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An impact of macroeconomic variables on corporate tax revenue in Nigeria

Wpływ zmiennych makroekonomicznych na dochody z podatku od osób prawnych w Nigerii

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A project of this magnitude would not have seen the light of today but for the immeasurable grace of Almighty God who granted me the opportunity of staying alive to see the completion of the work. However, my inexplicable kudos goes to my promoter dr Dariusz Woźniak Ph.D who has created time out of his schedule to supervise my project work, I am grateful Sir.

Abstract

This study examined the potential macroeconomic variables that determine corporate tax revenue in Nigeria. The integrating properties of the variables of this study were gauged from the augmented Dickey-Fuller unit root test (ADF-URT). The autoregressive distributed lag (ARDL) bounds testing approach confirmed the presence of a long-run relationship among the variables selected, while the Error Correction Model (ECM) was used to capture the short-run dynamics.The results of the ARDL short-run and long-run estimates showed that exchange rate and foreign direct investment are positive and significant determinants of corporate tax revenue, showing p-values lesser than 10% significance level. Furthermore, GDP per capita and unemployment rate are negative and significant determinants, thus these variables both in the short-run and long-run estimates have p-values which fall below the threshold of 10% level of significance. However, public debt, trade openness, corporate tax rate, and inflation could not be identified as significant determinants of corporate tax revenues having shown p-values greater than the 10% threshold level of significance. Therefore, the study concluded that exchange rate, unemployment rate, GDP per capita, and foreign direct investment are the macroeconomic determinants of corporate tax revenue in Nigeria.

Keywords

Corporate tax revenue, GDP per capita, Nigeria

Streszczenie

W badaniu przeanalizowano potencjalne zmienne makroekonomiczne, które określają dochody z podatku od osób prawnych w Nigerii. Właściwości integrujące zmiennych w tym badaniu zmierzono na podstawie rozszerzonego testu pierwiastka jednostkowego Dickeya-Fullera (ADF-URT). Podejście do testowania granic autoregresji z rozproszonym opóźnieniem (ARDL) potwierdziło istnienie długoterminowej zależności między wybranymi zmiennymi, natomiast do uchwycenia dynamiki krótkookresowej użyto modelu korekcji błędów (ECM). a długoterminowe szacunki wykazały, że kurs walutowy i bezpośrednie inwestycje zagraniczne są dodatnimi i istotnymi determinantami wpływów z podatku od osób prawnych, wykazując wartości p poniżej 10% poziomu istotności. Ponadto PKB per capita i stopa bezrobocia są negatywnymi i istotnymi determinantami, stąd zmienne te zarówno w szacunkach krótko-, jak i długoterminowych mają wartości p, które spadają poniżej progu 10% poziomu istotności. Jednak dług publiczny, otwartość handlowa, stawka podatku od osób prawnych i inflacja nie mogły być zidentyfikowane jako istotne determinanty wpływów z podatku od osób prawnych, które wykazały wartości p większe niż 10% progowy poziom istotności. Dlatego w badaniu stwierdzono, że kurs walutowy, stopa bezrobocia, PKB na mieszkańca i bezpośrednie inwestycje zagraniczne są makroekonomicznymi determinantami wpływów z podatku od osób prawnych w Nigerii.

Słowa kluczowe

Dochody z podatku dochodowego od osób prawnych, PKB na mieszkańca, Nigeria

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CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

The determinants of corporate tax revenue have been the subject of debate and investigation in the tax accounting literature especially in the Western world, therefore discussions on the possible macroeconomic determinants of corporate income tax (CIT) revenues have continued to attract the attention of scholars and researchers in the field. For a month of Sundays, CIT has become a major tax instrument in virtually all economies, and consequently an important element in policy advice by the international financial institutions especially, the International Monetary Fund (IMF) to developing African countries including Nigeria.

Corporate tax revenue is an important source of revenue for strengthening physical infrastructure and providing public services and utilities in an economy. Apart from the provision of public goods and welfare services, revenue from corporate taxes are also being used to correct externalities (Suri & Shome, 2013). Therefore, governments all over the world use corporate tax revenue to develop their economies by providing developmental projects such as health, education, infrastructure, and social security. In Nigeria, many times when actual tax revenue collected falls short of the projected tax revenue, government's investment in social infrastructure and social welfare programmes is affected negatively and this tends to halt developmental plans of the country, leading to increased poverty level. Consequently, the role of corporate tax revenue in financing infrastructural investment expenditures and a means to bolster economic growth and development cannot be overemphasised.

Following the increased level of global competition in order to attract cross border investments, corporate tax revenue decrease drastically across many nations (Otusanya, 2011).

Accordingly, Fox and Luna (2002) note that four sources of the deterioration in corporate tax revenue can be identified as cyclical declines in profits, reductions in the federal corporate tax base, federal policy decisions to reduce corporate tax burdens, and more aggressive corporate tax planning. To domesticate the aforementioned, Nigeria like many sub-Saharan African countries often face difficulty in raising domestic revenue in the form of taxes. Aggrey (2011) notes that the reasons for such difficulty include, low per capita incomes of individuals, reliance on subsistence agriculture and oil revenues, the existence of poorly structured tax systems, weak tax base, and customs administrations. Therefore, all these are identified to contribute to the problem of raising tax revenues as evidenced by the country's low total tax-revenue or individual tax types to gross domestic product (GDP) ratio.

Existing studies have shown that the ability to generate adequate corporate tax revenue probably responsive to significant changes in key macroeconomic variables, *inter alia*, trade openness, CIT rate, real GDP per capita, savings, money supply, public debt, exchange rate, unemployment rate, inflation rate, and cross bother investments. However, the effect of these macroeconomic variables on individual tax types varies, whereas some other variables such as population density and tax evasion affects all taxes (Muibi & Sinbo, 2013). The factors identified as the cause of variations in tax revenue, though not limited to the list include the level of development, which is usually represented by the GDP per capita (Clausing, 2007; Gupta, 2007; Muibi & Sinbo, 2013), unemployment rate (Sharma & Singh, 2015), money supply (Chaudhry & Munir, 2010; Karagöz, 2013), CIT tax rate (Karpowicz & Majewska, 2018; Kubatova, 2013; Riedl & Rocha-Akis, 2012), external factors such as the level of foreign direct investment (FDI) and trade (Bayar & Ozturk, 2018; Bird, Martinez-Vazquez, & Torgler, 2008; Gupta, 2007). Other factors comprise the level of public debt (Muibi & Sinbo, 2013; Suri & Shome, 2013; Teera &

Hudson, 2004) and public policies, including exchange rate, control of inflation and financial policies (Tanzi, 1988).

A low tax-GDP ratio has a plausible unfortunate consequence of causing high levels of fiscal deficits and this can stifle economic growth. It also subjects the government budget to foreign policies and political pressures (Chaudhry & Munir, 2010; Gobachew, Debela & Shigiru, 2018; Suri & Shome, 2013). Accordingly, this study is motivated by the huge debts of the Nigerian government which have continued to grow unabated. The public debts of the government exceed the annual GDP and this deteriorates the economic stability of the country. It is, however, important to stress that government revenues, including those from CIT, help to reduce the indebtedness of the country. As an assurance of sustainable budget receipts from CIT, it is essential to understand how the CIT revenues are shaped and have an understanding of the macroeconomic factors influencing CIT the most.

It is therefore necessary against this backdrop to puzzle out the possible macroeconomic determinants of corporate tax revenue in Nigeria, using key macroeconomic variables like real GDP per capita, public debt, exchange rate, trade openness, unemployment, statutory CIT tax rate, inflation rate, and FDI share of GDP which have been identified in extant tax literatures as potential determinants of corporate tax revenue.

1.2 Statement of the Problem

Over the years, the revenue which the government derives from taxes especially corporate taxes has been very low due to the effect of transfer pricing practiced by many multinational companies (MNCs) in the oil and gas, and manufacturing sectors (Otusanya, 2011). MNCs consider transfer pricing as the safest way to hide and/or shift their capital in order to minimise their income taxes, thus making tax revenue insufficient to embark on any meaningful physical development.

Bartelsman and Beetsma (2003) also agree that tax-motivated transfer pricing affects corporate income tax revenues. Furthermore, the total tax revenue and particularly corporate tax revenue as a percentage of GDP is very low in Nigeria compared to its tax capacity. This low tax revenue to GDP ratio tends to create fiscal crises for the Nigerian government, it also prevents the nation from undertaking ambitious expenditure programmes. This problem has engaged the Nigerian government to search for an appropriate policy strategy to stimulate tax revenue especially from corporate and petroleum profit taxes as a way of boosting the revenue profile of the country (Muibi & Sinbo, 2013).

Much attention has been paid to other regions of the world, and this includes a few existing panel data studies by Gupta (2007), Karpowicz (2014), and Mahdavi (2008), which are reviewed in this study. However, there is limited attention to the developing countries in the African region generally and specifically in Nigeria. There is no consensus among tax literature as far as the macroeconomic determinants of corporate tax revenue are concerned, with many studies providing suggestive but inconclusive evidence. More specifically, a literature survey for related country-specific time series evidence revealed that studies of this nature are generally infrequent and scarce, and particularly unexplored in Nigeria.

From the aforementioned, a few exceptions include these African studies (Addison & Levin, 2012; Ade, Rossouw & Gwatidzo, 2018; Ayenew, 2016; Birungi, 2013; Gobachew *et al*., 2018), while these studies are all important precursors to the broad objective of this study, they do not undertake a comprehensive analysis of potential macroeconomic determinants of corporate income tax revenues by ignoring FDI and tax variables in their investigations. Given the important contributions of FDI to the development of the African region, and Nigeria in particular, there is need to understand how variations in FDI inflows can influence the amount of tax revenue raised

by the government. Moreover, it is important to point out as a deduction from the aforementioned studies that the factors affecting tax revenue vary across countries which necessitate the need for country-level analysis of corporate tax revenue.

1.3 Research Questions

This study provided empirical answers to the following two research questions raised:

i. What are the trends and performance of corporate tax revenue to GDP ratio in Nigeria over the last decade?

ii. What are the macroeconomic factors that stimulates corporate tax revenue in Nigeria?

1.4 Objectives of the Study

The main objective of this study is to investigate the macroeconomic determinants of corporate tax revenue in Nigeria. The specific objectives are to:

i. Conduct a trend analysis to understand the performance of corporate tax revenue to GDP ratio in Nigeria over the period reviewed.

ii. Examine the macroeconomic factors that stimulates corporate tax revenue in Nigeria.

1.5 Justification for the Study

The study on the potential macroeconomic determinants of corporate tax revenue in Nigeria is important considering the high instability of tax revenue from the corporate sector; thus leading to the volatility of public expenditure. Fatás and Mihov (2003) put forward that tax revenue instability is of deep concern since it might result in public spending instability, a situation considered to be detrimental to growth and welfare. This instability coupled with the incidence of the global economic crisis has further raised the need to mobilise domestic tax revenue. A review of the empirical tax literature shows what largely revolves around the determinants of corporate

rates (for example, Mutti, 2003; Robinson, 2005), while corporate tax revenue is relatively under-explored. In a few foreign studies where the literature directly investigate revenue, the focus tends to be on either a trend analysis (for instance, Devereux, Griffith, Klemm, Thum & Ottavianit, 2002; Devereux, Griffith & Klemm, 2004). Other studies focused on the relationship between corporate tax rates, foreign direct investment and corporate tax revenue (Gropp & Kostial, 2000). Empirical studies concentrating on sub-Saharan Africa have used panel data analysis to identify major determinants of tax revenue effort in the region (for example, Addison & Levin, 2012; Chaudhry & Munir, 2010).

A study of this nature is economically important as it provides the backdrop on how the government can enhance investment on infrastructure and public services through magnified CIT revenues in order to build the nation further. Academically, this study contributes to the development of tax accounting because it widens the knowledge on CIT revenue, hence it serves as a springboard to further studies and intellectual debates regarding CIT revenue. Why corporate tax revenue? This study choose not to analyse the total tax revenues as a whole but motivated to choose only the corporate tax revenue, taking into consideration the relevant role of corporate sector- the creation of new businesses and their investments, as well as the added value generated by the sector, which contribute to economic growth and development in Nigeria. Furthermore, Baker (2018) stressed that corporate- rather than a personal tax is the greater source of public finance for less developed countries (LDCs) and that the CIT revenues are more important than personal tax revenues in LDCs.

