: restricted intercept and no trend (Pesaran et al., 2001). The calculated F statistic 9.10 is higher than the upper bound critical value 3.38 at the 5% level of significance. Thus, the null hypothesis of no cointegration is rejected, implying long run cointegration relationship among the variables.

4.2.4 Granger Causality test results

Since cointegration has been established, the study now proceeds with Granger-Causality test and the results are presented in table.

Table 4.6: Pairwise Granger Causality test results

Sample: 2007Q1 2017Q4
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
IL does not Granger Cause FDI	39	1.01980	0.3714
FDI does not Granger Cause IL		0.09821	0.9067
PL does not Granger Cause FDI	39	0.88199	0.4232
FDI does not Granger Cause PL		1.38188	0.2649
LGFCF does not Granger Cause FDI	39	0.46087	0.6346
FDI does not Granger Cause LGFCF		0.25597	0.7756
INTR does not Granger Cause FDI	39	1.47703	0.2426
FDI does not Granger Cause INTR		0.44586	0.6440
DUMMY does not Granger Cause FDI	39	0.41367	0.6645
FDI does not Granger Cause DUMMY		9.88300	0.0004
PL does not Granger Cause IL	39	1.51193	0.2349
IL does not Granger Cause PL		3.34689	0.0471
LGFCF does not Granger Cause IL	39	0.91760	0.4091
IL does not Granger Cause LGFCF		0.51278	0.6034
INTR does not Granger Cause IL	39	0.59742	0.5559
IL does not Granger Cause INTR		1.74238	0.1904
DUMMY does not Granger Cause IL	39	1.92298	0.1617
IL does not Granger Cause DUMMY		2.54271	0.0935
LGFCF does not Granger Cause PL	39	1.11620	0.3392
PL does not Granger Cause LGFCF		9.16352	0.0007
INTR does not Granger Cause PL	39	6.00290	0.0059
PL does not Granger Cause INTR		3.47161	0.0425
DUMMY does not Granger Cause PL	39	1.78367	0.1834
PL does not Granger Cause DUMMY		1.22125	0.3075
INTR does not Granger Cause LGFCF	39	5.15640	0.0111
LGFCF does not Granger Cause INTR		1.11416	0.3399
DUMMY does not Granger Cause LGFCF	39	4.24267	0.0227
LGFCF does not Granger Cause DUMMY		1.27377	0.2928
DUMMY does not Granger Cause INTR	39	0.16775	0.8463
INTR does not Granger Cause DUMMY		1.56293	0.2242

Source: Authors estimations

According to the results in table 4.6, there is no directional causality between income level and foreign direct investment. There is also no directional causality between interest rate and foreign direct investment. Productivity of labour does not granger cause foreign direct investment. The null hypothesis of granger causality cannot be rejected for the relationship between FDI and the strike actions. It is observed to be the same for the relationship between productivity of labour and the strike action. The analysis of granger causality test reveals bidirectional causality between strike action and foreign direct investment.

4.2.5 Diagnostic tests

The diagnostic tests are done to check the model specification. The results are based on statistical estimations. The results of the diagnostic tests results are presented in table 4.7.

Table 4.7: Diagnostic tests results

Test	Null Hypothesis	Test statistic	P-Value	Conclusion
Jarque-Bera	Residuals are normally distributed	98.72418	0.00000	We do not reject the H_0 because the P-value is greater than the LOS at 5%, hence the residuals are normally distributed.
Breusch-Pargan-Godfrey	No serial correlation	1.522410	0.4671	We do not reject the reject H_0 because the P-value is greater than LOS at 5%, hence there is no serial correlation.
Breusch-Pagan-Godfrey	No heteroscedasticity	10.06173	0.5248	We do not reject H_0 as P- value is greater than LOS at 5%, hence there is no heteroscedasticity.
Harvey	No heteroscedasticity	36.62231	0.0001	We do not reject H_0 as the P-value is greater than LOS at 5%, hence there is no heteroscedasticity.
Glejser	No heteroscedasticity	14.50752	0.2062	We do not reject H_0 as P- value is greater than LOS at 5%, hence there is no heteroscedasticity
Arch	No heteroscedasticity	0.031413	0.8593	We do not reject H_0 as P- value is greater than LOS at 5%, hence there is no heteroscedasticity

Null hypothesis: Homoskedasticity Alternative hypothesis: Heteroskedasticity

Source: Authors estimations

The residuals are normally distributed and there is no serial correlation. In the presence of heteroskedasticity, the null hypothesis is rejected (homoskedasticity) and the alternative is accepted. Detailed results are presented in Appendix C.

4.2.6 Stability tests

The results of stability test are presented in table 4.8 and figure 4.11 respectively.

4.2.6.1 Ramsey RESET test

Table 4.8: Ramsey RESET test results

	Value	DF	Probability
t-statistic	3.993520	24	0.0005
F-statistic	15.94821	(1, 24)	0.0005

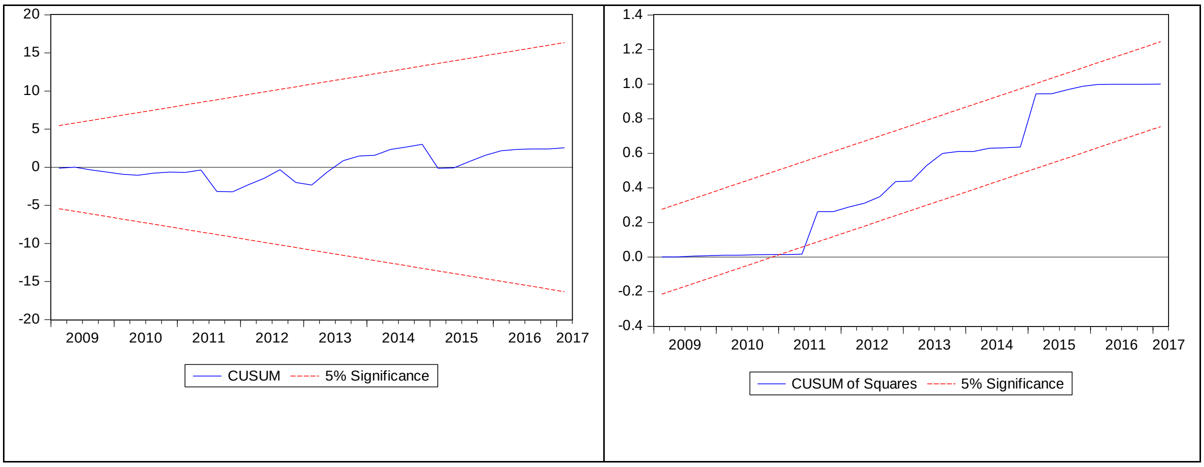
Source: Authors estimations

The summary of results presented in table 4.8 indicates that the null hypothesis of Ramsey reset test shows that the model is correctly specified. The probability is 0.00 therefore the study accepts the null hypothesis.

4.2.6.2 CUSUM and CUSUMSQ tests result

The stability tests result reveal that after incorporating the CUSUM and CUSUM of squares tests, ARDL model is stable.

Figure 4.11: Stability tests results



Source: Authors calculations

The plot of the cumulative sum of recursive residuals (CUSUM) and cumulative sum of squares recursive residuals (CUSUMQ) of the model presented in figure 4.11 indicates stability in the coefficients over the sample period as they fall within the critical bounds indicate by the 5% significance parameters.

4.3 Summary

In this chapter, the drivers of FDI in South Africa was estimated. This chapter attempted to empirically investigate the issue by using the South African IL, PL, InfrInv, Intr data. The data used to estimate the model was obtained from the SARB and Quantec Easy data respectively. The period covered was 2007 Q1 to 2017 Q1. All estimates were run using the EViews statistical estimation program 9.0. The presentation of results based on the objectives that were set out to be achieved in chapter 1. ADF and DG-GLS tests results indicated that all variables are stationary at different levels; some at level and others at first difference. The diagnostic test were conducted and the results indicated that we accept the alternative hypothesis.

CHAPTER 5

SUMMARY, RECOMMENDATIONS, CONCLUSION

5.1 Introduction

This chapter is divided into five sections. Section 5.2 presents the summary and Interpretation of Findings, 5.3 presents the conclusions; section 5.3 presents the contributions of the study and section 5.4 presents the limitations of the study.

5.2 Summary

The aim of this study was to investigate drivers of international investment decisions in South Africa. In order to address the research questions, the study pursued the following specific objectives:

- To identify drivers of international investment decisions in South Africa.
- To determine the impact of investment drivers on FDI in South Africa for the period 2007Q1 – 2017Q2.

Chapter 1 presented the introduction/background to the study which include a brief overview of foreign direct investment, the problem statement; research objectives and questions as well as the significance and justification of the study. FDI literature was reviewed in chapter 2 focusing on the theories of FDI and also selected determinants of FDI. Detailed description of the methodology was given in chapter 3 including the description of the type and sources of data, method of data analysis as well as the various econometric tests which were used and the results were presented in Chapter 4.

The study used secondary data from the SARB and Quantec Easy data. ARDL model was employed in data analysis to help in addressing the objectives which the study sought to address. Studies on the factors that determine FDI have been producing different results over the years. Though there are standard requirements investors consider when looking for rewarding investment opportunities, every country or region is different and unique in its own right. Even within a county like, South Africa different provinces will receive a different share of investment. Some of the critical factors influencing FDI have been studies and include macroeconomic policies, return on investment, agglomeration effects, natural resources, country risk, trade openness, infrastructure availability, market size and growth (Ajayi, 2006).

The study found that household income level had a negative effect in the stock of FDI. It also found that labour productivity increased the total output of goods and services and therefore impacting on the stock of FDI in the country. The finding is in line with the results of a study by Nahidi (2010), on the effect of main economic variable on DFI in Iran from 1973-2006 under stable and non-stable conditions shows positive effects of labour productivity as one of the variables on FDI.

The study found that public infrastructural investment in South Africa had a positive impact on FDI, this might contribute to reducing the cost of doing business in the country and thereby increases FDI's profititability. The significance of the availability of infrastructure cannot be over stated though it is not the only determining factor in FDI (Tampakoudis et al., 2017). Other studies came to a different conclusion concerning the significance of infrastructure's impact on FDI; Siddiqui & Aumebonnsuke, (2014) and Faroh & Shen (2015). Study also found to support the idea that interest rates attract the FDI inflow which is in line with Uwubanmwen & Ajoa (2012) and Hoonda (2011). On the other hand these are different from Chingarande et al., (2012) who found no significant relationship between interest rates and foreign direct investment. Results also indicate that labour unrest has a negative impact on foreign investment. A study by Menon and Paroma (2004) on the labour conflict and foreign direct investment in India producing similar results.