1.6 Scope of the Study

The focus of this study is to empirically investigate the potential macroeconomic determinants of corporate income tax revenue in Nigeria using time-series data collected for the period from 1981

to 2017. This study also observes the trend of corporate income tax revenue to GDP ratio in Nigeria covering the pre- and post Structural Adjustment Programme (SAP). The start period for this study is justified based on the availability of reliable data on corporate tax revenue in Nigeria. The period also showed the performance of corporate tax revenue prior to the adoption of SAP. However, the deregulation exercise which came on the heels of SAP has affected macroeconomic indicators in Nigeria as well as the performance of the corporate sector.

The geographic scope is limited to Nigeria, as there is scarce country-specific time-series evidence related to the topic in Nigeria, sub-Saharan Africa. The selected macroeconomic variables, such as real GDP per capita, public debt, exchange rate, trade openness, unemployment rate, tax rates, inflation rate, and foreign direct investment are also based on their strong significance in prior studies and as deeply rooted in theories as important variables that can influence the level of corporate tax revenue of the government.

CHAPTER TWO

LITERATURE REVIEW

This study seeks to unravel the macroeconomic determinants of corporate income tax (CIT) revenues in Nigeria and to evaluate the performance of Nigeria's corporate tax revenue. An understanding of the nature and importance of corporate tax revenue is necessary; as well as how corporate income tax within the economic context can be measured.

In this chapter, an attempt is made to discuss the concepts of tax and taxation, corporate income tax rate, macroeconomic variables, and corporate tax revenue. Secondly, two important theories: Olivera-Tanzi effect and Khaldun's Theory of Taxation, and their relevance for this study was discussed. Thirdly, this chapter presents the review of empirical studies on the potential macroeconomic determinants of CIT revenues, hence the review of previous studies which relates to the broad objective of this study is divided into three sections: multi-country studies, single-country studies, and Nigeria-specific studies. Finally, the hypotheses for this study are presented in the final section, as the outcome of the literature reviewed.

2.1 Conceptual Review

2.1.1 Tax and Taxation

A tax is a compulsory levy made by public tax authorities on the income, expenditure, wealth or people, for which nothing is received directly in return (James & Nobes, 1997; James, 2012; James & Nobes, 2013) and this covers many social security contributions as they are usually compulsory

and the link between paying contributions and entitlement to benefits is often a loose one at best (James, 2017). Tax is an obligatory charge imposed on a subject or upon his property by the government to provide security, social amenities and create conditions for the economic well-being of the society (Appah & Oyandonghan, 2011). Tax is an enforced but non-penal charge by a public authority on the income and properties of individuals and companies as stipulated by the government Decree, Acts or Case Laws irrespective of the exact amount of service of the payer in return (Omotoso, 2001). Jarkir (2011) asserts that tax is a contribution which is demanded by the state; hence it is a compulsory and unrequited transfer of resources from the private sector to the public sector, levied on the basis of pre-determined criteria.

The Institute of Chartered Accountants of Nigeria (2006) and the Chartered Institute of Taxation of Nigeria (2002) also view tax as an enforced contribution of money, enacted pursuant to legislative authority. The World Bank (1986) and the Organization for Economic Co-operation and Development (OECD, 1996) went beyond the traditional definition of a tax to include involuntary fee levied on corporations or individuals as well as unrequited payments to the general government. It is important to note that taxes are unrequited in the sense that the benefits provided by the government to taxpayers are not normally in proportion to their payments.

Tax can take a variety of forms, *viz*. direct and indirect taxes. Although the distinction is opaque, it has become conventional to classify taxes according to their incidence, that is, who actually pays the tax. Personal income tax, for example, are usually paid *directly* by the individual and is labelled a direct tax whereas value added tax formally levied on businesses, is labelled an indirect tax because it is usually passed on to the consumer in the form of higher prices. However, the focus of this study is on the macroeconomic factors that determine the revenues from corporate taxes which is classified as a direct form of tax.

Empirical studies (for example, Chaudhry & Munir, 2010; Clausing, 2007; Islam & Siddique, 2017; Muibi & Sinbo, 2013) have considered taxation as the means of transferring economic resources and income from the private sector to the public sector in order to raise revenue for infrastructural development. Taxation is the concept and science of imposing a tax on the taxable income of taxpayers within a particular jurisdiction (Asaolu, Olabisi, Akinode & Alebiosu, 2018). In the global arena, taxation has been widely used by countries striving to maximize tax revenue collection in order to raise the revenue needed for economic development without eroding the tax base (Ade *et al.*, 2018). This literature also identified that the government is not without other alternatives to the revenues from taxes; and that such include the printing of new notes, borrowing internally and/or externally, or to charge a regular fee for the public goods it provides. However, their position is that the effects of each of these alternatives can be both good and bad. Taxation also has its limit, nonetheless, the tax charged by the government can be used raise substantial amounts greater than what can be realized either by the printing of notes, charging consumers of public goods directly, or borrowing (Mashkoor, Yahya & Ali, 2010).

2.1.2 Corporate Income Tax

Corporate income tax, which is also known as company income tax is a structure among the various tax structures in the Nigerian economy. By virtue of section 8(1) of the companies income tax Act 1990, corporate income taxes are payable as specified upon profits of any company accruing in, derived from, brought into, or received in Nigeria in respect of amongst others, any trade or business for whatever period of time the trade or business may have been carried out.

The current rate of companies' income tax is 30 percent of assessable income, and this is applied to total profits which are made by corporations that operate in Nigeria. Corporate income tax was created by the Companies Income Tax Act (CITA) 1979 and has its root from the Income

Tax Management Act of 1961. It is one of the taxes administered and collected by the Federal Inland Revenue Service ('FIRS). As with the other tax types, corporate income taxes have been contributing to the revenue profile of the Nigerian government at minimum efficiency cost (Omotoso, 2001).

Corporate income tax is one of the direct taxes. Other direct taxes are personal income tax, companies' income tax, petroleum profit tax, capital gains tax, education tax and so on. Corporate tax is a tax paid by corporations based on the amount of profit generated. Companies' income tax is the tax payable on profits of incorporated entities in Nigeria. It also includes the tax on the profits of non-resident companies carrying on business in Nigeria. It is worth noting that some economists view the corporate income tax itself as an anachronism (Clausing, 2007). An anachronism in the sense that it has long been recognised that corporate income tax ultimately results in the taxation of individuals and thus corporate income tax may lead to the double taxation of corporate profits, as individuals are also taxed at the personal level on dividends and capital gains. With this notion, it can be deduced that Corporate Income Tax Acts as a backdrop for the personal income tax, particularly for high-income individuals. The definition includes local tax rates and any supplementary charges made. The most common reform to corporate income taxes in many countries has been to lower tax rates and to broaden tax bases (Devereux *et al.*, 2002).

2.1.3 Measurement of Corporate Income Tax

The most basic measure of corporate income taxes is the statutory tax rate. This measure is widely used, although even defining this rate is less straightforward than might be expected. Corporate income taxes are often applied at more than one level of government (Devereux *et al.*, 2002). Devereux *et al*. (2002) note that measures of corporate income taxes broadly fall into two groups. The first group is based on an analysis of the tax legislation itself. Measures in this group are based

on information on the statutory tax rate, capital allowances and so on. Corporate income tax liabilities are calculated by applying the statutory tax rate to the tax base, where the tax base can be defined with varying degrees of precision in tax legislation. Clearly, both the rate and base are relevant for exploring the incentives created by the tax regime (Devereux *et al*., 2002). The second group comprises measures based on tax revenues (Fox & Luna, 2002; Devereux, *et al*., 2002). They note that the measures are those that scale observed tax revenues by GDP (corporate taxes as a percent of GDP), corporate taxes by total tax revenue (corporate taxes as a percent of total tax revenue) or some approximation of the tax base (corporate taxes as a percent of before-tax corporate profits).

2.1.4 Corporate Tax Revenue

Corporate tax revenue is the income that is derived by Governments through the taxation of companies that operates within a country. With reference to classical economics, the primary objective of imposing a corporate tax is to generate revenues for the government, while the secondary aim is to, *inter alia*, affect consumption, production, and distribution with a view to achieving social welfare through economic development. Therefore, corporate tax revenue is one of the most important sources of revenue for the Nigerian government. Corporate tax revenue become higher when higher taxes are imposed on corporations, but higher taxes may also scare away potential and existing investors. This study describes corporate tax revenue as a non-resources type of revenue which is collected by the tax authorities on behalf of the central government which is important for sponsoring developmental activities.

A plausible explanation for rising revenues that has been emphasised in the literature is the tendency for countries to engage in base-broadening tax reform efforts over a long period of time (Clausing, 2007).

2.1.5 Nature and Importance of Corporate Income Tax Revenue

Income-taxes are one of the important sources of tax revenues for governments, specifically developing countries. The business angle is a chief contributor, while personal income tax is a complement in the income-tax category, suggesting the contribution of the salaried class as negligible. The sovereign power to charge a tax of any type including the CIT is exercised by the government, in order to ensure the mobilization of adequate tax revenue for the betterment of the people within its jurisdiction whose interest should be served, enhanced and protected. Corporate income tax revenue is collected from all business sectors across the geographic spread of the country. Andrejovská & Puliková (2018) note that corporate tax revenue represent the driving force of an economy, since governments will be able to provide an enabling environment which makes individual countries more attractive for different kinds of foreign investment, *inter alia*, commercial loans, official flows, foreign direct investment (FDI), and foreign portfolio investment (FPI). Among the many ways that governments can generate revenues, corporate tax revenue is recognized as the most important financial source for governmental public expenditures (James & Nobes, 2013). It is useful for creating new jobs and ultimately increase welfare in the country.

2.1.6 Macroeconomic Variables

Macroeconomic variables are good candidates (indicators) for predicting the prosperity of a nation, especially in terms of economic performance, structure, behavior, and decision-making (Birungi, 2013). Macroeconomic variables are independent of the level of income, and they affect total output, national income, level of unemployment, consumption, population density, inflation rate, savings, investment level, international trade, and international finance.

2.1.7 Potential Macroeconomic Determinants of Corporate Tax Revenue and Hypotheses Development

Empirical literature identifies a broad set of possible macroeconomic determinants of tax revenue of various types as well as total tax revenue, and these factors largely account for cross-country variations in corporate tax-GDP ratios. Therefore, the potential macroeconomic determinants which include but not limited to those discussed in this study are statutory CIT rate, real GDP per capita, public debt, exchange rate, trade openness, unemployment rate, inflation rate, FDI inflows, population density, foreign aid and grants.

2.1.7.1 Statutory CIT Rate

The CIT rate is the flat or top marginal corporate income tax rate levied by the Central Government. Corporate tax revenue depend on the statutory tax rates set by legislators (Clausing, 2007). First, Gropp and Kostial (2000) suggest that high tax countries would gain revenue from tax rate harmonization. Bartelsman and Beetsma (2003) look at a related question, how tax-motivated transfer pricing tends to affect corporate income tax revenues as an indication of profit shifting toward low-tax countries. However, the studies of Auerbach and Poterba (1988) and Douglas (1990) conclude that declining profitability, rather than declining tax rates, that explains the bulk of the reduction in corporate income tax revenues. The extent that multinational firms' location decisions are driven by tax differences, the tax rate of the country also affects the amount of real economic activity multinational firms choose to locate in that country, affecting both GDP and the level of corporate activity (Devereux *et al.*, 2002). Second, a low tax rate is likely to increase the share of the corporate sector in GDP as multinational firms will disproportionately increase the size of the corporate sector (Clausing, 2007).

The tax rate may not affect revenues linearly, thus the relationship between revenues and tax rates can be non-linear (Clausing, 2007). For example, revenues certainly increase as the tax

rate is increased from zero to small levels; however, beyond a certain point, tax revenues may decrease. Therefore, the squared value of tax rate can be used to account for likely non-linear relationship between CIT rates and corporate revenues, and this exerts a negative influence on corporate tax revenue (Clausing, 2007; Devereux, *et al*., 2002). For this reason, the CIT tax rate is a plausible determinant of the performance of corporate tax revenue. This study hypothesized that the CIT rate will positively affect the variations in corporate tax revenue to GDP ratio.

2.1.7.2 Real GDP per capita

One good indicator for the overall development of the economy is real GDP per capita and it is simultaneously used as a proxy for the size of the corporate sector to capture an increase in tax buoyancy (the responsiveness of revenue to income growth). Gupta (2007) found that GDP per capita is a significant and strong determinant of tax revenue. A higher per capita income reflects a higher level of development and is held to indicate a higher capacity to pay taxes as well as a greater capacity to levy and collect them (Chelliah, 1971). A positive relationship was documented by Aggrey (2011), Gaalya, Edward and Eria (2017), Gupta (2007), Monteiro, Brandão, and Martins (2011), Tanzi (1992), and Teera & Hudson (2004). Therefore, this study hypothesised that GDP per capita is a significant determinant of the performance of corporate tax revenue, as it is likely to increase corporate tax revenue.

2.1.7.3 Public Debt

The existence of a large and increasing public debt has important implication for the tax performance of any country. With such a huge debt, the government needs to raise the revenues through the foreign exchange which is necessary to service such (Terra & Hudson, 2004). Alternatively, Gupta (2007) suggests that a country may choose to increase import tariffs or other taxes with a view to generating a primary budget surplus to service the debt. Therefore, the degree

of internal and external indebtedness of a country may affect revenue performance as well (Gupta, 2007). For a country that chooses to reduce imports, in such a scenario, import taxes will be lower. The government may be encouraged to obtain more revenue following an increasing public debt, for example, the statutory corporate tax rate can be increased if the revenue from that source is regarded more preferable to any other means (Terra & Hudson, 2004). Therefore, the size of the public debt is a positive determinant of the present and future tax level. In addition, a large public debt may signal certain political traits or weaknesses. Existing literature (for example, Gaalya *et al.* 2017; Chaudhry & Munir, 2010; Gupta, 2007; Monteiro *et al.* 2011) have shown that public debt had a negative effect on tax revenue. This evidence shows that public debt as a percentage of gross national income is an important determinant of tax revenue.

2.1.7.4 Exchange Rate

The exchange rate is the amount of the local or home currency required to purchase one unit of foreign currency (Central Bank of Nigeria, 2016). There are various channels through which changes in the exchange rate affects real tax revenue, however, the empirical clarification regarding these channels are debatable. The distinction between the direct (price) effect and indirect (output) effect of exchange rate changes as an important insight which points out to the channels through which real exchange rate may affect tax revenue. Domestic currency overvaluation has a direct effect by suppressing import and export bases which are measured in units of the domestic currency (Tanzi, 1988). This causes a reduction in collections of international trade taxes, and sales and excise taxes, which are usually levied on both domestic and imported consumption.

The indirect effects of overvaluation are experienced following a reduction in the incentive been provided to produce goods for export, encouraging capital flight and currency substitution,

weakening the balance of payments, encouraging black markets, and encouraging trade restrictions (Tanzi, 1988). He concludes that even in heavily indebted countries, where it is generally assumed that devaluation weakens the fiscal balance through its effect on debt service, higher revenues may offset increases in debt service so that the overall effect of devaluation is largely an empirical question (Tokarick, 1995). The real effective exchange rate, suggests that real exchange rate appreciation depress revenues, which is consistent with Olivera-Tanzi's hypothesis. The hypothesis observes that there is often an inverse relationship between a country's tax revenue and the real level of its official exchange rate. This study hypothesised that the real level of the official exchange rate is a potential determinant of corporate tax revenue in Nigeria.

2.1.7.5 Trade Openness

This is the measure of a country's degree of openness to international trade. The effect of trade liberalization on tax revenues is ambiguous following the varying effects of different trade reform policies, and this a *priori* ambiguity has existed for long in the literature. The tarrification of quantitative restrictions is expected to increase tax revenues; however, increase in tariffs could adversely affect the volume of trade, thus, lowering tax revenues (Agbeyegbe, Stotsky, & WoldeMariam, 2006; Kassim, 2016). For example, the removal or at least a reduction in import tariffs is likely to influence imports and revenue performance depending on the price elasticity of supply for import substitutes, in that if the demand for imports is inelastic it is likely that import volumes and revenue performance will remain unchanged irrespective of the changes in import tariffs and prices (Gaalya *et al*., 2017). On the other hand, if the demand for imports is elastic it is possible that import volumes and revenue performance will increase owing to changes in import tariffs and prices.

Kassim (2016) opines that an increase in the production of import substitutes increases income tax receipts. Islam and Siddique (2017) reveal that financial integration dismantles different kinds of trade barriers and other restrictions, and this leads to a decrease in government revenues but in the short-run. However, in the long term, trade openness can bring excessive profits from a country's shift of hard to collect taxes, such as corporate income and value-added taxes. Therefore, countries with fewer trade barriers and a high ratio of trade across borders have a high tax to GDP ratio as they get specialization and economic efficiency. Trade liberalization policies are usually followed by exchange rate movements, hence, liberalization has an effect on tax revenue through such swings. Existing literature (for instance, Chaudhry & Munir, 2010; Gaalya *et al.,* 2017; Ghura, 1998; Monteiro *et al.,* 2011) have documented that trade openness positively influence tax revenues of any type whereas Gaalya *et al.,* (2017), Tanzi (1977), Tanzi (1988), Tanzi and Shome (1992) showed that trade openness had a negative effect on tax revenue. Therefore, this study formulated the hypothesis that trade openness matters for corporate tax revenue performance.

2.1.7.6 Unemployment Rate

Unemployment rate represents unemployed persons as a percentage of the labour force. The labour force is the total number of people employed and unemployed. Kennedy, McMillen, and Simmons (2015) point to the positive relationship between employment growth and revenues from the corporate tax. At the same time, they point out that the high level of unemployment is in a negative correlation with the tax rate, so governments have to stimulate the economy at a time of economic downturn with lower tax rates. Badu and Li (1994) note that unemployment expenditures are important factors in predicting the tax effort. They added that as discrete variables, the rate of unemployment affects tax revenue negatively.

Velaj and Prendi (2014) point out that a high rate of unemployment signals less income for individuals, less consumption, less production, and creates a situation of recession for the economy. Adding that the performance of tax revenue can be instigated by lowering the unemployment rate. Monteiro *et al.* (2011) also provide evidence of a negative relationship between unemployment rate and corporate tax revenue, because it has a great influence on the profitability of corporate firms, from which firms pay taxes. From the review, this study hypothesized that unemployment rate is a potential determinant of corporate tax revenue, it is expected to affect tax performance negatively.

2.1.7.7 Inflation Rate

Many economists believed that inflation is everywhere a monetary phenomenon and that it occurs when the rate of growth of money supply is higher than the rate of growth of the economy. Inflation might cause budget deficits to rise, which means tax revenue has fallen. Ade *et al.* (2018) explain that with a consistent increase in the inflation rate, business fundamentals would be eroded thereby causing an increase in the cost of doing business especially if companies cannot easily pass the price increases onward to the consumers. For this reason, tax evasion and tax avoidance may increase or it might even result in tax resistance, which leads to a reduction in overall tax revenue collected (negative relationship).

Alternatively, Ade *et al.* (2018) note that when inflation is fairly low and does not change too quickly, business profits will increase as the level of inflation in the economy increases. The effect of this is further enhanced when governments do not try to raise tax threshold levels for corporations. Resultantly, such inflation level could lead to an increase in both corporate and personal tax revenue for tax administrations (positive relationship). Velaj and Prendi (2014) reveal that inflation rate could have a positive effect on tax revenue whereas Gaalya *et al.* (2017),

Mahdavi (2008), and Muibi and Sinbo (2013) indicate that tax revenue is negatively affected by the rate of inflation. This study hypothesized that inflation is an important determinant of corporate tax revenue.

2.1.7.8 FDI Inflows

This indicator is the ratio between the inward foreign direct investment and GDP. It covers investment from the rest of the world. The effect of FDI inflows on tax revenue variables could be non-linear and remains ultimately an empirical matter. Foreign direct investment inflows have the potential to affect the total taxes indirectly, which is an important component of public sector revenues, through economic activity (Bayar & Ozturk, 2018). On the other hand, they added that cuts in the rate of corporation tax or giving exemption from taxes for a length of time and giving legal privileges to the multinational corporations in profit transfer by many countries can affect tax revenues negatively. The net effect of FDI on tax revenue is said to be ambiguous, yet FDI affects tax revenue through competition effect, technological spill-over, and demand creation effect (Nguyen, Nguyen & Goenka, 2013).

The competition effect of FDI may cause the economic activities of the domestic firms to drop and this may lower the amount of tax revenue that accrues to the government through corporate tax. On the other hand, technological spill-over, and demand creation effect may have a positive or negative impact on tax revenue depending on their magnitude. To portray this point furthermore, technology transfer, which empowers them domestic firms to produce at lower cost and supply input to Multinational companies through backward integration, will enhance tax revenue (Danielova & Sarkar, 2012). Employment creation is a channel through which FDI can generate more corporate income tax (Okey, 2013).

Danielova and Sarkar (2012) note that the government will earn direct as well as indirect benefits and costs (employment, indirect taxes, pollution, and technology transfer) from any (foreign) investment project. Thus, the net direct benefit to the government is the value of the corporate tax collections from the project less the investment subsidy provided. Furthermore, taxable income generated by foreign-owned firms is an important revenue source for the host country. FDI has reduced the pressure of unemployment and have contributed enormously to the government's tax revenue in China (Zhang, 2001). Zee, Stotsky, and Ley (2002) describe how FDI can also reduce tax revenue through certain channels. First, the "adverse effect" of tax incentives, like free enterprise zones, where imports and exports are usually free from tariffs and taxes and corporate taxes are low or equal to zero can limit the mobilization if tax revenue. Second, tax avoidance and tax evasion by multinationals, an excessive competition that may crowd out domestic investment and domestic entrepreneurship, and rent-seeking activities among tax officials and multinational firms (Okey, 2013). Third, FDI can lead to outflows of financial resources in the form of repatriated earnings or fees (United Nations Conference on Trade and Development-UNCTAD, 2012).

According to Gropp and Kostial (2001), multinationals enterprises have the ability to shift taxable income to countries with a less burdensome tax regime through "transfer pricing" and other tax-planning techniques such as debt placement. The effect of FDI inflows on the tax revenues has been documented in a few studies and most of the limited literature revealed that FDI inflows have a positive effect on tax revenues (for example, Gropp & Kostial, 2000; Mahmood & Chaudhary, 2013; Odabas, 2016; Okey, 2013). Few studies seem to have shown contrary findings (for instance, Tabasam, 2014; Tesfaye, 2015). In view of the review on the relationship between FDI inflows and corporate tax revenue, it is difficult to determine the net effect of FDI on tax

revenue *a priori*. This study hypothesized either a positive or negative relationship between FDI inflows and corporate tax revenue.

2.2 Theoretical Literature

The theoretical link between some of the macroeconomic variables in the study and corporate tax revenue performance of corporate tax revenue can be explained with the Olivera-Tanzi Effect, Khaldun's Theory of Taxation and the Neo-Classical Trade Theory. Hence, these theories explain the relationship between the selected macroeconomic variables and corporate tax revenue.

2.2.1 Olivera-Tanzi Effect

The Olivera-Tanzi effect was a theory co-developed from the study of Olivera (1967) and Tanzi (1977). The Olivera-Tanzi effect explains the erosion of the real value of tax revenue by high rates of inflation, since there exist a time-lag between the date for which tax is imposed and the effective collection date. This theory has been used in the literature to describe the decrease in the tax revenue in the period of rising inflation, and in relations with this, there are two parallel processes going on behind Olivera-Tanzi effect. First, the process of how real inflation tax revenues reacts to the rate of inflation, and the second one relates to the reaction of the real tax revenues from "normal" sources (for example, sales tax, corporation income tax, personal income tax) to the rate of inflation (Anušić & Švaljek, 1996). With regard to the revenue from "normal" sources, the adoption of the progressive tax system could make tax revenue unchanged when price level increase, or even cause a rise in tax revenue.

The theory further explains the effect of lagged cash flow when the level of inflation is high, by stressing that it can be expected with greater certainty that the government would collect a smaller amount of taxes in real terms and that the loss of real resources would be the greater the longer the lag between the moment the taxable event occurred and the moment the government

collects the tax (Olivera, 1967; Tanzi, 1977). Therefore, the case of the loss of real tax revenue which is induced by the level of inflation is known as the Olivera-Tanzi effect.

In essence, there is unavoidably a lag between the time tax payments are assessed and the time they are collected by the tax authority. The Tanzi effect on corporate tax revenue is large when the level of inflation grows higher. This leads to a drop in corporate tax collection, especially when companies endeavour to delay the settlement of tax obligations; moreover, tax agents will often use their prerogatives to allow delayed payments and share some of the taxpayers' gains. An increase in the inflation rate reduces the real value of income tax revenue given the time lags involved in tax collections, thus enlarging the government budget deficit through an increase in the ex-ante real government deficit. This is usually referred to as the Olivera (1967)-Tanzi (1977) effect. The Olivera-Tanzi effect could have been the most relevant for this study, however, it should be mentioned that there will also be inflation effects working into the opposite direction as noted by Sadka (1991). For instance, nominal accounting procedures of corporations will lead to an overstatement of real income if depreciation allowances are calculated on the basis of historic nominal costs. So, the overall sign of the effect cannot be decided by theoretical considerations alone (Friedrich, 2000).