5.3 Recommendations

The study found all variables to be important in explaining variations in foreign direct investment in South Africa both in the short and long run and the study recommends the following policy implications:

There is need for domestic actions which involve actions to be taken by policy makers in the country. These include image building, domestic regulatory reforms, and marketing of investment opportunities. This requires labour stability, macroeconomic stability and the protection of property rights as well as the rule of law.

Improving the investment climate for existing domestic and foreign investors through infrastructure development; provision of services and changes in the regulatory framework by relaxing laws on profit repatriation will encourage multinational corporations to increase their investments and also attract new investors. Creating awareness of investment opportunities through the use of existing investors and information communication technologies such as the internet. Policies which promotes increase in labour productivity should be encouraged and labour disputes that results to strike actions must be avoided.

5.4 Limitations of the study

This study was focused on South Africa. This means that the results are unique to South Africa and may not be generalised to other countries which were not the focus of the present study. Therefore such conclusion should be approached with this fact in mind. The study also collected data from 2007Q1 to 2017Q1, this is a fairly long period but may not be long enough to observe the changes in the series. The sample period may not be very valuable for the interpretations that involve time series where long run relationships need to be established.

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APPENDICES

APPENDIX A: DATA OF THE STUDY

Years	FDI	IL	PL	InfInv	Intr	Dummy
2007/01	411.9	286264	98.9	103110	12.5	1
2007/02	1820.4	323982	98.3	105429	12.6667	1
2007/03	2174.9	324214	98.2	110440	13.3333	1
2007/04	2179.6	333779	100.8	116569	14.1667	1
2008/01	5880	309151	100.5	123569	14.5	1
2008/02	1564.3	352231	103.6	132859	15.1667	1
2008/03	2192.3	359288	101.3	145961	15.5	1
2008/04	248.4	385982	95	154608	15.3333	1
2009/01	818.7	319064	90.2	142294	14	1
2009/02	3733.1	376975	89.7	135242	11.6667	1
2009/03	2014	383774	92.4	131279	10.6667	1
2009/04	1058.7	404623	97.3	130625	10.5	1
2010/01	553.9	358165	98	129592	10.3333	1
2010/02	349.6	401021	100.6	131856	10	1
2010/03	1324.6	429566	100.5	134361	9.83333	1
2010/04	1465.1	419672	101	133622	9.16667	1
2011/01	619.6	376627	104.8	134328	9	1
2011/02	2250.9	445657	103.6	139528	9	1
2011/03	-941.1	471912	103.3	148997	9	1
2011/04	2209.9	484253	104.6	155162	9	1
2012/01	1313.7	422792	105.8	148706	9	1
2012/02	696.7	491591	106.5	155861	9	1
2012/03	2728.5	504847	106	157723	8.5	1
2012/04	-112.9	525679	108.1	163353	8.5	1
2013/01	1252.8	444907	107.2	162051	8.5	1
2013/02	1841.8	536950	108.7	176008	8.5	1
2013/03	4695.1	544276	107.8	188199	8.5	1
2013/04	442.8	572188	108.8	194976	8.5	1
2014/01	694	479870	109.7	184214	9	1
2014/02	2607.6	572609	110.1	191569	9	1

2014/03	769.6	592059	108.4	203449	9.25	1
2014/04	1720.5	598007	112.2	205186	9.25	1
2015/01	-1184.7	519670	111.6	197175	9.25	1
2015/02	456.8	614148	108.2	202500	9.25	1
2015/03	1239.4	622535	110.3	214986	9.5	1
2015/04	1009.6	633310	111.7	212664	9.66667	1
2016/01	717.6	546683	112.2	205448	10.3333	1
2016/02	570	661043	113.8	213227	10.5	1
2016/03	498.1	670464	112.9	216525	10.5	1
2016/04	464.6	695198	111.7	214091	10.5	1
2017/01	678.8	596715	110.6	208778	10.5	1

APPENDIX B: ARDL BOUND TEST

Sample: 2008Q1 2017Q1
Included observations: 37
Null Hypothesis: No long-run relationships exist

Test Statistic	Value	k
F-statistic	9.101431	5

Critical Value Bounds

Significance	I0 Bound	I1 Bound
10%	2.26	3.35
5%	2.62	3.79
2.5%	2.96	4.18
1%	3.41	4.68

Test Equation:
Dependent Variable: D(FDI)
Method: Least Squares
Date: 11/08/17 Time: 10:05
Sample: 2008Q1 2017Q1
Included observations: 37

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(PL)	32.94768	34.26697	0.961500	0.3455
D(DUMMY)	5.000544	4.040297	1.237668	0.2273
D(DUMMY(-1))	-2.129158	4.241934	-0.501931	0.6201
D(DUMMY(-2))	-0.034572	4.233573	-0.008166	0.9935
D(DUMMY(-3))	-12.78946	4.124229	-3.101055	0.0047
C	176.7446	124.4314	1.420418	0.1678
IL(-1)	0.230686	9.773130	0.023604	0.9814
PL(-1)	-15.64214	19.96895	-0.783323	0.4408
LGFCF(-1)	-9.197275	13.22935	-0.695218	0.4933
INTR(-1)	0.715288	0.507815	1.408562	0.1713
DUMMY(-1)	6.356730	3.919449	1.621843	0.1174
FDI(-1)	-1.224759	0.170959	-7.164053	0.0000

R-squared	0.732920	Mean dependent var	-0.031502
Adjusted R-squared	0.615404	S.D. dependent var	5.631295
S.E. of regression	3.492292	Akaike info criterion	5.595600
Sum squared resid	304.9025	Schwarz criterion	6.118060
Log likelihood	-91.51860	Hannan-Quinn criter.	5.779791
F-statistic	6.236798	Durbin-Watson stat	2.192235
Prob(F-statistic)	0.000076		

APPENDIX C: DIAGNOSTIC TESTS RESULTS

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.493487	Prob. F(2,23)	0.6168
Obs*R-squared	1.522410	Prob. Chi-Square(2)	0.4671

Test Equation:
Dependent Variable: RESID
Method: ARDL

Sample: 2008Q1 2017Q1
Included observations: 37
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FDI(-1)	0.133651	0.299041	0.446930	0.6591
IL	-1.706375	11.10499	-0.153658	0.8792
PL	-4.649165	33.78365	-0.137616	0.8917
PL(-1)	10.53496	36.57671	0.288024	0.7759
LGFCF	0.082011	17.72677	0.004626	0.9963
INTR	-0.168663	0.551623	-0.305757	0.7625
DUMMY	-2.101740	5.198544	-0.404294	0.6897
DUMMY(-1)	1.893949	6.074510	0.311786	0.7580
DUMMY(-2)	-0.420343	5.007526	-0.083942	0.9338
DUMMY(-3)	0.024593	5.028421	0.004891	0.9961
DUMMY(-4)	0.323045	4.339001	0.074451	0.9413
C	-4.884371	124.4605	-0.039244	0.9690
RESID(-1)	-0.224870	0.362175	-0.620887	0.5408
RESID(-2)	-0.181552	0.273559	-0.663665	0.5135

R-squared	0.041146	Mean dependent var	9.91E-14
Adjusted R-squared	-0.500815	S.D. dependent var	2.854197
S.E. of regression	3.496613	Akaike info criterion	5.622800
Sum squared resid	281.2049	Schwarz criterion	6.232336
Log likelihood	-90.02179	Hannan-Quinn criter.	5.837690
F-statistic	0.075921	Durbin-Watson stat	2.095896
Prob(F-statistic)	0.999989		

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.848887	Prob. F(11,25)	0.5968
Obs*R-squared	10.06173	Prob. Chi-Square(11)	0.5248
Scaled explained SS	19.47107	Prob. Chi-Square(11)	0.0531

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares

Sample: 2008Q1 2017Q1
Included observations: 37

Variable	Coefficient	Std. Error	t-Statistic	Prob.

C	-1276.866	846.1764	-1.508983	0.1438
FDI(-1)	1.602411	1.174220	1.364661	0.1845
IL	-110.0972	75.11233	-1.465768	0.1552
PL	-91.23566	227.8345	-0.400447	0.6922
PL(-1)	306.4116	238.6028	1.284191	0.2108
LGFCF	152.3885	121.3367	1.255915	0.2208
INTR	-8.579864	3.558809	-2.410881	0.0236
DUMMY	-46.44957	28.31174	-1.640647	0.1134
DUMMY(-1)	7.377092	34.64764	0.212918	0.8331
DUMMY(-2)	-4.604873	34.01943	-0.135360	0.8934
DUMMY(-3)	0.153014	34.43604	0.004443	0.9965
DUMMY(-4)	-8.541131	29.24615	-0.292043	0.7727

R-squared	0.271939	Mean dependent var	7.926269
Adjusted R-squared	-0.048409	S.D. dependent var	23.39665
S.E. of regression	23.95626	Akaike info criterion	9.446943
Sum squared resid	14347.56	Schwarz criterion	9.969403
Log likelihood	-162.7684	Hannan-Quinn criter.	9.631135
F-statistic	0.848887	Durbin-Watson stat	1.857193
Prob(F-statistic)	0.596813		

Heteroskedasticity Test: Harvey

F-statistic	220.3753	Prob. F(11,25)	0.0000
Obs*R-squared	36.62231	Prob. Chi-Square(11)	0.0001
Scaled explained SS	2390.239	Prob. Chi-Square(11)	0.0000

Test Equation:
Dependent Variable: LRESID2
Method: Least Squares

Sample: 2008Q1 2017Q1
Included observations: 37

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-114.5417	77.91473	-1.470091	0.1540
FDI(-1)	-0.033493	0.108120	-0.309772	0.7593
IL	-13.17096	6.916238	-1.904353	0.0684
PL	35.75244	20.97868	1.704228	0.1007
PL(-1)	-12.46355	21.97021	-0.567293	0.5756
LGFCF	15.83956	11.17251	1.417727	0.1686
INTR	-0.868841	0.327690	-2.651409	0.0137
DUMMY	-58.58602	2.606905	-22.47340	0.0000
DUMMY(-1)	-2.880286	3.190306	-0.902824	0.3752
DUMMY(-2)	2.336316	3.132461	0.745840	0.4627
DUMMY(-3)	-3.789428	3.170822	-1.195093	0.2433
DUMMY(-4)	58.01318	2.692944	21.54266	0.0000