2.2.2 Khaldun's Theory of Taxation

The theory which was propounded by Ibn Khaldun (1332-1406) and later espoused by Islahi (2006) stated that there is a relationship between tax rate and tax revenue. It shows that the higher the tax rate, the less tax revenue that will be collected, and vice versa. The theory further explains that differences in the tax rate as dependent on the levels experienced by a government. The theory advocates for the reduction of taxes on businesses to encourage their growth by ensuring higher profits to entrepreneurs and high taxes to the government (Islahi, 2006). The relationship between

tax rate and tax revenue shows that when there is a change in the tax rate, then two effects will result, namely, the arithmetic effect and economic impact (Laffer, 2004). The theory argued that an increase in tax assessment will result in decreased tax revenue. Therefore, the step taken to overcome problems of tax revenue is to impose an increased amount of liability on individual and corporations, hence standing as a compensation for the reduction in tax revenue which has occurred in the previous period.

2.2.3 Neo-Classical Trade Theory

This theory was developed by Ohlin (1993) focused on the effect that FDI has on a host country's general welfare and tax revenue. It showed that FDI could increase national welfare, particularly through increased tax revenue (Faeth, 2011), but an overall positive effect was not always certain. Welfare and revenue from FDI can also be improved by introducing an optimal tax on foreign-owned capital. Countries could lose out on tax revenue when incentives are paid to multinational enterprises (MNEs) or when transfer pricing (including other strategies to minimize taxes) is an issue (Faeth, 2011). Transfer pricing helps in the repatriation of profits on income from foreign affiliates to their home countries- officially as compensation for technology transfers, paid as royalties or license fees. Multinational companies could set unreasonably high transfer prices in order to avoid high taxes in the host country, thereby minimizing the host country's welfare by worsening potential tax revenue and balance of payments position. Therefore, when there is transfer-pricing resulting from international trade host countries may lose out on tax revenue.

The three theories as discussed in the foregoing are important and relevant to this study since they point to the relationship between the selected macroeconomic variables and corporate tax revenue in this study, these theories form the basis for this study.

2.3 Empirical Review

2.3.1 Evidence from Country-Group Studies

Tahlova and Banociova (2019) assessed the tax and non-tax determinants of corporate income tax revenues in the EU-28 states over the period 2007-2016. Utilizing the panel data regression technique, the results showed that corporate tax revenue is significantly determined by elements of tax legislation and specific non-tax factors.

In a study involving all the 15 Southern African Development Community (SADC) Countries, Ade *et al.* (2018) investigated the determinants of tax revenue performance during 1990-2010 using panel data estimator. The least squares dummy variables (LSDV) fixed effects and the feasible generalized least squares (FGLS) are used to test for country specificity, the findings showed that government expenditure, inflation, export, tax rates, and FDI inflows are positive and significant determinants of tax revenue in the SADC.

Andrejovská and Puliková (2018) quantified the impact of selected macroeconomic indicators on the total amount of tax revenues of 28 European Union (EU) member states. The study used the static panel data method, and it was found that employment rate, GDP, and foreign direct investment are decisive factors that have a significant impact on tax revenue, while tax rates had a positive but not a significant impact.

Karpowicz and Majewska (2018) scrutinized the importance of tax rate as a determinant of corporate income tax revenue for all EU Members states over the period 1995-2014. The results of the generalized method of moment (GMM) estimator showed that level of CIT rate exerts a lesser impact on CIT revenues than all other relevant determinants collectively.

Using Westerlund-Durbin-Hausmann's panel co-integration test and Dumitrescu and Hurlin's panel causality test to analyze the relationship among foreign direct investment inflows,

economic growth and total tax revenues in 33 OECD countries for the period 1995-2014, Bayar and Ozturk (2018) provided the panel result which suggested that FDI inflows and economic growth did not have significant effects on the total tax revenues.

Using 22 sub-Saharan African countries and the data obtained over the period 2005-2014, Onakoya, Olotu, Johnson, and Afintinni (2017) studied the relationship between tax revenue performance, trade liberalization, and macroeconomic variables. Applying the vector error correction model (VECM) technique, the results showed that inflation, trade openness, interest rate, and unemployment rate had a significant positive relationship with tax revenue, unlike exchange rate.

Utilizing an unbalanced panel dataset comprising 172 countries over the period 1980-2013, Gnangnon (2017) explored the impact of FDI inflows on government revenue, notably total non-resource tax revenue and non-resource corporate tax revenue. The results of the two-step generalized methods of moments (GMM) system did not clearly show whether the impact of FDI on non-resource corporate tax revenue is non-linear and statistically significant for all levels of FDI inflows as a percentage of GDP.

Nezhad, Ansari, and Moradi (2016) investigated the significance of trade liberalization in determining tax revenue performance using a panel of 83 countries over the period 1990-2012. Estimating the generalized method of moment regression, the results indicated that trade liberalization leads to greater tax revenue. In addition, the results revealed that GDP growth and exchange rate are also potential determinants of tax revenue.

Karpowicz (2014) studied the determinants of corporate income tax revenues of all European Union (EU) member states for the period 1995-2011. In sum, the study found that CIT revenues of EU countries are determined both by the CIT laws and factors beyond the CIT

legislative regulations of the member states, whereas the latter factors jointly excerpt greater impact on CIT revenues than the CIT laws.

Castro and Camarillo (2014) analyzed the impact of economic, structural, institutional and social factors on tax revenue, across 34 countries from the OECD, over the period 2001-2011. The results showed that GDP per capita had a positive significant impact on tax revenue, while gross fixed capital formation had a negative impact.

Using a panel dataset of eight West African countries over the period 1989-2009, Okey (2013) examined the impact of FDI on tax revenue. The one-step system-GMM results found that FDI had a positive and significant effect on tax revenues, especially those tax on income and profits. Furthermore, other factors such as the level of development, inflation, trade openness and foreign aid significantly affect revenue mobilization.

With an unbalanced panel dataset of 39 countries over the period 1980-2005, Addison and Levin (2012) examined factors that can potentially influence tax revenues. The results suggested that trade openness has a positive significant effect on the total tax revenue-GDP ratio, while per capita GDP is positively related to the total tax revenue ratio but non-statistically significant. It also found that population density is significantly negatively related to the total tax revenue.

Monteiro *et al.* (2011) investigated the economic determinants of corporate tax revenue to GDP across 27 European Union members over the period 1998-2009. The results of the panel feasible generalized least squares (FGLS) method suggested that factors such as GDP, government deficit, trade openness, FDI positively affect the performance of corporate tax revenue among member nations, while unemployment rate negatively affects corporate tax revenue to GDP ratio. Tax rate variable- effective marginal tax rate (EMTR) but not effective average tax rate (EATR)

indicated a parabolic relationship with corporate tax revenue, reinforcing the hypothesis of the existence of a Laffer curve.

Garikai (2009) examined the determinants of tax buoyancy in the SADC. Using panel data for 14 SADC countries during 1994-2005, the study found that monetization, external aid growth and the growth of fiscal deficit (that is, increased government expenditure in relation to tax revenue collected) negatively affect annual tax buoyancy and tax performance in the SADC. The fiscal deficit increase can be reduced by limiting government expenditure or raising tax revenues. Variables such as trade openness and economic development are found to be non-statistically significant.

Kubátová and Říhová (2009) analyzed the impact of economic, legislative and social factors on corporate tax revenue in 29 OECD countries for the period 1980-2006. Using panel regressions, the variables of the study including statutory tax rate, FDI inflows, trade openness, inflation rate, interest rate, and unemployment are significant determinants of corporate tax revenue.

In an unbalanced panel data for 43 developing countries for the period 1973-2002, Mahdavi (2008) investigated the level and composition of tax revenue in these countries using the generalized method of moments (GMM). The results showed that aid and non-tax revenue have a negative effect on tax revenue. Furthermore, population density, monetization, and inflation rate remained negatively correlated with tax revenue, the inverse of GDP per capita was strongly and negatively correlated with the level of taxation.

Gupta (2007) evaluated the potential determinants of tax revenue performance across developing countries, which included SSA countries. The study utilized a broad dataset for 120 countries and made use of a revenue performance index. The results confirm that economic factors

such as per capita GDP, agriculture share in GDP, trade openness and foreign aid significantly affect revenue performance of an economy.

Using a panel of 22 countries in sub-Saharan Africa, over the period 1980–1996, Agbeyegbe, *et al. (*2006) performed the generalized method of moments (GMM) regressions to determine the relationship between trade liberalization, exchange rates, and tax revenue. The study found that tax revenue is sensitive to trade liberalization, but in general, trade liberalization is not strongly linked to aggregate tax revenue or its components-though with one measure, it is linked to higher income tax revenue.

Bartelsman and Beetsma (2003) considered how tax motivated transfer pricing issues affect corporate income tax revenues in 16 OECD countries over 1979-1997. The results for their baseline regression suggested that an increase in the corporate income tax rate will lead to a small decrease in corporate tax revenue.

Within a more sophisticated model used to estimate the data for 39 sub-Saharan Africa countries, Ghura (1998) employed macroeconomic policies and the extent of corruption to explain the variations in tax revenue-GDP ratios over the period 1985–1996. The results indicated that the tax-GDP ratio across the countries of the sample rises with income but declines with inflation; whereas the degree of openness influence tax revenue.

2.3.2 Evidence from Country-Specific Studies

Gobachew *et al.* (2018) identified the determinants of tax revenue in Ethiopia over the period 1990-2016. Using a time-series data to estimate the ordinary least squares (OLS), they found that per capita income and trade openness have a significant positive effect on tax revenue whereas; inflation has a significant and negative effect on tax revenue.

Using monthly and quarterly data of January 1995-December 2016 and annual data for the period 1995-2015, Ozolina and Auzina-Emsina (2018) modelled and forecasted corporate income tax revenues in Latvia by fitting variables, including export and corporate income tax rate into the monthly, quarterly and annual equations in the study. The results of the OLS estimator suggested that export was positive and significant on corporate income tax revenue in the three equations, while corporate income tax rate was also positive and significant on corporate income tax revenue in the monthly and quarterly equations.

Using OLS regression analysis, Simbachawene (2018) examined the potential tax determinants which influence tax revenue performance in Tanzania from 1999-2016. The results of the study showed that foreign direct investment had a negative and non-statistically significant effect on tax revenue, while trade openness has a positive and significant effect on tax revenue.

Using Pooled OLS, Masiya, Chafuwa, and Donda (2016) studied the determinants of tax revenue in Malawi. Using monthly data for the period 2003-2012, the result of the OLS estimates showed that GDP had a positive impact on tax revenue in Malawi. Furthermore, an increase in broad money led to enhanced revenue collections.

Employing the multiple regression analysis, Sharma and Singh (2015) explored the determinants of tax-revenue in India over the period 1999-2012. Using a principal component analysis to develop a composite index on three factors that influence tax revenue performance such as core developmental indicators, growth boosters, and sustainable development indicators. The results showed that these factors have played a positive role in tax-revenue generation in India.

Velaj & Prendi (2014) analyzed the determinant factors of tax revenue in case of Albania over the period 1993-2013 by considering unemployment, income tax, inflation, GDP and imports.

Pearson correlation and regression analyses were employed and it was found that all the factors considered significantly affect tax revenue with the exception of import of goods and services.

Basirat, Aboodi, and Ahangari (2014) analyzed the effect of economic variables on total tax revenues in Iran for the period 1974-2011. The Autoregressive Distributed Lag (ARDL) model was used as an estimator. The results from the study indicated that the exchange rate and annual import had a positive significant relationship with total tax revenues.

Mahmood and Chaudhary (2013)'s study investigated the impact of FDI and GDP on tax revenue in Pakistan over the period 1972-2010. The results of the ARDL model reported that FDI and GDP have a positive and significant impact on tax revenue.

Karagöz (2013) examined the tax determinants affecting tax performance in Turkey; the regression results indicated that agriculture and industrial share, external debt stock, monetization rate of the economy, and urbanization rate affect tax revenue significantly while the openness to foreign trade does not affect tax revenue performance.

Employing time series econometric techniques over the period 1973-2009, Chaudhry and Munir (2010) analyzed the determinants of low tax revenue in Pakistan. The results of the study suggested that openness, broad money, external debt, foreign aid, and political stability are the significant determinants of tax efforts in Pakistan.

Stinespring (2009) estimated the impact of corporate income tax rates on corporate tax revenue at the state level over the period 1996-2007. Using panel data regression, the results also showed that the revenue-maximizing corporate tax rate has declined over time. This supports the Olivera-Tanzi effect.

Devereux *et al.* (2004) examined the impact of reductions in corporate income tax rates in the United Kingdom (U.K.) on corporate tax revenue between 1980 and 2004. The results showed that reductions in the statutory tax rate have not been wholly offset by base-broadening measures.

2.3.3 Evidence from Nigeria

Muibi and Sinbo (2013) examined the macroeconomic determinants of total tax revenue in Nigeria for the period 1970-2011. Using the error correction modelling technique, the results of the study showed that tax revenue is more significantly responsive to changes in income level, exchange rate, and inflation rate while trade liberalization policy seems not to have adversely affected the tax revenue.

In somewhat different but related studies, Nwosa, Saibu, and Fakunle (2012) unravelled how trade liberalization contributes to trade tax revenue in Nigeria for the period 1970-2009. Employing the ECM technique, findings from their study revealed that trade liberalization, trade openness, public debt, GDP, and labor force have a positive impact on trade tax revenue while exchange rate has a negative effect. Labor force, public debt, and exchange rate had a significant influence on trade tax revenue as shown by a Wald test. It was also reported that trade liberalization policy was the major determinant of trade tax revenue in Nigeria.

2.4 Research Gap

The review of related studies outside Nigeria shows that empirical studies on the macroeconomic determinants of corporate tax revenue are few and scarce. Although there has been a growing pool of studies on related topics in the literature, and empirical studies exist on the impact of tax revenue on economic growth in Nigeria (for example, Ojong, Oka & Arikpo, 2016; Popoola, Jimoh & Oladipo, 2017), macroeconomic determinants of total tax revenue in Nigeria (for

example, Muibi & Sinbo, 2013), effect of trade liberalization on trade tax revenue in Nigeria (for instance, Fakunle, 2012; Nwosa *et al.* 2012).

From the foregoing, the closest attempt to this study's broad objective is the work of Muibi and Sinbo (2013), however, this study emphasizes on the role of the corporate sector taxes in generating CIT revenues for the Nigerian government in the midst of the country's growing public debt and declining in corporate tax rate. Muibi and Sinbo (2013) note that the effect of macroeconomic variables on total tax revenue differs from how the revenue from the various tax types respond to changes that occur such macroeconomic variables. Evidence from the review of literature outside Nigeria identified how statutory CIT rates affect total tax revenue or revenues from any tax type, however, it is hard to find a related study for Nigeria that considers the influence of this macroeconomic variable on total tax revenue nor tax revenues from any tax type. This study fills the gap created in the literature by examining the macroeconomic determinants of corporate tax revenue in the context of Nigeria, taking foreign direct investment and corporate income tax as a plausible determinant.

CHAPTER THREE

METHODOLOGY

This chapter explains the methods for the collection, measurement, specification, and analysis of the data. Specifically, it is structured into the specification of the model; research design; description of variables; the measurement and sources of variables; *a priori* expectation; estimation procedure and estimation techniques.

3.1 Model Specification

The model for this study is based on the modification of Muibi and Sinbo (2013)'s tax equation by including other potential macroeconomic variables, such as CIT tax rate, unemployment rate, and foreign direct investment. Therefore, this study states the following model which describes corporate tax revenue to GDP ratio as a function of selected macroeconomic variables.

$$Corporate\ tax\ revenue/GDP = f\left(GDPpc,\ PUD,\ EXG,\ OPEN,\ UMP,\ CIT,\ INF,\ FDI\right) \quad \text{(i)}$$

In econometrics form, the model was restated as:

$$Corporate\ tax\ revenue/GDP_t = \alpha + \gamma_1 GDPpc_t + \gamma_2 PUD_t + \gamma_3 EXG_t + \gamma_4 OPEN_t + \gamma_5 UMP_t + \gamma_6 CIT_t + \gamma_7 INF_t + \gamma_8 FDI_t + \mu_t \quad \text{(ii)}$$

where GDPpc = Real gross domestic product per capita; PUD = Public debt as a ratio of GDP; EXG= Exchange rate; OPEN = Trade Openness as a ratio of GDP; UMP = Unemployment rate; CIT = Company income tax rate; INF = Inflation rate and FDI = Foreign direct investment; α is the intercept of the model; $\gamma_1 - \gamma_8$ are the coefficients of the macroeconomic variables to be estimated; μ is the stochastic error term and t is the time period properties.

3.3 Research Design

This study adopted the *ex-post* facto research design which establishes a relationship between variables. This research design is appropriate because it examines the existing facts and data.

3.4 Variables Definition, Measurement, and Sources

All data series are obtained from the World Bank's World Development Indicators (WDI) database and the Central Bank of Nigeria (CBN) Statistical Bulletin.

Table 3.1 presents the description of variables and the sources of data, their measurement, and the supporting studies that have used these variables in investigating the effect of macroeconomic variables on the performance of corporate tax revenue.

Table 3.1: Description of Variables, Measurement and Supporting Studies

Variables	Description	Measurement	Supporting Studies	A priori Expectation
CR-GDP	Corporate revenue/GDP	It is measured as a percentage of corporate tax revenue as a ratio of GDP	Karpowicz (2014); Kawano and Slemrod (2015); Kubátová (2013); Monteiro *et al.* (2011)	
rGDPpc	Real GDP per capita	It indicates the overall level of development of a country. It measured in units of US Dollars.	Agbeyegbe *et al.* (2006); Ayenew (2016); Gaalya *et al.* (2017)	$\gamma_1 > 0$
PD	Public debt	PD is comprised of domestic debt and external debt. It is measured as a percentage of GDP.	Gobachew *et al.* (2018); Muibi and Sinbo (2013)	$\gamma_2 < 0$
EXG	Exchange rate	It is measured as the % change in the real effective exchange rate.	Agbeyegbe *et al.* (2006); Gaalya *et al.* (2017); Muibi and Sinbo (2013)	$\gamma_3 < 0$
OPEN	Trade openness	OPEN serves as a yardstick of the relative importance of international trade of a nation's economy. It is measured as the ratio of the total trade (aggregate value of exports and imports) to GDP for a country.	Chaudhry and Munir (2010); Gobachew *et al.* (2018); Gupta (2007); Monteiro *et al.* (2011); Muibi and Sinbo (2013)	$\gamma_4 < 0$ or $\gamma_4 > 0$
UMR	Unemployment rate (%)	It is measured as the % of total labour force	Clausing (2007); Monteiro *et al.* (2011); Velaj and Prendi (2014)	$\gamma_5 < 0$
CIT	Statutory CIT rate	Average values of company income tax rate of the current year and the previous year	Karpowicz (2014); Kubátová (2013); Ozolina and Auzina-Emsina (2018)	$\gamma_6 > 0$
INF	Inflation rate (%)	It is measured as the annual % change in the consumer price index.	Agbeyegbe *et al.* (2006); Gaalya *et al.* (2017); Gobachew *et al.* (2018);	$\gamma_7 < 0$

			Muibi and Sinbo (2013)	
FDI	FDI inflows (% of GDP)	FDI represents the inflows of physical investments to a country. It is measured as the ratio of inward foreign direct investment to GDP.	Gobachew *et al.* (2018); Monteiro *et al.* (2011); Okey (2013)	$\gamma_8 < 0$ or $\gamma_8 > 0$

Source: Author's Computation, (2019).

3.4 *A Priori* Expectation

The expected sign that is reported for each of the independent variables from equation i represents the *a priori* expectation as shown in Table 3.1. The expectation for each of the independent variable has been provided in extant empirical studies as well as theories. $\gamma > 0$ (positively signed coefficient) implies that an independent variable has a positive effect on corporate tax revenue performance whereas $\gamma < 0$ (negatively signed coefficient) suggests that the independent variable has a negative effect corporate tax revenue performance.

3.5 Estimation Procedure

This study performs several estimations using the Autoregressive Distributed Lag (ARDL) bounds testing approach to co-integration and Error Correction Modelling (ECM) techniques.

3.5.1 Unit Root Test

The time series characteristics of the variable for this study is investigated in order to determine the order of integration. The study also conducted a unit root test in order to establish the stationarity of the variables included in the regression by employing the Augmented Dickey-Fuller unit root test (ADF-URT). It is important to test for the statistical properties of the variables used when dealing with time-series data in order to avoid spurious regression from non-stationary series.

The basic ADF model is stated as follows:

$$\Delta X_t = a_0 + \beta_t X_{t-1} + \sum_{i-1}^{n} \rho_i \Delta X_{t-1} + \varepsilon_t \quad (2)$$

where ΔX_t is the first difference of a series, and where X_{t-1} is lagged value of a series, $\Delta X_{t-1} = X_{t-1} - X_{t-2}$ is the lagged value of a first difference series, $a_0, \beta_i, and \rho_i$ are the parameters to be estimated, Δ represents the first difference operator, t refers to the time period, ε_t is the stationary random error and n is the maximum lag length. The null hypothesis is that the series contains a unit root which implies that $\beta_1 = 0$. Therefore, the null hypothesis is rejected if $\beta_1 < 0$ and statistically significant but accepted if otherwise.

3.5.2 Co-integration Test

The study proceeds further to test the long-run (co-integration) relationship between the variables used in the model by employing the ARDL bounds testing approach to co-integration which was proposed by Pesaran, Shin, and Smith (2001). The ARDL approach requires two steps. In the first step, the existence of any long-run relationship among the variables of interest is determined by using the F-test. The second stage requires the estimation of the long-run relationship between dependent and explanatory variables and to determine their values, thereafter the short-run elasticity of the variables with the error correction representation of the ARDL model. The purpose of applying the ECM version of the ARDL is to determine the speed of adjustment to equilibrium.

3.6 Estimation Techniques

Both the descriptive and inferential analysis is employed in this study. The descriptive analysis helps to capture the trend of corporate income tax revenue over the last decade, while econometric analysis performed using the ARDL model captures the short-run dynamics and long-run relationship between macroeconomic determinants and corporate tax revenue. The model has a

number of advantages over the Johansen cointegration technique. First, the Johansen technique may require large data sample, which is a luxury that most developing economies do not have, and more so, the ARDL model is the most useful method of determining the existence of cointegration in small samples (Ghatak & Siddiki, 2001). Second, the ARDL approach has been used even when other cointegration techniques require all of the regressors to be of the same order, therefore, the ARDL approach can be applied whether the variables in the regression are purely I(1) and/or purely I(0) or a mixture of both. The ARDL approach also avoids the pre-testing problem associated with standard co-integration, which requires that the variables be already classified into I(1) (Pesaran *et al.*, 2001). Third, the ARDL approach to co-integration is preferable to the Johansen approach because it avoids the problem of too many choices that are to be made in the Johansen method. These include the treatment of deterministic elements, the order of VAR and the optimal lag length to be used. Finally, the ARDL approach allows variables to have different lag length, whereas in the Johansen method this is not permissible.

CHAPTER FOUR

DATA ANALYSIS AND INTERPRETATION OF RESULTS

This chapter explains the results from the estimations performed in the study; it also presents and interprets the estimation results and post-estimation test conducted.

4.1 Trends in Corporate Tax Revenue-GDP ratio

Figure 1: Trends in Corporate Tax Revenue-GDP ratio, 1981-2017 (% change)

Source: Author's Drawing, (2019) with Data from the Federal Inland Revenue Service, various issues.

Fig. 1 shows that corporate tax revenue as a percentage of GDP have continued to fluctuate over the years, but reached the lowest point of 0.06% and the highest point of 2.42% in 1992 and 2009 respectively. Corporate tax revenue-to-GDP ratio grew steadily from 0.42% in 1981 to 0.82% in 1986 which could have been as a result of positive changes in total business income relative to GDP. In 1987, a year after the liberalisation exercise in the Nigerian economy, more so, corporate tax revenue-to-GDP ratio had experienced a sharp downward turn to 0.62% and decline further to 0.50% in 1989. The figure rose steadily up to 0.70% recorded for 1991 and dropped drastically to reach the largest falls of 0.06% in 1992 as a result of lower revenues from income and profits taxes and from taxes on goods and services. Therefore, the company income tax Act of 1990 has not improved tax revenue collection during that period. However, it improved greatly up 0.88% in 1993 due to the downward review of the corporate tax rate. It appeared fairly stable from 1993 to 1994. The emergence of the military administrations had created an unhealthy business environment, hence corporate tax revenue-to-GDP ratio declined to 0.55% in 1996, but increased greatly up to 0.99% in 1999, and fell to 0.76% in 2000. It grew from 0.76% in 2000 to about 1.16% in 2003 and gradually fell through to 0.96% in 2005.