R-squared	0.989792	Mean dependent var	-5.966919
Adjusted R-squared	0.985301	S.D. dependent var	18.19417
S.E. of regression	2.205859	Akaike info criterion	4.676717
Sum squared resid	121.6453	Schwarz criterion	5.199177
Log likelihood	-74.51927	Hannan-Quinn criter.	4.860909
F-statistic	220.3753	Durbin-Watson stat	2.498107
Prob(F-statistic)	0.000000		

Heteroskedasticity Test: Glejser

F-statistic	1.465896	Prob. F(11,25)	0.2062
Obs*R-squared	14.50752	Prob. Chi-Square(11)	0.2062
Scaled explained SS	16.93161	Prob. Chi-Square(11)	0.1099

Test Equation:
Dependent Variable: ARESID
Method: Least Squares

Sample: 2008Q1 2017Q1
Included observations: 37

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-131.5713	74.72898	-1.760646	0.0905
FDI(-1)	0.120635	0.103700	1.163311	0.2557
IL	-11.58776	6.633449	-1.746867	0.0929
PL	-2.033709	20.12091	-0.101074	0.9203
PL(-1)	26.90194	21.07190	1.276673	0.2134
LGFCF	15.08436	10.71569	1.407688	0.1715
INTR	-0.935665	0.314292	-2.977060	0.0064
DUMMY	-6.089782	2.500315	-2.435606	0.0223
DUMMY(-1)	0.807430	3.059862	0.263878	0.7940
DUMMY(-2)	-0.449183	3.004382	-0.149509	0.8824
DUMMY(-3)	-0.058563	3.041175	-0.019257	0.9848
DUMMY(-4)	0.166256	2.582836	0.064370	0.9492

R-squared	0.392095	Mean dependent var	1.717913
Adjusted R-squared	0.124617	S.D. dependent var	2.261247
S.E. of regression	2.115666	Akaike info criterion	4.593223
Sum squared resid	111.9011	Schwarz criterion	5.115683
Log likelihood	-72.97463	Hannan-Quinn criter.	4.777415
F-statistic	1.465896	Durbin-Watson stat	1.852345
Prob(F-statistic)	0.206156		

Heteroskedasticity Test: ARCH

F-statistic	0.029694	Prob. F(1,34)	0.8642
Obs*R-squared	0.031413	Prob. Chi-Square(1)	0.8593

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares

Sample (adjusted): 2008Q2 2017Q1
Included observations: 36 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	7.897653	4.240171	1.862579	0.0712
RESID^2(-1)	0.029536	0.171404	0.172319	0.8642

R-squared	0.000873	Mean dependent var	8.137766
Adjusted R-squared	-0.028514	S.D. dependent var	23.69264
S.E. of regression	24.02805	Akaike info criterion	9.250273
Sum squared resid	19629.80	Schwarz criterion	9.338246
Log likelihood	-164.5049	Hannan-Quinn criter.	9.280978
F-statistic	0.029694	Durbin-Watson stat	1.997351

Prob(F-statistic)	0.864209

Ramsey RESET Test
Equation: UNTITLED
Specification: FDI FDI(-1) IL PL PL(-1) LGFCF INTR DUMMY DUMMY(-1) DUMMY(-2) DUMMY(-3) DUMMY(-4) C
Omitted Variables: Squares of fitted values

	Value	df	Probability
t-statistic	3.993520	24	0.0005
F-statistic	15.94821	(1, 24)	0.0005

F-test summary:

	Sum of Sq.	df	Mean Squares
Test SSR	117.0806	1	117.0806
Restricted SSR	293.2719	25	11.73088
Unrestricted SSR	176.1913	24	7.341305

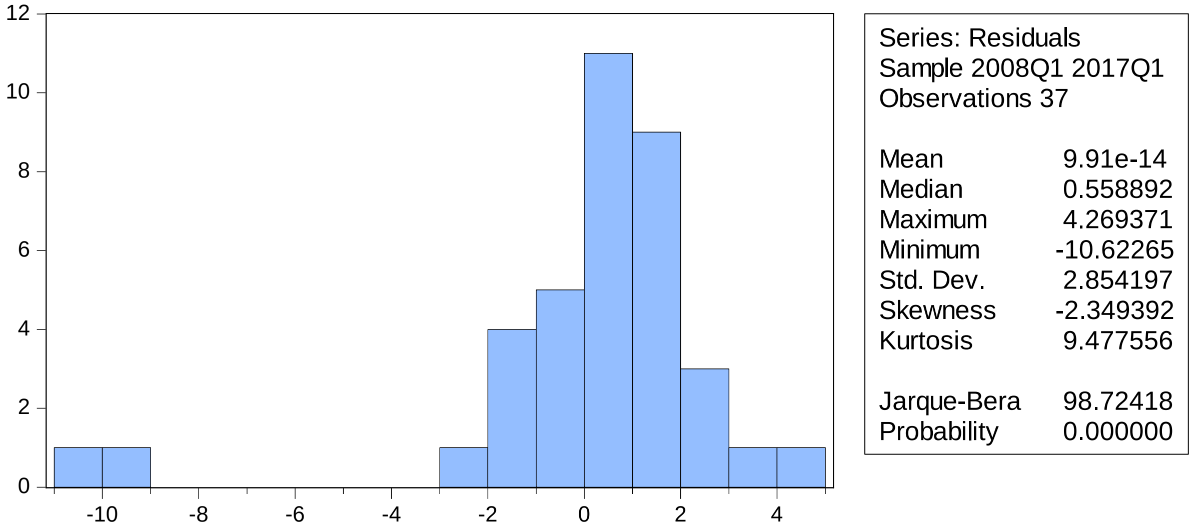
Unrestricted Test Equation:
Dependent Variable: FDI
Method: ARDL

Sample: 2008Q1 2017Q1
Included observations: 37
Maximum dependent lags: 4 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (4 lags, automatic):
Fixed regressors: C

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
FDI(-1)	-1.943768	0.452325	-4.297282	0.0002
IL	123.3665	28.71290	4.296554	0.0002
PL	159.8758	44.27276	3.611155	0.0014
PL(-1)	-375.6946	88.08839	-4.264973	0.0003
LGFCF	-224.5754	51.99156	-4.319459	0.0002
INTR	9.565779	2.162202	4.424090	0.0002
DUMMY	50.42650	11.60813	4.344068	0.0002
DUMMY(-1)	-12.02058	4.745731	-2.532924	0.0183
DUMMY(-2)	20.14159	5.946905	3.386904	0.0024
DUMMY(-3)	-37.69987	7.401298	-5.093684	0.0000
DUMMY(-4)	50.44958	9.729379	5.185283	0.0000
C	1996.835	455.5183	4.383655	0.0002
FITTED^2	-0.639410	0.160112	-3.993520	0.0005

R-squared	0.651633	Mean dependent var	5.943976
Adjusted R-squared	0.477450	S.D. dependent var	3.748199
S.E. of regression	2.709484	Akaike info criterion	5.101232
Sum squared resid	176.1913	Schwarz criterion	5.667230
Log likelihood	-81.37280	Hannan-Quinn criter.	5.300773
F-statistic	3.741075	Durbin-Watson stat	1.874548
Prob(F-statistic)	0.002882		

*Note: p-values and any subsequent tests do not account for model selection.


12
10
8
6
4
2
0
-10
-8
-6
-4
-2
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2
4
Series: Residuals
Sample 2008Q1 2017Q1
Observations 37
Mean 9.91e-14
Median 0.558892
Maximum 4.269371
Minimum -10.62265
Std. Dev. 2.854197
Skewness -2.349392
Kurtosis 9.477556
Jarque-Bera 98.72418
Probability 0.000000

APPENDIX D: GRANGER CAUSALITY TEST RESULTS

Pairwise Granger Causality Tests

Sample: 2007Q1 2017Q4
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
IL does not Granger Cause FDI	39	1.01980	0.3714
FDI does not Granger Cause IL		0.09821	0.9067
PL does not Granger Cause FDI	39	0.88199	0.4232
FDI does not Granger Cause PL		1.38188	0.2649
LGFCF does not Granger Cause FDI	39	0.46087	0.6346
FDI does not Granger Cause LGFCF		0.25597	0.7756
INTR does not Granger Cause FDI	39	1.47703	0.2426
FDI does not Granger Cause INTR		0.44586	0.6440
DUMMY does not Granger Cause FDI	39	0.41367	0.6645
FDI does not Granger Cause DUMMY		9.88300	0.0004
PL does not Granger Cause IL	39	1.51193	0.2349
IL does not Granger Cause PL		3.34689	0.0471
LGFCF does not Granger Cause IL	39	0.91760	0.4091
IL does not Granger Cause LGFCF		0.51278	0.6034
INTR does not Granger Cause IL	39	0.59742	0.5559
IL does not Granger Cause INTR		1.74238	0.1904
DUMMY does not Granger Cause IL	39	1.92298	0.1617
IL does not Granger Cause DUMMY		2.54271	0.0935
LGFCF does not Granger Cause PL	39	1.11620	0.3392
PL does not Granger Cause LGFCF		9.16352	0.0007
INTR does not Granger Cause PL	39	6.00290	0.0059
PL does not Granger Cause INTR		3.47161	0.0425
DUMMY does not Granger Cause PL	39	1.78367	0.1834
PL does not Granger Cause DUMMY		1.22125	0.3075
INTR does not Granger Cause LGFCF	39	5.15640	0.0111
LGFCF does not Granger Cause INTR		1.11416	0.3399
DUMMY does not Granger Cause LGFCF	39	4.24267	0.0227
LGFCF does not Granger Cause DUMMY		1.27377	0.2928
DUMMY does not Granger Cause INTR	39	0.16775	0.8463
INTR does not Granger Cause DUMMY		1.56293	0.2242

APPENDIX E: ADF AND DF-GLS TEST RESULTS

ADF test results

Null Hypothesis: FDI has a unit root
Exogenous: Constant
Lag Length: 0 (Fixed)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.909021	0.0000
Test critical values:	1% level	-3.605593	
	5% level	-2.936942	
	10% level	-2.606857	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(FDI)
Method: Least Squares

Sample (adjusted): 2007Q2 2017Q1
Included observations: 40 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FDI(-1)	-1.113746	0.161202	-6.909021	0.0000
C	6.759215	1.134517	5.957788	0.0000

R-squared	0.556772	Mean dependent var	0.012465
Adjusted R-squared	0.545108	S.D. dependent var	5.415737
S.E. of regression	3.652682	Akaike info criterion	5.477507
Sum squared resid	506.9993	Schwarz criterion	5.561951
Log likelihood	-107.5501	Hannan-Quinn criter.	5.508039
F-statistic	47.73458	Durbin-Watson stat	2.011164
Prob(F-statistic)	0.000000		

Null Hypothesis: FDI has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Fixed)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-7.043838	0.0000
Test critical values:	1% level	-4.205004	
	5% level	-3.526609	
	10% level	-3.194611	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(FDI)
Method: Least Squares

Sample (adjusted): 2007Q2 2017Q1
Included observations: 40 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FDI(-1)	-1.146738	0.162800	-7.043838	0.0000

C	8.180720	1.651286	4.954151	0.0000
@TREND("2007Q1")	-0.059592	0.050528	-1.179389	0.2458

R-squared	0.572830	Mean dependent var	0.012465
Adjusted R-squared	0.549740	S.D. dependent var	5.415737
S.E. of regression	3.634036	Akaike info criterion	5.490603
Sum squared resid	488.6300	Schwarz criterion	5.617269
Log likelihood	-106.8121	Hannan-Quinn criter.	5.536401
F-statistic	24.80832	Durbin-Watson stat	2.025715
Prob(F-statistic)	0.000000		

Null Hypothesis: D(FDI) has a unit root
Exogenous: Constant
Lag Length: 3 (Fixed)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-7.057306	0.0000
Test critical values:	1% level	-3.626784	
	5% level	-2.945842	
	10% level	-2.611531	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(FDI,2)
Method: Least Squares

Sample (adjusted): 2008Q2 2017Q1
Included observations: 36 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(FDI(-1))	-3.838244	0.543868	-7.057306	0.0000
D(FDI(-1),2)	1.929832	0.448341	4.304386	0.0002
D(FDI(-2),2)	1.185309	0.308102	3.847133	0.0006
D(FDI(-3),2)	0.518572	0.152828	3.393165	0.0019
C	-0.142849	0.672693	-0.212355	0.8332

R-squared	0.855199	Mean dependent var	-0.017046
Adjusted R-squared	0.836515	S.D. dependent var	9.979353
S.E. of regression	4.034986	Akaike info criterion	5.756129
Sum squared resid	504.7144	Schwarz criterion	5.976062
Log likelihood	-98.61031	Hannan-Quinn criter.	5.832891
F-statistic	45.77157	Durbin-Watson stat	2.093126
Prob(F-statistic)	0.000000		

Null Hypothesis: D(FDI) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 3 (Fixed)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-7.002356	0.0000
Test critical values:	1% level	-4.234972	
	5% level	-3.540328	
	10% level	-3.202445	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(FDI,2)
Method: Least Squares

Sample (adjusted): 2008Q2 2017Q1
Included observations: 36 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(FDI(-1))	-3.857952	0.550951	-7.002356	0.0000
D(FDI(-1),2)	1.945242	0.454090	4.283824	0.0002
D(FDI(-2),2)	1.194419	0.311910	3.829371	0.0006
D(FDI(-3),2)	0.521825	0.154620	3.374890	0.0021
C	-0.987045	1.625731	-0.607139	0.5483
@TREND("2007Q1")	0.037494	0.065583	0.571703	0.5718

R-squared	0.856759	Mean dependent var	-0.017046
Adjusted R-squared	0.832886	S.D. dependent var	9.979353
S.E. of regression	4.079521	Akaike info criterion	5.800848
Sum squared resid	499.2749	Schwarz criterion	6.064768
Log likelihood	-98.41527	Hannan-Quinn criter.	5.892963
F-statistic	35.88750	Durbin-Watson stat	2.108052
Prob(F-statistic)	0.000000		

Null Hypothesis: IL has a unit root
Exogenous: Constant
Lag Length: 3 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.120168	0.6975
Test critical values:	1% level	-3.621023	
	5% level	-2.943427	
	10% level	-2.610263	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(IL)
Method: Least Squares
Date: 12/01/17 Time: 06:06
Sample (adjusted): 2008Q1 2017Q1
Included observations: 37 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
IL(-1)	-0.024148	0.021557	-1.120168	0.2710
D(IL(-1))	-0.971170	0.054135	-17.93977	0.0000
D(IL(-2))	-0.971358	0.060429	-16.07430	0.0000
D(IL(-3))	-0.981026	0.050834	-19.29847	0.0000
C	0.392431	0.280932	1.396888	0.1721

R-squared	0.947105	Mean dependent var	0.015702
Adjusted R-squared	0.940493	S.D. dependent var	0.113872
S.E. of regression	0.027778	Akaike info criterion	-4.204047
Sum squared resid	0.024692	Schwarz criterion	-3.986355
Log likelihood	82.77486	Hannan-Quinn criter.	-4.127300
F-statistic	143.2425	Durbin-Watson stat	1.968834
Prob(F-statistic)	0.000000		

Null Hypothesis: IL has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Fixed)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-8.034730	0.0000
Test critical values:	1% level	-4.205004	
	5% level	-3.526609	
	10% level	-3.194611	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(IL)
Method: Least Squares

Sample (adjusted): 2007Q2 2017Q1
Included observations: 40 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
IL(-1)	-1.304093	0.162307	-8.034730	0.0000
C	16.49050	2.048158	8.051382	0.0000
@TREND("2007Q1")	0.025456	0.003401	7.484466	0.0000

R-squared	0.638363	Mean dependent var	0.018363
Adjusted R-squared	0.618815	S.D. dependent var	0.110779
S.E. of regression	0.068395	Akaike info criterion	-2.454988
Sum squared resid	0.173083	Schwarz criterion	-2.328322
Log likelihood	52.09976	Hannan-Quinn criter.	-2.409190
F-statistic	32.65632	Durbin-Watson stat	2.151319
Prob(F-statistic)	0.000000		

Null Hypothesis: D(IL) has a unit root
Exogenous: Constant
Lag Length: 2 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-30.03733	0.0001
Test critical values:	1% level	-3.621023	
	5% level	-2.943427	
	10% level	-2.610263	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(IL,2)
Method: Least Squares
Date: 12/01/17 Time: 06:08
Sample (adjusted): 2008Q1 2017Q1
Included observations: 37 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.

D(IL(-1))	-3.961931	0.131900	-30.03733	0.0000
D(IL(-1),2)	1.971270	0.097842	20.14750	0.0000
D(IL(-2),2)	0.986564	0.050788	19.42502	0.0000
C	0.077796	0.005345	14.55623	0.0000

R-squared	0.980997	Mean dependent var	-0.004914
Adjusted R-squared	0.979269	S.D. dependent var	0.193672
S.E. of regression	0.027885	Akaike info criterion	-4.219638
Sum squared resid	0.025660	Schwarz criterion	-4.045485
Log likelihood	82.06331	Hannan-Quinn criter.	-4.158241
F-statistic	567.8519	Durbin-Watson stat	1.902389
Prob(F-statistic)	0.000000		

Null Hypothesis: D(IL) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Fixed)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-10.15469	0.0000
Test critical values:	1% level	-4.211868	
	5% level	-3.529758	
	10% level	-3.196411	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(IL,2)
Method: Least Squares

Sample (adjusted): 2007Q3 2017Q1
Included observations: 39 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(IL(-1))	-1.502040	0.147916	-10.15469	0.0000
C	0.038533	0.033807	1.139805	0.2619
@TREND("2007Q1")	-0.000545	0.001410	-0.386871	0.7011

R-squared	0.741293	Mean dependent var	-0.007091
Adjusted R-squared	0.726920	S.D. dependent var	0.189542
S.E. of regression	0.099049	Akaike info criterion	-1.712599
Sum squared resid	0.353186	Schwarz criterion	-1.584633
Log likelihood	36.39568	Hannan-Quinn criter.	-1.666686
F-statistic	51.57671	Durbin-Watson stat	2.244466
Prob(F-statistic)	0.000000		

Null Hypothesis: PL has a unit root
Exogenous: Constant
Lag Length: 0 (Fixed)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.082079	0.7136
Test critical values:	1% level	-3.605593	
	5% level	-2.936942	
	10% level	-2.606857	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(PL)
Method: Least Squares

Sample (adjusted): 2007Q2 2017Q1
Included observations: 40 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
PL(-1)	-0.061691	0.057012	-1.082079	0.2860
C	0.289411	0.264898	1.092537	0.2815

R-squared	0.029892	Mean dependent var	0.002795
Adjusted R-squared	0.004363	S.D. dependent var	0.022176
S.E. of regression	0.022127	Akaike info criterion	-4.735320
Sum squared resid	0.018605	Schwarz criterion	-4.650876
Log likelihood	96.70641	Hannan-Quinn criter.	-4.704788
F-statistic	1.170895	Durbin-Watson stat	1.479209
Prob(F-statistic)	0.286036		

Null Hypothesis: PL has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Fixed)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.231444	0.4600
Test critical values:	1% level	-4.205004	
	5% level	-3.526609	
	10% level	-3.194611	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(PL)
Method: Least Squares

Sample (adjusted): 2007Q2 2017Q1
Included observations: 40 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
PL(-1)	-0.232774	0.104316	-2.231444	0.0318
C	1.062304	0.475041	2.236235	0.0315
@TREND("2007Q1")	0.001071	0.000555	1.931056	0.0612

R-squared	0.118711	Mean dependent var	0.002795
Adjusted R-squared	0.071074	S.D. dependent var	0.022176
S.E. of regression	0.021373	Akaike info criterion	-4.781342
Sum squared resid	0.016902	Schwarz criterion	-4.654676
Log likelihood	98.62685	Hannan-Quinn criter.	-4.735544
F-statistic	2.491981	Durbin-Watson stat	1.390196
Prob(F-statistic)	0.096536		