In 2006, corporate tax revenue-to-GDP ratio improved steadily from 1.32% to reach an all-time peak of 2.42% in 2009. The financial and economic crisis from 2008 to 2009 has no devastating effect on corporate tax revenue-to-GDP ratio. Again, it declined sharply from 1.22% in 2010 and further to 1.05% in 2011. The corporate tax revenue-to-GDP ratio in Nigeria increased steadily from 1.14% in 2012 through to 1.52% which was recorded for 2015 can be attributed to

increased corporate profits, capital gains, and structural changes which lead to greater participation of the financial sector. However, it slumped to 1.11% in 2016 and improved to 1.37% in 2017.

4.2 Descriptive Statistics

The descriptive statistics including the mean, standard deviation, minimum, and maximum values of the variables in the empirical model for this study are reflected in table 4.1.

Table 4.1: Results of Descriptive Statistics

VARIABLE	OBS	MEAN	STD. DEV	MIN	MAX
CTR/GDP	37	0.946581	0.426577	0.057123	2.420324
PCGDP	37	1271.037	893.0894	270.0636	3221.678
PUD	37	2.56×10^{10}	8.52×10^{9}	9.62×10^{9}	$4.02 \times 10^{\wedge 10}$
EXG	37	149.6973	120.1980	48.92413	531.8238
OPEN	37	32.23791	12.73733	9.135846	53.27796
UMP	37	4.130685	0.986599	2.163530	7.060000
CIT	37	34.32432	5.911637	30.00000	45.00000
INF	37	17.25635	26.36061	0.686099	19.0028
FDI	37	2.72×10^{9}	2.60×10^{9}	1.89×10^{8}	8.84×10^{9}

Source: Author's Computation, (2019).

Table 4.1 reveals that corporate tax revenue as a ratio of GDP (CTR/GDP) ranges from 0.06% to 2.4%, it also has a mean of 0.94% showing the deviation of 0.43% from its mean value. This is an indication that corporate tax revenue on average contributes about 0.95% to GDP. The overall average of GDP per capita (PcGDP) is ₦1271.04b ranging from ₦270.06b to ₦3221.68b with the deviation of ₦893.09b from the mean. This shows that the movement/changes in PcGDP are less satisfactory but still lower than the mean value. The range shows that there are no extreme values.

Public debt (PUD) has a minimum of ₦9.62b, a maximum of ₦40.2b, and a mean of ₦25.6b with a deviation of ₦8.52b from its mean value. As far as the exchange rate is concerned, it has a minimum value of ₦48.92 and maximum of ₦531.82 with an average value of ₦149.7. On the other hand, the mean of trade openness (OPEN) is 32.24% with a standard deviation of 12.74%

over the period under review while the variable ranges from 9.14% to 53.28%. From these results, there is no problem of extreme volatility with these variables.

Furthermore, unemployment rate (UMP) ranges from 2.16% to 7.06%, showing a deviation of 0.98% from its mean value of 4.13%. Corporate tax rate (CIT) demonstrated a minimum value of 30% and a maximum value of 45% with a mean value of 34.32% showing a 5.91% deviation from its mean value. Inflation (INF) is averaged at 17.26% with a standard deviation of 26.36% and the variable ranges from 0.69% to 19%. Finally, foreign direct investment (FDI) has a minimum value of ₦186m to a maximum value of ₦8.84b while it shows an average value of ₦2.72b with a standard deviation of ₦2.6b. Inflation deviates more rapidly from its average value, this implies that the level of inflation in Nigeria is high and unexpected.

4.2 Results of the Test for Multicollinearity

Variance Inflation Factor (VIF) was used to test for multicollinearity among the independent variables. This is necessary because the OLS regression technique assumes the absence of multicollinearity among the independent variables in order to expect a high level of accuracy from the estimator.

Table 4.2: Results of Variance Inflation Factor

VARIABLE	VIF	I/VIF
CIT	7.41	0.17
FDI	7.18	0.14
OPEN	5.17	0.19
PCGDP	3.63	0.27
UMP	3.43	0.29
PUD	3.01	0.33
EXG	2.36	0.42
INF	1.34	0.75
MEAN VIF	4.19	

Source: *Author's Computation, (2019).*

Table 4.2 shows the results of the VIF and its inverse (also called tolerance) for all the independent variables. By rule of thumb, any variable whose VIF is greater than 10% is highly collinear and vice-versa. Thus, all the variables have VIF that are less than 10 which implies that they are not collinear.

4.3 Results for the Test for the Stationarity of Variables

The stationarity of all the variables in the study is confirmed using the Augmented Dickey-Fuller Unit Root test (ADF-URT). The test reveals the presence/absence of a unit root (stationarity properties) in the variables as well as their order of integration-I(*d*). The null hypothesis is that a variable has a unit root while the alternative hypothesis is that a variable has no unit root. The optimal lag length for the stationarity test was chosen based on the Schwarz information criterion with the maximum length automatically set at 9.

Table 4.3: Results of the ADF-URT

Variables	Unit Root at Level		Unit Root at First Difference		I(*d*)
	Test statistic	*p*-value	Test statistic	*p*-value	
lnCTR/GDP	-5.624826[c]	0.0003***	—	—	I(0)
lnPCGDP	-3.103889[c]	0.1207	-4.149931[a]	0.0001***	I(1)
lnPUD	-2.097245[b]	0.2469	-4.618369[a]	0.0000***	I(1)
lnEXG	-2.128284[b]	0.2353	-4.538788[a]	0.0000***	I(1)
lnOPEN	-1.831756[b]	0.3597	-7.410279[c]	0.0000***	I(1)
lnUMP	-2.231009[c]	0.4590	-6.282901[b]	0.0000***	I(1)

lnCIT	-1.850623[a]	0.0618*	—	—	I(0)
lnINF	-5.002989[c]	0.0014***	—	—	I(0)
lnFDI	-5.474249[c]	0.0007***	—	—	I(0)

Notes: [a, b] and [c] indicates test equation has no intercept and trend, intercept only, and intercept and trend respectively, while * and *** denote the rejection of null hypothesis at 10% and 1% significance level respectively.
Source: *Author's Computation, (2019).*

The ADF unit root test results in Table 4.3 show that four variables, such as lnCTR/GDP, lnCIT, lnINF, and lnFDI follow the I(0) processes, hence they are level stationary at 1% significance level, while lnCIT is level stationary at 10% significance level. However, lnPCGDP, lnEXG, lnOPEN, and lnUMP follow the I(1) processes; they are first-difference stationary series. The implication is that the order of integration of the variables is a mix of *I(*0) and *I(*1). Therefore, the Autoregressive Distributed-Lag (ARDL) model is an appropriate technique when considering the likelihood of a long-run (co-integrating) relationship between variables which are mutually integrated. Having established the stationarity of the series, this study proceeds to test for the presence of cointegrating among the underlying variables.

4.4 ARDL Bounds Testing Approach to Co-integration

This study adopts the ARDL bounds testing procedure which was proposed by Pesaran and Shin (1999) and espoused by Pesaran *et al.* (2001) in order to determine the long-run equilibrium relationship among the variables in the estimation model. The optimal lag order of 3 is selected for the ARDL specification based on the Akaike information criterion (AIC). The lower and upper bound critical values from the ARDL bounds test is used to check the null hypothesis of no long-term relationship between the underlying variables. Therefore, the null hypothesis of no cointegration is rejected when the calculated F-statistic exceeds the upper bound critical values and accepted if otherwise.

Table 4.4: Results of the ARDL Bounds Test for Co-integrating Relationship

H_0: No cointegration exist	***F*-statistics Value (k = 8)**	**5% Asymptotic critical value**		**1% Asymptotic critical value**	
		Lower Bound	**Upper Bound**	**Lower Bound**	**Upper Bound**
		I(0)	**I(1)**	**I(0)**	**I(1)**
Computed *F*-test statistic	10.14897***	2.55	3.68	3.15	4.43

Source: *Author's Computation, (2019). Note: *** denotes the rejection of null hypothesis at a 1% significance level.*

The results of the ARDL bounds test in table 4.4 show that the calculated *F*-test value is 10.14897. This figure well exceeds the upper critical values at 1% significance level. Thus, the null hypothesis of the absence of cointegration is not rejected. Therefore, it indicates that a cointegrating (long-term) relationship exists between corporate tax revenue and its selected macroeconomic determinants. After confirming that the series are co-integrated, this study presents the long-run and short-run dynamic estimates from the ARDL co-integration technique based on Schwarz Information Criteria (SIC). The optimal lags structure for the underlying ARDL model that minimises the SIC is given as: ARDL(1, 0, 0, 0, 0, 0, 0, 0, 0). This emphasises on the process by which the regressors enter the model.

Table 4.5: Results of the ARDL Long-Run Estimates

Dependent Variable: Corporate Tax Revenue

Variable	Coefficient	Std. Error	t-Statistic	*p*-value
lnPCGDP	-0.896000	0.429202	-2.087596	0.0472**
lnPUD	-0.353397	0.382572	-0.923740	0.3645
lnEXG	1.071342	0.183317	0.389172	0.0704*
lnOPEN	-0.309524	0.349751	-0.884986	0.3846
lnUMP	-1.771740	0.789021	-2.245493	0.0338**
lnCIT	1.862170	1.944729	0.957547	0.3475
lnINF	-0.134162	0.106990	-1.253969	0.2215
lnFDI	1.049010	0.211019	0.232256	0.0812*
INTERCEPT	8.141062	12.903031	0.630942	0.5338
ARDL Long-Run Model Diagnostic Results				
			***F*-statistics**	***p*-value**
Breusch-Godfrey Serial Correlation LM Test			1.061576	0.3623
Breusch-Pagan-Godfrey (BPG) Heteroscedasticity Test			1.480702	0.2046
Ramsey RESET Test			9.064537	0.1060

Source: *Author's Computation, (2019). Note:* * and ** implies the rejection of the null hypothesis of non-significance of variables at 10% and 5% level respectively.

Table 4.5 reports the results of the ARDL long-run estimation. The coefficient of GDP per capita is = -0.896000, implying that there is a negative relationship between GDP per capita and corporate tax revenue. It also indicates that a 1% change in GDP per capita causes a negative change in corporate tax revenue by 0.896%. This result is not in accordance with the *a priori* expectation of a positive sign. However, GDP per capita is significant at $p<0.05$. Similarly, a negative relationship exist between public debt and corporate tax revenue since the coefficient of public debt has a negative figure of -0.353397 as expected. This implies that a 1% change in public debt lessens corporate tax revenue by 0.353%. The coefficient of public debt is non-significant having shown a *p*-value that is greater than the 10% threshold. Contrary to expectation, exchange rate has a positive coefficient of 1.071342. This shows that a positive relationship exist between exchange rate and corporate tax revenue. Therefore, a 1% change in the exchange rate leads to a positive change in corporate tax revenue by 1.0713%. Exchange rate is significant at $p<0.1$.

Trade openness revealed a negative coefficient of -0.309524 as expected. Therefore, there is a negative relationship between trade openness and corporate tax revenue. Based on magnitude, corporate tax revenue will decline by 0.3095% when a 1% positive change occur in trade openness. However, the *p*-value for trade openness is non-significant even at $p<0.1$. The coefficient of unemployment rate is negative (-1.771740), thus indicating that a negative relationship exist between unemployment rate and corporate tax revenue. This shows that a 1% change in unemployment rate creates a negative change in corporate tax revenue by 1.7717% and this is in line with the *a priori* expectation. Unemployment rate showed a coefficient which is significant at $p<0.05$. The corporate tax rate has a positive coefficient of 1.862170 as expected. This implies that corporate tax rate is positively related to corporate tax revenue. Therefore, a 1% change in corporate tax rate leads to a positive change in corporate tax revenue by 1.8622%, while the variable shows a *p*-value that is greater than the 10% threshold level. Inflation shows a negative coefficient of -0.134162 as expected, implying that there is a negative relationship between inflation and corporate tax revenue. Hence, corporate tax revenue declines by 0.134% if there is a 1% change in the level of inflation. However, inflation is non-significant even at $p<0.1$. Foreign direct investment has a positive coefficient of 1.049010 which shows that foreign direct investment is positively related to corporate tax revenue. The result implies that 1% change in foreign direct investment causes a positive change in corporate tax revenue by 1.049%. However, foreign direct investment is significant at $p<0.1$.