Null Hypothesis: D(PL) has a unit root
Exogenous: Constant
Lag Length: 0 (Fixed)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.785870	0.0004
Test critical values:	1% level	-3.610453	
	5% level	-2.938987	
	10% level	-2.607932	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(PL,2)
Method: Least Squares

Sample (adjusted): 2007Q3 2017Q1
Included observations: 39 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(PL(-1))	-0.766913	0.160245	-4.785870	0.0000
C	0.002296	0.003573	0.642417	0.5246

R-squared	0.382351	Mean dependent var	-9.77E-05
Adjusted R-squared	0.365658	S.D. dependent var	0.027743
S.E. of regression	0.022096	Akaike info criterion	-4.736925
Sum squared resid	0.018065	Schwarz criterion	-4.651614
Log likelihood	94.37003	Hannan-Quinn criter.	-4.706316
F-statistic	22.90455	Durbin-Watson stat	1.936304
Prob(F-statistic)	0.000027		

Null Hypothesis: D(PL) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 3 (Fixed)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.023586	0.0167
Test critical values:	1% level	-4.234972	
	5% level	-3.540328	
	10% level	-3.202445	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(PL,2)
Method: Least Squares

Sample (adjusted): 2008Q2 2017Q1
Included observations: 36 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(PL(-1))	-1.275685	0.317052	-4.023586	0.0004
D(PL(-1),2)	0.487624	0.261279	1.866297	0.0718
D(PL(-2),2)	0.381927	0.218465	1.748231	0.0907
D(PL(-3),2)	0.264921	0.174690	1.516521	0.1399
C	0.001757	0.008996	0.195320	0.8465
@TREND("2007Q1")	9.39E-05	0.000366	0.256656	0.7992

R-squared	0.444949	Mean dependent var	-0.000192
Adjusted R-squared	0.352440	S.D. dependent var	0.028100

S.E. of regression	0.022612	Akaike info criterion	-4.589642
Sum squared resid	0.015339	Schwarz criterion	-4.325722
Log likelihood	88.61355	Hannan-Quinn criter.	-4.497526
F-statistic	4.809816	Durbin-Watson stat	1.904472
Prob(F-statistic)	0.002397		

Null Hypothesis: LGFCF has a unit root
Exogenous: Constant
Lag Length: 1 (Fixed)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.560054	0.4933
Test critical values:	1% level	-3.605593	
	5% level	-2.936942	
	10% level	-2.606857	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LGFCF)
Method: Least Squares

Sample (adjusted): 2007Q3 2017Q2
Included observations: 40 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LGFCF(-1)	-0.047188	0.030247	-1.560054	0.1273
D(LGFCF(-1))	0.263911	0.153202	1.722632	0.0933
C	0.578370	0.362744	1.594429	0.1193

R-squared	0.134783	Mean dependent var	0.017492
Adjusted R-squared	0.088015	S.D. dependent var	0.041908
S.E. of regression	0.040022	Akaike info criterion	-3.526758
Sum squared resid	0.059264	Schwarz criterion	-3.400092
Log likelihood	73.53516	Hannan-Quinn criter.	-3.480960
F-statistic	2.881920	Durbin-Watson stat	1.855886
Prob(F-statistic)	0.068677		

Null Hypothesis: LGFCF has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 1 (Fixed)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.937899	0.1621
Test critical values:	1% level	-4.205004	
	5% level	-3.526609	
	10% level	-3.194611	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LGFCF)
Method: Least Squares

Sample (adjusted): 2007Q3 2017Q2
Included observations: 40 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LGFCF(-1)	-0.275995	0.093943	-2.937899	0.0057
D(LGFCF(-1))	0.395693	0.151945	2.604191	0.0133
C	3.223446	1.089732	2.958016	0.0054
@TREND("2007Q1")	0.004409	0.001727	2.553495	0.0150

R-squared	0.267461	Mean dependent var	0.017492
Adjusted R-squared	0.206416	S.D. dependent var	0.041908
S.E. of regression	0.037333	Akaike info criterion	-3.643222
Sum squared resid	0.050176	Schwarz criterion	-3.474334
Log likelihood	76.86443	Hannan-Quinn criter.	-3.582157
F-statistic	4.381377	Durbin-Watson stat	1.926249
Prob(F-statistic)	0.009956		

Null Hypothesis: D(LGFCF) has a unit root
Exogenous: Constant
Lag Length: 1 (Fixed)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.655331	0.0006
Test critical values:	1% level	-3.610453	
	5% level	-2.938987	
	10% level	-2.607932	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LGFCF,2)
Method: Least Squares

Sample (adjusted): 2007Q4 2017Q2
Included observations: 39 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LGFCF(-1))	-0.902377	0.193837	-4.655331	0.0000
D(LGFCF(-1),2)	0.248737	0.162890	1.527027	0.1355
C	0.015342	0.007356	2.085576	0.0442

R-squared	0.403259	Mean dependent var	-0.000769
Adjusted R-squared	0.370107	S.D. dependent var	0.050828
S.E. of regression	0.040340	Akaike info criterion	-3.509154
Sum squared resid	0.058583	Schwarz criterion	-3.381188
Log likelihood	71.42851	Hannan-Quinn criter.	-3.463241
F-statistic	12.16384	Durbin-Watson stat	1.993967
Prob(F-statistic)	0.000092		

Null Hypothesis: D(LGFCF) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 1 (Fixed)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.680027	0.0030
Test critical values:	1% level	-4.211868	
	5% level	-3.529758	
	10% level	-3.196411	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LGFCF,2)
Method: Least Squares

Sample (adjusted): 2007Q4 2017Q2
Included observations: 39 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LGFCF(-1))	-0.929164	0.198538	-4.680027	0.0000
D(LGFCF(-1),2)	0.259011	0.164564	1.573926	0.1245
C	0.025260	0.015486	1.631126	0.1118
@TREND("2007Q1")	-0.000429	0.000588	-0.729224	0.4707

R-squared	0.412190	Mean dependent var	-0.000769
Adjusted R-squared	0.361806	S.D. dependent var	0.050828
S.E. of regression	0.040605	Akaike info criterion	-3.472951
Sum squared resid	0.057706	Schwarz criterion	-3.302330
Log likelihood	71.72255	Hannan-Quinn criter.	-3.411734
F-statistic	8.181009	Durbin-Watson stat	1.989962
Prob(F-statistic)	0.000294		

Null Hypothesis: INTR has a unit root
Exogenous: Constant
Lag Length: 9 (Fixed)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.371077	0.5834
Test critical values:	1% level	-3.661661	
	5% level	-2.960411	
	10% level	-2.619160	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(INTR)
Method: Least Squares

Sample (adjusted): 2009Q3 2017Q1
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INTR(-1)	-0.096153	0.070130	-1.371077	0.1855
D(INTR(-1))	0.283755	0.122712	2.312363	0.0315
D(INTR(-2))	0.061539	0.134769	0.456625	0.6529
D(INTR(-3))	-0.030518	0.131715	-0.231696	0.8191
D(INTR(-4))	0.097599	0.132025	0.739245	0.4683
D(INTR(-5))	-0.070950	0.135861	-0.522228	0.6072
D(INTR(-6))	0.206207	0.135457	1.522303	0.1436
D(INTR(-7))	0.053360	0.132942	0.401378	0.6924
D(INTR(-8))	-0.083303	0.130248	-0.639572	0.5297
D(INTR(-9))	0.083980	0.103409	0.812114	0.4263
C	0.950244	0.665360	1.428166	0.1687

R-squared	0.594090	Mean dependent var	-0.037635
Adjusted R-squared	0.391135	S.D. dependent var	0.302639
S.E. of regression	0.236149	Akaike info criterion	0.222712
Sum squared resid	1.115324	Schwarz criterion	0.731546
Log likelihood	7.547962	Hannan-Quinn criter.	0.388579
F-statistic	2.927204	Durbin-Watson stat	2.424802
Prob(F-statistic)	0.019616		

Null Hypothesis: INTR has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 9 (Fixed)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.730505	0.2321
Test critical values:	1% level	-4.284580	
	5% level	-3.562882	
	10% level	-3.215267	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(INTR)
Method: Least Squares

Sample (adjusted): 2009Q3 2017Q1
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INTR(-1)	-0.199435	0.073040	-2.730505	0.0133
D(INTR(-1))	-0.093763	0.179442	-0.522522	0.6073
D(INTR(-2))	-0.182449	0.150364	-1.213389	0.2399
D(INTR(-3))	-0.215458	0.135365	-1.591681	0.1280
D(INTR(-4))	-0.107617	0.139747	-0.770085	0.4507
D(INTR(-5))	-0.169382	0.125057	-1.354440	0.1915
D(INTR(-6))	0.026110	0.137258	0.190228	0.8511
D(INTR(-7))	0.024788	0.117272	0.211373	0.8348
D(INTR(-8))	-0.074178	0.114454	-0.648104	0.5247
D(INTR(-9))	-0.030453	0.100701	-0.302409	0.7656
C	0.586474	0.600538	0.976581	0.3410
@TREND("2007Q1")	0.045632	0.017341	2.631417	0.0164

R-squared	0.702508	Mean dependent var	-0.037635
Adjusted R-squared	0.530276	S.D. dependent var	0.302639
S.E. of regression	0.207418	Akaike info criterion	-0.023516
Sum squared resid	0.817423	Schwarz criterion	0.531576
Log likelihood	12.36449	Hannan-Quinn criter.	0.157430
F-statistic	4.078845	Durbin-Watson stat	2.049420
Prob(F-statistic)	0.003605		

Null Hypothesis: D(INTR) has a unit root
Exogenous: Constant
Lag Length: 9 (Fixed)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-2.973615	0.0490

Test critical values:	1% level	-3.670170	
	5% level	-2.963972	
	10% level	-2.621007	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(INTR,2)
Method: Least Squares

Sample (adjusted): 2009Q4 2017Q1
Included observations: 30 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(INTR(-1))	-0.566633	0.190553	-2.973615	0.0078
D(INTR(-1),2)	-0.430388	0.215307	-1.998951	0.0601
D(INTR(-2),2)	-0.300618	0.183178	-1.641123	0.1172
D(INTR(-3),2)	-0.275915	0.160332	-1.720898	0.1015
D(INTR(-4),2)	-0.194425	0.153394	-1.267488	0.2203
D(INTR(-5),2)	-0.200499	0.133917	-1.497189	0.1508
D(INTR(-6),2)	-0.049273	0.131666	-0.374231	0.7124
D(INTR(-7),2)	0.086595	0.107822	0.803133	0.4318
D(INTR(-8),2)	-0.013010	0.100052	-0.130028	0.8979
D(INTR(-9),2)	0.042482	0.098411	0.431675	0.6708
C	0.062232	0.050130	1.241425	0.2296

R-squared	0.658921	Mean dependent var	0.033333
Adjusted R-squared	0.479406	S.D. dependent var	0.319831
S.E. of regression	0.230765	Akaike info criterion	0.181740
Sum squared resid	1.011796	Schwarz criterion	0.695513
Log likelihood	8.273895	Hannan-Quinn criter.	0.346101
F-statistic	3.670559	Durbin-Watson stat	1.894558
Prob(F-statistic)	0.007160		

Null Hypothesis: D(INTR) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 6 (Fixed)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.798381	0.0002
Test critical values:	1% level	-4.262735	
	5% level	-3.552973	
	10% level	-3.209642	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(INTR,2)
Method: Least Squares

Sample (adjusted): 2009Q1 2017Q1
Included observations: 33 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(INTR(-1))	-1.754213	0.302535	-5.798381	0.0000
D(INTR(-1),2)	0.964771	0.220127	4.382796	0.0002
D(INTR(-2),2)	0.691688	0.203486	3.399183	0.0024

D(INTR(-3),2)	0.483100	0.190621	2.534354	0.0182
D(INTR(-4),2)	0.257683	0.151234	1.703868	0.1013
D(INTR(-5),2)	0.227546	0.139292	1.633598	0.1154
D(INTR(-6),2)	0.178167	0.139828	1.274188	0.2148
C	-1.394224	0.268900	-5.184915	0.0000
@TREND("2007Q1")	0.048498	0.009645	5.028270	0.0000

R-squared	0.649415	Mean dependent var	0.005052
Adjusted R-squared	0.532553	S.D. dependent var	0.472281
S.E. of regression	0.322899	Akaike info criterion	0.804049
Sum squared resid	2.502336	Schwarz criterion	1.212187
Log likelihood	-4.266802	Hannan-Quinn criter.	0.941375
F-statistic	5.557118	Durbin-Watson stat	2.192099
Prob(F-statistic)	0.000487		

Null Hypothesis: DUMMY has a unit root
Exogenous: Constant
Lag Length: 0 (Fixed)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.000000	0.7442
Test critical values:	1% level	-3.605593	
	5% level	-2.936942	
	10% level	-2.606857	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(DUMMY)
Method: Least Squares

Sample (adjusted): 2007Q2 2017Q1
Included observations: 40 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DUMMY(-1)	-0.050000	0.050000	-1.000000	0.3236
C	0.050000	0.035355	1.414214	0.1654

R-squared	0.025641	Mean dependent var	0.025000
Adjusted R-squared	0.000000	S.D. dependent var	0.158114
S.E. of regression	0.158114	Akaike info criterion	-0.802296
Sum squared resid	0.950000	Schwarz criterion	-0.717852
Log likelihood	18.04591	Hannan-Quinn criter.	-0.771763
F-statistic	1.000000	Durbin-Watson stat	2.002632
Prob(F-statistic)	0.323636		

Null Hypothesis: DUMMY has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Fixed)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.973010	0.5978
Test critical values:	1% level	-4.205004	
	5% level	-3.526609	
	10% level	-3.194611	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(DUMMY)
Method: Least Squares

Sample (adjusted): 2007Q2 2017Q1
Included observations: 40 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DUMMY(-1)	-0.192857	0.097748	-1.973010	0.0560
C	-0.025000	0.056289	-0.444138	0.6595
@TREND("2007Q1")	0.007143	0.004234	1.687055	0.1000

R-squared	0.095238	Mean dependent var	0.025000
Adjusted R-squared	0.046332	S.D. dependent var	0.158114
S.E. of regression	0.154408	Akaike info criterion	-0.826404
Sum squared resid	0.882143	Schwarz criterion	-0.699738
Log likelihood	19.52807	Hannan-Quinn criter.	-0.780605
F-statistic	1.947368	Durbin-Watson stat	1.871255
Prob(F-statistic)	0.156995		

Null Hypothesis: D(DUMMY) has a unit root
Exogenous: Constant
Lag Length: 0 (Fixed)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.244998	0.0000
Test critical values:	1% level	-3.610453	
	5% level	-2.938987	
	10% level	-2.607932	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(DUMMY,2)
Method: Least Squares

Sample (adjusted): 2007Q3 2017Q1
Included observations: 39 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(DUMMY(-1))	-1.026316	0.164342	-6.244998	0.0000
C	0.026316	0.026316	1.000000	0.3238

R-squared	0.513158	Mean dependent var	0.000000
Adjusted R-squared	0.500000	S.D. dependent var	0.229416
S.E. of regression	0.162221	Akaike info criterion	-0.749789
Sum squared resid	0.973684	Schwarz criterion	-0.664478
Log likelihood	16.62088	Hannan-Quinn criter.	-0.719180
F-statistic	39.00000	Durbin-Watson stat	2.001422
Prob(F-statistic)	0.000000		

Null Hypothesis: D(DUMMY) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Fixed)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.160669	0.0000
Test critical values:	1% level	-4.211868	
	5% level	-3.529758	
	10% level	-3.196411	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(DUMMY,2)
Method: Least Squares

Sample (adjusted): 2007Q3 2017Q1
Included observations: 39 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(DUMMY(-1))	-1.026316	0.166592	-6.160669	0.0000
C	0.030567	0.055907	0.546742	0.5879
@TREND("2007Q1")	-0.000202	0.002340	-0.086521	0.9315

R-squared	0.513259	Mean dependent var	0.000000
Adjusted R-squared	0.486218	S.D. dependent var	0.229416
S.E. of regression	0.164442	Akaike info criterion	-0.698715
Sum squared resid	0.973482	Schwarz criterion	-0.570748
Log likelihood	16.62493	Hannan-Quinn criter.	-0.652801
F-statistic	18.98066	Durbin-Watson stat	2.001840
Prob(F-statistic)	0.000002		

DF-GLS test results

Null Hypothesis: FDI has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic
Elliott-Rothenberg-Stock DF-GLS test statistic		-6.999282
Test critical values:	1% level	-2.624057
	5% level	-1.949319
	10% level	-1.611711

*MacKinnon (1996)

DF-GLS Test Equation on GLS Detrended Residuals
Dependent Variable: D(GLSRESID)
Method: Least Squares

Sample (adjusted): 2007Q2 2017Q1
Included observations: 40 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GLSRESID(-1)	-1.113721	0.159119	-6.999282	0.0000

R-squared	0.556765	Mean dependent var	0.012465
Adjusted R-squared	0.556765	S.D. dependent var	5.415737
S.E. of regression	3.605575	Akaike info criterion	5.427522

Sum squared resid	507.0066	Schwarz criterion	5.469744
Log likelihood	-107.5504	Hannan-Quinn criter.	5.442788
Durbin-Watson stat	2.011180		

Null Hypothesis: FDI has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic
Elliott-Rothenberg-Stock DF-GLS test statistic		-7.175184
Test critical values:	1% level	-3.770000
	5% level	-3.190000
	10% level	-2.890000

*Elliott-Rothenberg-Stock (1996, Table 1)
Warning: Test critical values calculated for 50 observations
and may not be accurate for a sample size of 40

DF-GLS Test Equation on GLS Detrended Residuals
Dependent Variable: D(GLSRESID)
Method: Least Squares

Sample (adjusted): 2007Q2 2017Q1
Included observations: 40 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GLSRESID(-1)	-1.138704	0.158700	-7.175184	0.0000

R-squared	0.568958	Mean dependent var	0.039465
Adjusted R-squared	0.568958	S.D. dependent var	5.415737
S.E. of regression	3.555638	Akaike info criterion	5.399628
Sum squared resid	493.0600	Schwarz criterion	5.441850
Log likelihood	-106.9926	Hannan-Quinn criter.	5.414895
Durbin-Watson stat	2.021703		

Null Hypothesis: D(FDI) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic
Elliott-Rothenberg-Stock DF-GLS test statistic		-10.79083
Test critical values:	1% level	-2.625606
	5% level	-1.949609
	10% level	-1.611593

*MacKinnon (1996)

DF-GLS Test Equation on GLS Detrended Residuals
Dependent Variable: D(GLSRESID)
Method: Least Squares

Sample (adjusted): 2007Q3 2017Q1
Included observations: 39 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.

GLSRESID(-1)	-1.507579	0.139709	-10.79083	0.0000

R-squared	0.753951	Mean dependent var	-0.028351
Adjusted R-squared	0.753951	S.D. dependent var	9.581038
S.E. of regression	4.752517	Akaike info criterion	5.980532
Sum squared resid	858.2840	Schwarz criterion	6.023188
Log likelihood	-115.6204	Hannan-Quinn criter.	5.995837
Durbin-Watson stat	2.259619		

Null Hypothesis: D(FDI) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 3 (Automatic - based on SIC, maxlag=9)

		t-Statistic
Elliott-Rothenberg-Stock DF-GLS test statistic		-6.586869
Test critical values:	1% level	-3.770000
	5% level	-3.190000
	10% level	-2.890000

*Elliott-Rothenberg-Stock (1996, Table 1)
Warning: Test critical values calculated for 50 observations
and may not be accurate for a sample size of 36

DF-GLS Test Equation on GLS Detrended Residuals
Dependent Variable: D(GLSRESID)
Method: Least Squares

Sample (adjusted): 2008Q2 2017Q1
Included observations: 36 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GLSRESID(-1)	-3.591573	0.545262	-6.586869	0.0000
D(GLSRESID(-1))	1.732880	0.450415	3.847298	0.0005
D(GLSRESID(-2))	1.063301	0.311326	3.415389	0.0017
D(GLSRESID(-3))	0.470803	0.155876	3.020373	0.0049

R-squared	0.839783	Mean dependent var	-0.000801
Adjusted R-squared	0.824763	S.D. dependent var	9.979353
S.E. of regression	4.177495	Akaike info criterion	5.801740
Sum squared resid	558.4468	Schwarz criterion	5.977686
Log likelihood	-100.4313	Hannan-Quinn criter.	5.863150
Durbin-Watson stat	1.983386		