To validate the aforestated results, this study employed a battery of model diagnostic and stability tests. The model diagnostic checked for the assumption of the normality of residuals, serial correlation, and heteroscedasticity. As shown in table 4.5, the results of the diagnostic test could not find evidence indicating the presence of higher-order autocorrelation in the disturbance

of the error term. The Breusch-Pagan-Godfrey test also showed that the errors are independent of the independent variables and they are homoskedastic. The model is correctly specified as revealed by the RESET test which shows a *p*-value that is non-significant. These diagnostic tests are performed to determine the rejection of the null hypothesis by examining the test statistic value of each test and the *p*-value at a 5% level of significance. The cumulative sum (CUSUM) and the cumulative sum of squares (CUSUMSQ) tests suggested by Brown, Durbin, and Evans (1975) are used to determine the structural stability of the long-run coefficients. The results as presented in the appendix showed that the ARDL error correction model is stable since neither the plots of CUSUM nor CUSUMSQ statistics exceeds the critical bounds of 5% significance level. The results of the error correction model (ECM) which allows a variable to be dynamic in the short-run while remaining at equilibrium, in the long run, are displayed in Table 4.6.

Table 4.6: Results of the ARDL Short-Run Estimates

Dependent Variable: Corporate Tax Revenue

Variable	Coefficient	Std. Error	t-Statistic	*p*-value
Dln(PCGDP)	-0.892352	0.364331	-2.449286	0.0217**
Dln(PUD)	-0.351958	0.370430	-0.950134	0.3511
Dln(EXG)	1.071051	0.182092	0.390194	0.0697*
Dln(OPEN)	-0.308264	0.345534	-0.892139	0.3808
Dln(UMP)	-1.764527	0.714419	-2.469879	0.0207**
Dln(CIT)	1.854588	1.864961	0.994438	0.3295
Dln(INF)	-0.133616	0.105542	-1.266000	0.2172
Dln(FDI)	1.048811	0.210085	0.232338	0.0812*
CointEq(-1)	-0.995929	0.165979	-6.000327	0.0000***
	ARDL Model Fitness Results			
R-squared		0.785156		
F-statistics		9.136333***		
Durbin Watson statistics		2.475609		

Source: *Author's Computation, (2019). Note:* ***, **, and * implies the rejection of null hypothesis of non-significance of variables at 1%, 5%, and 10% level respectively.

Cointeq = lnCTR -0.8960*lnPCGDP - 0.3534*lnPUD + 0.0713*lnEXG - 0.3095*lnOPEN - 1.7717*lnUMP + 1.8622*lnCIT - 0.1342*lnINF + 0.0490*lnFDI + 8.1411 + 0.1222*@TREND)

Similar to the results of the ARDL long-run model, (ΔlnPCGDP(−1), ΔlnPUD(-1), Δln(OPEN(-1), ΔlnUMP(−1), and ΔlnINF(-1) have negative coefficients. This implies that a 1% change in any of these independent variables will lead to a negative change in corporate tax revenue by the value of the coefficients of the independent variables, while other variables such as exchange rate, corporate tax rate, and foreign direct investment have positive coefficients.

The short-term results of the ARDL model show that four variables: (ΔlnPCGDP(−1), ΔlnUMP(−1), ΔlnEXG(−1), and ΔlnFDI(−1) out of the eight independent variables are statistically significant. Precisely, the respective *p*-values attached to the coefficients of ΔlnPCGDP(−1) and ΔlnUMP(−1) show that these variables are statistically significant at the 5% level, while ΔlnEXG(−1) and ΔlnFDI(−1) are statistically significant at 10% level as revealed by their respective *p*-values. However, independent variables (GDP per capita, unemployment rate, exchange rate, and foreign direct investment that were significant in the short-run dynamic model remained statistically significant also in the long-run model. The goodness of fit of the short-run ARDL model was confirmed by the R-squared value of 0.785, which implies the explanatory power of the independent variables regarding the behaviour of corporate tax revenue. The *F*-statistics which has an exact *p*-value of 0.000 implies the overall significance of the short-run ARDL model. Based on the rule of thumb, the Durbin Watson statistics falls within the acceptable limit, hence, there is no presence of first-order serial correlation in the model.

The lagged error correction term (CointEq(-1)) refers to the series of OLS residuals which are derived from the long run model. The lagged error correction term has a negative coefficient as expected, the term is also highly statistically significant at the 1% level. The ECM term validates

the existence of a long-run relationship between corporate tax revenue and its macroeconomic determinants in Nigeria. The ECM term indicates that the speed of adjustment short-run errors toward long-run equilibrium when there is a shock in the system. Therefore, the disequilibrium in the system is being corrected at the rate of 0.996%, implying a high speed of adjustment back to long-equilibrium at about 99.6%. It is important to note that the short-run elasticity coefficients fall below those of the long-run in their absolute values.

4.5 Discussion of Findings

The evidence provided in this study is supportive of the existence of both short-run and long-run relationships between corporate tax revenue and its macroeconomic determinants. The results of the ARDL long-run estimates are discussed since short-run shocks are quickly restored back to long-run equilibrium as shown in the preceding section.

Specifically, GDP per capita has a negative and significant effect on corporate tax revenue, therefore the findings of Bird *et al.* (2008), Ozolina and Auzina-Emsina (2018) are realistic but contradicts the evidence shown by Aggrey (2011), Gaalya *et al.* (2017), Monteiro *et al.* (2011), Muibi and Sinbo (2013), Terefe and Teera (2018). The finding of this study indicates tax collection inefficiencies and problems of administrative capacity. The position of this study is that higher income level in Nigeria does not guarantee an appropriate payment of income taxes by economic entities (particularly, corporate organisations). However, corporate tax revenue in Nigeria is negatively determined by GDP per capita.

Public debt showed a negative but non-significant effect on corporate tax revenue. This result is in line with that of Chaudhry and Munir (2010), Gaalya *et al.* (2017), Gupta (2007), Monteiro *et al.* (2011) but negates the positive result of Agburuga (2018). This study establishes that an increase in government debt figures as a result of the deficit budget decreases corporate tax

base in Nigeria; the characteristics of a low-income country like Nigeria. This evidence shows that public debt as a percentage of gross national income is not a determinant of corporate tax revenue in the country.

Exchange rate has a positive and significant effect on corporate tax revenue. This result differs from the studies of Agbeyegbe *et al.* (2006), Gaalya *et al.* (2017), Terefe and Teera (2018), and the Tanzi's hypothesis which all claimed an inverse relationship between a country's tax revenue and the real levels of its official rate of exchange. The position of this study is that the appreciation of the nation's domestic currency leads to an increase in the volume of corporate sector imports which has an indirect effect on corporate tax revenue. This is congruent with the submission of Muibi and Sinbo (2013) and Ozolina and Auzina-Emsina (2018). Thus, exchange rate is a positive determinant of corporate tax revenue in Nigeria.

Trade openness revealed a negative and non-significant effect on corporate tax revenue. This is in line with the result of Gupta (2007). However, it differs from the evidence documented by Agbeyegbe *et al.* (2006), Gaalya *et al.* (2017), Monteiro *et al (*2011), and Terefe and Teera (2018). It was thus argued that a decrease in the import tariffs to be paid by corporate entities as a result of increasing the country's trade openness often leads to a decrease in corporate tax revenue. It may also indicate that taxes on imports and exports have lots of administrative complications such that they cannot be easily collected and managed. Hence, trade openness does not significantly determine corporate tax revenue in Nigeria.

Unemployment rate has a negative and significant relationship with corporate tax revenue. This finding aligns with the studies of Clausing (2007), Kennedy *et al.* (2015), Monteiro *et al. (*2011), Tahlova and Banociova (2019), and Velaj and Prendi (2014). This result implies that a high level of unemployment reduces individuals' income thus lowering consumption and

production thereby creating a situation of recession for the economy. The consequential effect of low productivity is lower corporate sector profitability, thus leading to lower revenues from corporate taxes. The result also showed that corporate tax revenue can be largely determined by the rate of unemployment.

The corporate tax rate showed the highest positive influence on corporate tax revenue through the influence is a non-significant relationship. This result partially supports the propositions in Ibn Khaldun's theory of taxation and the outcome from the studies of Gupta (2007), Kawano and Slemrod (2016) but contrasts with the results of Ozolina and Auzina-Emsina (2018), Riedl and Rocha-Akis (2008). This study submits that an increase in corporate tax rates improves tax collection and make revenue grows higher. However, corporate tax rate is not a significant determinant of corporate tax revenue.

Inflation exhibited a negative and but non-significant relationship with corporate tax revenue. This result agrees with the finding of Agbeyegbe *et al.* (2006), Gaalya *et al.* (2017), Terefe and Teera (2018) and consistent with the Tanzi's hypothesis but differs from Muibi and Sinbo (2013)'s result. This study contends that a consistent increase in inflation would erode business fundamentals and increase the cost of doing business. This may increase tax evasion and tax avoidance or even result in tax resistance, leading to a reduction in corporate tax revenue collected.

Foreign direct investment had a positive and significant relationship with corporate tax revenue. This study is congruent with the findings of Gropp and Kostial (2000), Mahmood and Chaudhary (2013), Monteiro *et al.* (2011), Odabas (2016) but contradicts the negative result showed by Tabasam (2014). This position this study keep is that the attraction of high level of brownfield and Greenfield investments is important to bring greater capital reserves which lead to

higher corporate tax revenue. Corporate tax revenue also increases indirectly when FDI inflows contribute to the development of the financial sector.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary

This study examined the macroeconomic determinants of corporate tax revenue in Nigeria for the period 1981 to 2017 by employing the ARDL bounds testing approach to co-integration and error correction modelling. The specific objectives of the study were to determine the trend analysis of corporate tax revenue to GDP ratio in Nigeria over the period investigated and to identify the macroeconomic factors which stimulate corporate tax revenue among those employed. The motivation for this study is the huge debts of the Nigerian Government which have continued to grow unabated, hence the need to stimulate internal revenues sources. It is important to point out that prior studies in Nigeria have focused on total tax revenue which does not specifically point out the important role played by the corporate sector in the country.

Literature was reviewed under conceptual, theoretical, and empirical studies. The conceptual review discussed the issues of tax and taxation, corporate income tax rate, macroeconomic variables, and corporate tax revenue. The Olivera-Tanzi effect and Khaldun's theory of taxation were discussed. This study equally provided a comprehensive discussion from extant studies on the potential macroeconomic determinants of CIT revenues while also stating its

hypotheses. The Autoregressive Distributed-Lag (ARDL) bound testing approach to co-integration and Error Correction Modelling (ECM) techniques are used for the estimation. Prior to the test for the long-run relationship between corporate tax revenue and its macroeconomic determinants, this study determines the stationarity of all variables using the traditional ADF-URT test, which reveals that the variables are mutually integrated, while the ARDL approach confirmed the existence of a long-run relationship among the variables.

The model estimation was carried out by using the long-run estimates from the ARDL model. The estimation of the result showed a divergence between the hypothesised sign and outcome from some of the variables. However, all the results are largely supported by existing literatures. The long-run estimated equation from the ARDL results identified exchange rate and foreign direct investment as positive and significant determinants of corporate tax revenue in Nigeria, while GDP per capita and unemployment rate had a negative and significant effect on corporate tax revenue. The importance of other variables such as public debt, openness to trade, corporate tax rate, and inflation as significant determinants of corporate tax revenue cannot be established.

5.2 Conclusion

This study investigated the macroeconomic determinants of corporate tax revenue in Nigeria over the period 1981-2017 by analysing data on the selected variables with the use of the ARDL modelling technique and the error correction mechanism. It also studied the trends of corporate tax revenue-to-GDP ratio in Nigeria as well as the macroeconomic variables that have a significant effect on corporate tax revenue. The estimated results of this study showed that corporate tax revenue is influenced by certain macroeconomic variables such as exchange rate, unemployment rate, GDP per capita, and foreign direct investment. Exchange rate is a positive and significant determinant of corporate tax revenue, while unemployment rate is a negative and significant

determinant of corporate tax revenue. This study showed that corporate income has a direct relationship with the size and profitability of the corporate sector. This study concludes that exchange rate, unemployment rate, GDP per capita, and foreign direct investment are the macroeconomic determinants of corporate tax revenue in Nigeria.

5.3 Recommendations

Based on the conclusions reached, this study recommends as follows:

i. The negative effects of GDP per capita suggest that higher corporate taxes should be levied on corporate entities that offer products and/or services which are directly focused on the high-income groups. Since GDP per capita is a crucial determinant of corporate tax revenue in Nigeria, the government should set out policies to check the high level of inefficiencies associated with tax collection and its administration.

ii. The negative effect of unemployment rates on corporate tax revenue can be addressed by bridging the distortions created by economic cyclicality in a way that ensures greater profits for corporations.

iii. The government should set prudent macroeconomic policies that can promote and sustain the development of FDI in the economy and to ensure that multinational corporations do not neglect providing social overheads which include excellent corporate social responsibility, brilliant customer service base, and qualitative security measures.

iv. Considering the positive effect of exchange rate on tax revenue, there is the need for the Nigerian government through the regulatory authorities to step-up the exchange rate stabilisation efforts in order to reduce and/or eliminates the foreign exchange risk which otherwise can lead to lower corporate tax revenue.

v. The government should also take into account the association which exists corporate tax policies and corporate behaviour, thus it is important to set policies related to direct taxes in general and corporate tax in particular indirect taxes in a way that guarantees a high collection of the income source.