Null Hypothesis: IL has a unit root
Exogenous: Constant
Lag Length: 3 (Fixed)

		t-Statistic
Elliott-Rothenberg-Stock DF-GLS test statistic		2.785887
Test critical values:	1% level	-2.628961
	5% level	-1.950117
	10% level	-1.611339

*MacKinnon (1996)

DF-GLS Test Equation on GLS Detrended Residuals

Dependent Variable: D(GLSRESID)
Method: Least Squares

Sample (adjusted): 2008Q1 2017Q1
Included observations: 37 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GLSRESID(-1)	0.124942	0.044848	2.785887	0.0088
D(GLSRESID(-1))	-0.871165	0.131839	-6.607806	0.0000
D(GLSRESID(-2))	-0.758166	0.143066	-5.299408	0.0000
D(GLSRESID(-3))	-0.791710	0.119798	-6.608716	0.0000

R-squared	0.669757	Mean dependent var	0.015702
Adjusted R-squared	0.639735	S.D. dependent var	0.113872
S.E. of regression	0.068349	Akaike info criterion	-2.426585
Sum squared resid	0.154161	Schwarz criterion	-2.252431
Log likelihood	48.89181	Hannan-Quinn criter.	-2.365187
Durbin-Watson stat	0.756831		

Null Hypothesis: IL has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Fixed)

		t-Statistic
Elliott-Rothenberg-Stock DF-GLS test statistic		-7.575781
Test critical values:	1% level	-3.770000
	5% level	-3.190000
	10% level	-2.890000

*Elliott-Rothenberg-Stock (1996, Table 1)
Warning: Test critical values calculated for 50 observations
and may not be accurate for a sample size of 40

DF-GLS Test Equation on GLS Detrended Residuals
Dependent Variable: D(GLSRESID)
Method: Least Squares

Sample (adjusted): 2007Q2 2017Q1
Included observations: 40 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GLSRESID(-1)	-1.220518	0.161108	-7.575781	0.0000

R-squared	0.595317	Mean dependent var	-0.001603
Adjusted R-squared	0.595317	S.D. dependent var	0.110779
S.E. of regression	0.070472	Akaike info criterion	-2.442524
Sum squared resid	0.193685	Schwarz criterion	-2.400302
Log likelihood	49.85049	Hannan-Quinn criter.	-2.427258
Durbin-Watson stat	2.015934		

Null Hypothesis: D(IL) has a unit root
Exogenous: Constant
Lag Length: 0 (Fixed)

	t-Statistic

Elliott-Rothenberg-Stock DF-GLS test statistic		-9.199986
Test critical values:	1% level	-2.625606
	5% level	-1.949609
	10% level	-1.611593

*MacKinnon (1996)

DF-GLS Test Equation on GLS Detrended Residuals
Dependent Variable: D(GLSRESID)
Method: Least Squares

Sample (adjusted): 2007Q3 2017Q1
Included observations: 39 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GLSRESID(-1)	-1.415355	0.153843	-9.199986	0.0000

R-squared	0.689704	Mean dependent var	-0.007091
Adjusted R-squared	0.689704	S.D. dependent var	0.189542
S.E. of regression	0.105583	Akaike info criterion	-1.633335
Sum squared resid	0.423614	Schwarz criterion	-1.590680
Log likelihood	32.85003	Hannan-Quinn criter.	-1.618031
Durbin-Watson stat	1.986516		

Null Hypothesis: D(IL) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Fixed)

		t-Statistic
Elliott-Rothenberg-Stock DF-GLS test statistic		-9.286632
Test critical values:	1% level	-3.770000
	5% level	-3.190000
	10% level	-2.890000

*Elliott-Rothenberg-Stock (1996, Table 1)
Warning: Test critical values calculated for 50 observations
and may not be accurate for a sample size of 39

DF-GLS Test Equation on GLS Detrended Residuals
Dependent Variable: D(GLSRESID)
Method: Least Squares

Sample (adjusted): 2007Q3 2017Q1
Included observations: 39 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GLSRESID(-1)	-1.399839	0.150737	-9.286632	0.0000

R-squared	0.693988	Mean dependent var	-0.004230
Adjusted R-squared	0.693988	S.D. dependent var	0.189542
S.E. of regression	0.104852	Akaike info criterion	-1.647235
Sum squared resid	0.417766	Schwarz criterion	-1.604580
Log likelihood	33.12109	Hannan-Quinn criter.	-1.631931
Durbin-Watson stat	2.038043		

Null Hypothesis: PL has a unit root

Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic
Elliott-Rothenberg-Stock DF-GLS test statistic		-0.858614
Test critical values:	1% level	-2.624057
	5% level	-1.949319
	10% level	-1.611711

*MacKinnon (1996)

DF-GLS Test Equation on GLS Detrended Residuals
Dependent Variable: D(GLSRESID)
Method: Least Squares

Sample (adjusted): 2007Q2 2017Q1
Included observations: 40 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GLSRESID(-1)	-0.047571	0.055405	-0.858614	0.3958

R-squared	0.002558	Mean dependent var	0.002795
Adjusted R-squared	0.002558	S.D. dependent var	0.022176
S.E. of regression	0.022147	Akaike info criterion	-4.757534
Sum squared resid	0.019129	Schwarz criterion	-4.715312
Log likelihood	96.15068	Hannan-Quinn criter.	-4.742268
Durbin-Watson stat	1.458652		

Null Hypothesis: PL has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic
Elliott-Rothenberg-Stock DF-GLS test statistic		-2.165694
Test critical values:	1% level	-3.770000
	5% level	-3.190000
	10% level	-2.890000

*Elliott-Rothenberg-Stock (1996, Table 1)
Warning: Test critical values calculated for 50 observations
and may not be accurate for a sample size of 40

DF-GLS Test Equation on GLS Detrended Residuals
Dependent Variable: D(GLSRESID)
Method: Least Squares

Sample (adjusted): 2007Q2 2017Q1
Included observations: 40 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GLSRESID(-1)	-0.214274	0.098940	-2.165694	0.0365

R-squared	0.105529	Mean dependent var	-0.000989
Adjusted R-squared	0.105529	S.D. dependent var	0.022176
S.E. of regression	0.020973	Akaike info criterion	-4.866496
Sum squared resid	0.017155	Schwarz criterion	-4.824274
Log likelihood	98.32991	Hannan-Quinn criter.	-4.851229
Durbin-Watson stat	1.391679		

Null Hypothesis: D(PL) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic
Elliott-Rothenberg-Stock DF-GLS test statistic		-4.703556
Test critical values:	1% level	-2.625606
	5% level	-1.949609
	10% level	-1.611593

*MacKinnon (1996)

DF-GLS Test Equation on GLS Detrended Residuals
Dependent Variable: D(GLSRESID)
Method: Least Squares

Sample (adjusted): 2007Q3 2017Q1
Included observations: 39 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GLSRESID(-1)	-0.737205	0.156733	-4.703556	0.0000

R-squared	0.367959	Mean dependent var	-9.77E-05
Adjusted R-squared	0.367959	S.D. dependent var	0.027743
S.E. of regression	0.022056	Akaike info criterion	-4.765173
Sum squared resid	0.018485	Schwarz criterion	-4.722518
Log likelihood	93.92087	Hannan-Quinn criter.	-4.749869
Durbin-Watson stat	1.944257		

Null Hypothesis: D(PL) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic
Elliott-Rothenberg-Stock DF-GLS test statistic		-4.820031
Test critical values:	1% level	-3.770000
	5% level	-3.190000
	10% level	-2.890000

*Elliott-Rothenberg-Stock (1996, Table 1)
Warning: Test critical values calculated for 50 observations
and may not be accurate for a sample size of 39

DF-GLS Test Equation on GLS Detrended Residuals
Dependent Variable: D(GLSRESID)
Method: Least Squares

Sample (adjusted): 2007Q3 2017Q1
Included observations: 39 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GLSRESID(-1)	-0.761762	0.158041	-4.820031	0.0000

R-squared	0.379397	Mean dependent var	-0.000155
Adjusted R-squared	0.379397	S.D. dependent var	0.027743
S.E. of regression	0.021855	Akaike info criterion	-4.783435

Sum squared resid	0.018151	Schwarz criterion	-4.740780
Log likelihood	94.27698	Hannan-Quinn criter.	-4.768131
Durbin-Watson stat	1.936114		

Null Hypothesis: INFINV has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on SIC, maxlag=9)

		t-Statistic
Elliott-Rothenberg-Stock DF-GLS test statistic		-0.061236
Test critical values:	1% level	-2.625606
	5% level	-1.949609
	10% level	-1.611593

*MacKinnon (1996)

DF-GLS Test Equation on GLS Detrended Residuals
Dependent Variable: D(GLSRESID)
Method: Least Squares

Sample (adjusted): 2007Q3 2017Q1
Included observations: 39 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GLSRESID(-1)	-0.001355	0.022131	-0.061236	0.9515
D(GLSRESID(-1))	0.639498	0.132570	4.823866	0.0000

R-squared	0.253308	Mean dependent var	0.022218
Adjusted R-squared	0.233127	S.D. dependent var	0.043035
S.E. of regression	0.037686	Akaike info criterion	-3.669116
Sum squared resid	0.052550	Schwarz criterion	-3.583805
Log likelihood	73.54775	Hannan-Quinn criter.	-3.638507
Durbin-Watson stat	1.628635		

Null Hypothesis: INFINV has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 1 (Automatic - based on SIC, maxlag=9)

		t-Statistic
Elliott-Rothenberg-Stock DF-GLS test statistic		-2.597313
Test critical values:	1% level	-3.770000
	5% level	-3.190000
	10% level	-2.890000

*Elliott-Rothenberg-Stock (1996, Table 1)
Warning: Test critical values calculated for 50 observations
and may not be accurate for a sample size of 39

DF-GLS Test Equation on GLS Detrended Residuals
Dependent Variable: D(GLSRESID)
Method: Least Squares

Sample (adjusted): 2007Q3 2017Q1
Included observations: 39 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GLSRESID(-1)	-0.140597	0.054132	-2.597313	0.0134

D(GLSRESID(-1))	0.614591	0.129843	4.733328	0.0000

R-squared	0.402777	Mean dependent var	0.000511
Adjusted R-squared	0.386636	S.D. dependent var	0.043035
S.E. of regression	0.033704	Akaike info criterion	-3.892478
Sum squared resid	0.042031	Schwarz criterion	-3.807167
Log likelihood	77.90332	Hannan-Quinn criter.	-3.861869
Durbin-Watson stat	1.683268		

Null Hypothesis: D(INFINV) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic
Elliott-Rothenberg-Stock DF-GLS test statistic		-3.288102
Test critical values:	1% level	-2.625606
	5% level	-1.949609
	10% level	-1.611593

*MacKinnon (1996)

DF-GLS Test Equation on GLS Detrended Residuals
Dependent Variable: D(GLSRESID)
Method: Least Squares

Sample (adjusted): 2007Q3 2017Q1
Included observations: 39 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GLSRESID(-1)	-0.444081	0.135057	-3.288102	0.0022

R-squared	0.221162	Mean dependent var	-0.000844
Adjusted R-squared	0.221162	S.D. dependent var	0.041229
S.E. of regression	0.036386	Akaike info criterion	-3.763973
Sum squared resid	0.050309	Schwarz criterion	-3.721318
Log likelihood	74.39748	Hannan-Quinn criter.	-3.748669
Durbin-Watson stat	1.590694		

Null Hypothesis: D(INFINV) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic
Elliott-Rothenberg-Stock DF-GLS test statistic		-3.338763
Test critical values:	1% level	-3.770000
	5% level	-3.190000
	10% level	-2.890000

*Elliott-Rothenberg-Stock (1996, Table 1)
Warning: Test critical values calculated for 50 observations
and may not be accurate for a sample size of 39

DF-GLS Test Equation on GLS Detrended Residuals
Dependent Variable: D(GLSRESID)
Method: Least Squares

Sample (adjusted): 2007Q3 2017Q1
Included observations: 39 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GLSRESID(-1)	-0.452547	0.135543	-3.338763	0.0019

R-squared	0.226613	Mean dependent var	-0.000657
Adjusted R-squared	0.226613	S.D. dependent var	0.041229
S.E. of regression	0.036258	Akaike info criterion	-3.770997
Sum squared resid	0.049957	Schwarz criterion	-3.728341
Log likelihood	74.53443	Hannan-Quinn criter.	-3.755692
Durbin-Watson stat	1.591239		

Null Hypothesis: INTR has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on SIC, maxlag=9)

		t-Statistic
Elliott-Rothenberg-Stock DF-GLS test statistic		-1.751646
Test critical values:	1% level	-2.625606
	5% level	-1.949609
	10% level	-1.611593

*MacKinnon (1996)

DF-GLS Test Equation on GLS Detrended Residuals
Dependent Variable: D(GLSRESID)
Method: Least Squares

Sample (adjusted): 2007Q3 2017Q1
Included observations: 39 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GLSRESID(-1)	-0.050578	0.028875	-1.751646	0.0881
D(GLSRESID(-1))	0.679478	0.119714	5.675820	0.0000

R-squared	0.469680	Mean dependent var	-0.055556
Adjusted R-squared	0.455347	S.D. dependent var	0.555513
S.E. of regression	0.409972	Akaike info criterion	1.104464
Sum squared resid	6.218848	Schwarz criterion	1.189775
Log likelihood	-19.53705	Hannan-Quinn criter.	1.135073
Durbin-Watson stat	1.716469		

Null Hypothesis: INTR has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 1 (Automatic - based on SIC, maxlag=9)

		t-Statistic
Elliott-Rothenberg-Stock DF-GLS test statistic		-2.258734
Test critical values:	1% level	-3.770000
	5% level	-3.190000
	10% level	-2.890000

*Elliott-Rothenberg-Stock (1996, Table 1)
Warning: Test critical values calculated for 50 observations
and may not be accurate for a sample size of 39

DF-GLS Test Equation on GLS Detrended Residuals
Dependent Variable: D(GLSRESID)
Method: Least Squares

Sample (adjusted): 2007Q3 2017Q1
Included observations: 39 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GLSRESID(-1)	-0.089665	0.039697	-2.258734	0.0299
D(GLSRESID(-1))	0.710839	0.118710	5.988007	0.0000

R-squared	0.496300	Mean dependent var	0.042224
Adjusted R-squared	0.482687	S.D. dependent var	0.555513
S.E. of regression	0.399550	Akaike info criterion	1.052963
Sum squared resid	5.906680	Schwarz criterion	1.138274
Log likelihood	-18.53279	Hannan-Quinn criter.	1.083572
Durbin-Watson stat	1.778716		

Null Hypothesis: D(INTR) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic
Elliott-Rothenberg-Stock DF-GLS test statistic		-2.783590
Test critical values:	1% level	-2.625606
	5% level	-1.949609
	10% level	-1.611593

*MacKinnon (1996)

DF-GLS Test Equation on GLS Detrended Residuals
Dependent Variable: D(GLSRESID)
Method: Least Squares

Sample (adjusted): 2007Q3 2017Q1
Included observations: 39 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GLSRESID(-1)	-0.338066	0.121450	-2.783590	0.0083

R-squared	0.169297	Mean dependent var	-0.004274
Adjusted R-squared	0.169297	S.D. dependent var	0.462768
S.E. of regression	0.421780	Akaike info criterion	1.136642
Sum squared resid	6.760145	Schwarz criterion	1.179297
Log likelihood	-21.16452	Hannan-Quinn criter.	1.151946
Durbin-Watson stat	1.650945		

Null Hypothesis: D(INTR) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic
Elliott-Rothenberg-Stock DF-GLS test statistic		-2.856712
Test critical values:	1% level	-3.770000
	5% level	-3.190000
	10% level	-2.890000

*Elliott-Rothenberg-Stock (1996, Table 1)

Warning: Test critical values calculated for 50 observations
and may not be accurate for a sample size of 39

DF-GLS Test Equation on GLS Detrended Residuals
Dependent Variable: D(GLSRESID)
Method: Least Squares

Sample (adjusted): 2007Q3 2017Q1
Included observations: 39 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GLSRESID(-1)	-0.351344	0.122989	-2.856712	0.0069

R-squared	0.176621	Mean dependent var	-0.006557
Adjusted R-squared	0.176621	S.D. dependent var	0.462768
S.E. of regression	0.419917	Akaike info criterion	1.127786
Sum squared resid	6.700540	Schwarz criterion	1.170441
Log likelihood	-20.99182	Hannan-Quinn criter.	1.143090
Durbin-Watson stat	1.645511		

Null Hypothesis: DUMMY has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic
Elliott-Rothenberg-Stock DF-GLS test statistic		-0.661165
Test critical values:	1% level	-2.624057
	5% level	-1.949319
	10% level	-1.611711

*MacKinnon (1996)

DF-GLS Test Equation on GLS Detrended Residuals
Dependent Variable: D(GLSRESID)
Method: Least Squares

Sample (adjusted): 2007Q2 2017Q1
Included observations: 40 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GLSRESID(-1)	-0.031854	0.048178	-0.661165	0.5124

R-squared	-0.014272	Mean dependent var	0.025000
Adjusted R-squared	-0.014272	S.D. dependent var	0.158114
S.E. of regression	0.159238	Akaike info criterion	-0.812149
Sum squared resid	0.988916	Schwarz criterion	-0.769927
Log likelihood	17.24297	Hannan-Quinn criter.	-0.796883
Durbin-Watson stat	1.959022		

Null Hypothesis: DUMMY has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

	t-Statistic
Elliott-Rothenberg-Stock DF-GLS test statistic	-1.964948

Test critical values:	1% level	-3.770000
	5% level	-3.190000
	10% level	-2.890000

*Elliott-Rothenberg-Stock (1996, Table 1)
Warning: Test critical values calculated for 50 observations
and may not be accurate for a sample size of 40

DF-GLS Test Equation on GLS Detrended Residuals
Dependent Variable: D(GLSRESID)
Method: Least Squares

Sample (adjusted): 2007Q2 2017Q1
Included observations: 40 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GLSRESID(-1)	-0.182654	0.092956	-1.964948	0.0566

R-squared	0.088054	Mean dependent var	-0.007370
Adjusted R-squared	0.088054	S.D. dependent var	0.158114
S.E. of regression	0.150992	Akaike info criterion	-0.918495
Sum squared resid	0.889147	Schwarz criterion	-0.876273
Log likelihood	19.36990	Hannan-Quinn criter.	-0.903229
Durbin-Watson stat	1.875121		

Null Hypothesis: D(DUMMY) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic
Elliott-Rothenberg-Stock DF-GLS test statistic		-6.293601
Test critical values:	1% level	-2.625606
	5% level	-1.949609
	10% level	-1.611593

*MacKinnon (1996)

DF-GLS Test Equation on GLS Detrended Residuals
Dependent Variable: D(GLSRESID)
Method: Least Squares

Sample (adjusted): 2007Q3 2017Q1
Included observations: 39 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GLSRESID(-1)	-1.020737	0.162187	-6.293601	0.0000

R-squared	0.510369	Mean dependent var	0.000000
Adjusted R-squared	0.510369	S.D. dependent var	0.229416
S.E. of regression	0.160531	Akaike info criterion	-0.795358
Sum squared resid	0.979263	Schwarz criterion	-0.752703
Log likelihood	16.50948	Hannan-Quinn criter.	-0.780054
Durbin-Watson stat	2.000878		

Null Hypothesis: D(DUMMY) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic
Elliott-Rothenberg-Stock DF-GLS test statistic		-6.321490
Test critical values:	1% level	-3.770000
	5% level	-3.190000
	10% level	-2.890000

*Elliott-Rothenberg-Stock (1996, Table 1)
Warning: Test critical values calculated for 50 observations
and may not be accurate for a sample size of 39

DF-GLS Test Equation on GLS Detrended Residuals
Dependent Variable: D(GLSRESID)
Method: Least Squares
Date: 11/05/17 Time: 09:26
Sample (adjusted): 2007Q3 2017Q1
Included observations: 39 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GLSRESID(-1)	-1.025265	0.162187	-6.321490	0.0000

R-squared	0.512578	Mean dependent var	-0.000128
Adjusted R-squared	0.512578	S.D. dependent var	0.229416
S.E. of regression	0.160168	Akaike info criterion	-0.799881
Sum squared resid	0.974844	Schwarz criterion	-0.757225
Log likelihood	16.59767	Hannan-Quinn criter.	-0.784576
Durbin-Watson stat	2.001088		