5.4 Contributions to Knowledge

This study contributes to existing literature majorly in three ways. First, it provides an initial evidence on the macroeconomic determinants of corporate tax revenue in Nigeria. Second, it incorporates macroeconomic variables including CIT rate, unemployment rate, and foreign direct investment which have been ignored in the extant studies in Nigeria (Muibi & Sinbo, 2013). Lastly, this study covers a long-time horizon, 1981-2017, hence, it captures how the corporate sector (in terms of revenue collection) has responded to changes in the macroeconomic policies of the Nigerian government over the years.

5.5 Suggestions for Further Studies

The questions which are directly related to changes in the effective tax burden on corporate income should be the focus of future research and this can be actualised by including other variables such as democratic accountability, tax morale, government stability, and country's investment profile separate from the choice of macroeconomic variables that were used in this study. Furthermore, future studies should pursue the same objective(s) using other econometric technique such as vector autoregressive model in order to check the robustness of this study. Finally, future studies should adopt proxies like population to scale the corporate tax revenue.

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APPENDIX I

Table A: Raw Data Used for the Study

YEAR	CTR '₦ b'	GDP '₦ b'	CTR/GDP '%'	GDPpc '₦ b'	PUD '₦ b'	EXG	OPEN '%'	UMP	CIT '%'	INF '%'	FDI '₦ b'
1981	0.4	94.3	0.424178155	2178.983	11445499562	317.7598	18.17173	2.1635297	45	19.00284	542327289.1
1982	0.5	101	0.495049505	1842.83	11992466650	325.8871	13.77983	2.4740767	45	14.802552	430611256.5
1983	0.6	110.1	0.544959128	1221.899	17576996153	385.723	10.04497	2.753969	45	19.56895	364434580.2
1984	0.8	116.2	0.688468158	901.6736	17783310907	531.8238	9.380541	2.9221721	45	5.6536641	189164784.9
1985	1	134.5	0.743494424	881.9867	18655375059	478.1367	10.39198	3.0728549	45	6.9277691	485581320.9
1986	1.1	134.6	0.817236256	638.6251	22215781654	261.2165	9.135846	3.2076694	45	5.4154526	193214907.5
1987	1.2	193.1	0.621439669	597.9009	29024891233	83.20754	19.49534	3.3296025	40	19.669476	610552091.5
1988	1.5	263.3	0.569692366	548.9034	29624118543	83.6232	16.94061	3.4389422	40	20.177126	378667097.7
1989	1.9	382.2	0.497121926	473.9444	30121991493	74.89669	34.18262	3.536548	40	28.969673	1884249739
1990	3	472.6	0.634786289	567.1859	33458483418	69.81269	30.92474	3.6229932	40	6.6689419	587882970.6
1991	3.8	545.7	0.696353308	502.6121	33526931287	59.04511	37.0216	5.2690001	40	18.863907	712373362.5
1992	0.5	875.3	0.057123272	476.8926	29018663728	48.92413	38.22739	5.2729998	35	46.752355	896641282.5
1993	9.5	1,090	0.871799	270.0636	30699263	53.5137	33.71975	4.435999	35	41.63905	13453685

			578		746			9		9	87
1994	12.3	1399.7	0.878759734	321.1313	33092276818	98.9684	23.05924	4.4289999	35	43.296464	1959219858
1995	21.9	2907.4	0.753250327	407.9425	34094439060	157.5363	39.52838	4.421	35	75.401653	1079271551
1996	22	4032.3	0.545594326	461.2524	31414754639	204.2861	40.25773	4.427	30	26.49109	1593459222
1997	26	4189.2	0.62064356	479.7088	28467535604	232.4856	51.46101	4.4229999	30	5.0553459	1539445718
1998	33.3	3989.5	0.834691064	469.1644	30313714708	268.964	39.27861	4.415	30	6.0093443	1051326217
1999	46.2	4679.2	0.987348265	497.562	29095550937	68.20654	34.45783	4.401	30	13.430572	1004916719
2000	51.1	6713.6	0.761141563	567.6144	32374088077	69.19784	48.9956	4.3959999	30	22.673737	1140167556
2001	68.7	6895.2	0.996345284	590.0553	31418239764	77.13765	49.6805	4.3990002	30	10.076477	1190618644
2002	89.1	7795.8	1.142923112	741.3403	31780094348	77.41115	40.03517	4.4029999	30	21.10905	1874070753
2003	114.8	9913.5	1.158016846	794.9529	36711571871	72.70942	49.33496	4.3969998	30	9.8043238	2005353563
2004	113	11411.1	0.990263866	1007.329	39898090686	74.58207	31.89587	4.3969998	30	22.368341	1874060887
2005	140.3	14610.9	0.960242011	1267.704	25754639315	85.26863	33.05946	4.3039999	30	19.858495	4982533930
2006	244.9	18564.6	1.319177359	1655.545	9617377579	90.52423	42.56657	4.2150002	30	23.864381	4854353979
2007	275.3	20657.3	1.332700789	1882.47	12144518677	89.59343	39.33693	4.1300001	30	7.099731	6036021405
2008	420.6	24296.3	1.731127785	2241.712	13128901893	99.15729	40.79684	4.0479999	30	7.9213872	8195499253
2009	600.1	24794.2	2.420324108	1890.389	15942067576	91.92908	36.05871	3.971	30	0.6860989	8554740717

2010	666.1	54612.2	1.219690838	2291.36	15484219062	100	43.32076	3.8989999	30	16.342766	6026232041
2011	659.6	62980.4	1.047309957	2519.29	17663306192	100.4061	53.27796	3.826	30	9.7784581	8841113287
2012	816.5	71713.9	1.13855194	2745.867	18127298622	111.6556	44.53237	3.7609999	30	9.9476367	7069934205
2013	963.6	80092.6	1.203107403	2996.964	21143710109	119.1415	31.04886	3.7	30	4.9647457	5562873606
2014	1180.4	89043.6	1.325642719	3221.678	24755952586	127.5896	30.88519	4.5599999	30	4.6626229	4651465948
2015	1229	81022.1	1.516870089	2729.763	28942969916	126.717	21.44693	4.3099999	30	2.8636651	3137318700
2016	933.537	84163.7	1.109192324	2175.656	31151474940	116.2647	20.72252	7.0599999	30	9.5436701	4445102771
2017	1215.05	88762.4	1.368886826	1968.426	40238485334	105.4964	26.3476	7.0430002	30	11.11891	3497233435

Sources: https://www.firs.gov.ng/tax-statistics.html, CBN Statistical Bulletin 2017, National Bureau of Statistics Database, WDI Database, & The Tax Revenue Extract from FIRS Quarterly Publications

APPENDIX II

Table B: Descriptive Statistics

	CTR/GDP	PCGDP	PUD	EXG	OPEN	UMP	CIT	INF	FDI
Mean	0.946581	1271.037	2.56E+10	149.6973	32.23791	4.130685	34.32432	22.66164	2.72E+09
Median	0.878760	881.9867	2.90E+10	99.15729	34.18262	4.304000	30.00000	13.43057	1.59E+09
Maximum	2.420324	3221.678	4.02E+10	531.8238	53.27796	7.060000	45.00000	219.0028	8.84E+09
Minimum	0.057123	270.0636	9.62E+09	48.92413	9.135846	2.163530	30.00000	0.686099	1.89E+08
Std. Dev.	0.426577	893.0894	8.52E+09	120.1980	12.73733	0.986599	5.911637	36.36061	2.60E+09
Skewness	1.017586	0.673439	-0.324428	1.782485	-0.344139	0.976434	0.877370	4.491330	1.033243
Kurtosis	5.355267	2.048460	1.961105	5.320362	2.132111	5.428930	2.122925	24.43147	2.811689
Jarque-Bera	14.93752	4.192577	2.312988	27.89351	1.891561	14.97482	5.932906	832.4939	6.638147
Probability	0.000571	0.122912	0.314587	0.000001	0.388376	0.000560	0.051486	0.000000	0.036186
Sum	35.02350	47028.38	9.48E+11	5538.798	1192.803	152.8354	1270.000	838.4807	1.01E+11
Sum Sq. Dev.	6.550857	28713912	2.62E+21	520112.1	5840.627	35.04162	1258.108	47595.37	2.44E+20
Observations	37	37	37	37	37	37	37	37	37

Table C: Multicollinearity test

estat vif

Variable	VIF	1/VIF
cit	7.41	0.134884
fdi	7.18	0.139266
open	5.17	0.193418

pcgdp	3.63 0.275113
ump	3.43 0.291603
pud	3.01 0.331736
exg	2.36 0.424341
inf	1.34 0.745752
Mean VIF	4.19

Table D: Unit Root Tests

ADF-URT at Level on corporate tax revenue/GDP

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

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.624826	0.0003
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(CTR)
Method: Least Squares
Date: 03/28/19 Time: 15:47
Sample (adjusted): 1982 2017
Included observations: 36 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CTR(-1)	-0.979771	0.174187	-5.624826	0.0000
C	-0.773394	0.220931	-3.500615	0.0014
@TREND("1981")	0.033311	0.009895	3.366454	0.0019

R-squared	0.489569	Mean dependent var	0.032544
Adjusted R-squared	0.458634	S.D. dependent var	0.661474
S.E. of regression	0.486696	Akaike info criterion	1.477303
Sum squared resid	7.816825	Schwarz criterion	1.609263

Log likelihood	-23.59146	Hannan-Quinn criter.	1.523361
F-statistic	15.82562	Durbin-Watson stat	1.994863
Prob(F-statistic)	0.000015		

ADF-URT at Level on PCGDP

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

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.103889	0.1207
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(PCGDP)
Method: Least Squares
Date: 03/28/19 Time: 15:41
Sample (adjusted): 1982 2017
Included observations: 36 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
PCGDP(-1)	-0.145243	0.046794	-3.103889	0.0039
C	0.757809	0.292862	2.587598	0.0143
@TREND("1981")	0.012849	0.003272	3.926951	0.0004

R-squared	0.333930	Mean dependent var	-0.002823
Adjusted R-squared	0.293562	S.D. dependent var	0.199643
S.E. of regression	0.167800	Akaike info criterion	-0.652436
Sum squared resid	0.929172	Schwarz criterion	-0.520477
Log likelihood	14.74386	Hannan-Quinn criter.	-0.606379
F-statistic	8.272181	Durbin-Watson stat	1.713435
Prob(F-statistic)	0.001225		

Null Hypothesis: D(PCGDP) has a unit root
Exogenous: None
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

	t-Statistic	Prob.*

Augmented Dickey-Fuller test statistic		-4.149931	0.0001
Test critical values:	1% level	-2.632688	
	5% level	-1.950687	
	10% level	-1.611059	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(PCGDP,2)
Method: Least Squares
Date: 03/28/19 Time: 15:44
Sample (adjusted): 1983 2017
Included observations: 35 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(PCGDP(-1))	-0.665862	0.160451	-4.149931	0.0002

R-squared	0.336175	Mean dependent var	0.001927
Adjusted R-squared	0.336175	S.D. dependent var	0.231785
S.E. of regression	0.188848	Akaike info criterion	-0.467598
Sum squared resid	1.212556	Schwarz criterion	-0.423159
Log likelihood	9.182962	Hannan-Quinn criter.	-0.452258
Durbin-Watson stat	2.131732		

ADF-URT at Level on PUD
Null Hypothesis: PUD has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.097245	0.2469
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(PUD)
Method: Least Squares
Date: 03/28/19 Time: 15:49
Sample (adjusted): 1982 2017

Included observations: 36 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
PUD(-1)	-0.196513	0.093700	-2.097245	0.0435
C	4.728927	2.238457	2.112583	0.0421

R-squared	0.114547	Mean dependent var	0.034923
Adjusted R-squared	0.088505	S.D. dependent var	0.222724
S.E. of regression	0.212639	Akaike info criterion	-0.204485
Sum squared resid	1.537328	Schwarz criterion	-0.116511
Log likelihood	5.680725	Hannan-Quinn criter.	-0.173780
F-statistic	4.398436	Durbin-Watson stat	1.498450
Prob(F-statistic)	0.043482		

Null Hypothesis: D(PUD) has a unit root
Exogenous: None
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.618369	0.0000
Test critical values:	1% level	-2.632688	
	5% level	-1.950687	
	10% level	-1.611059	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(PUD,2)
Method: Least Squares
Date: 03/28/19 Time: 15:52
Sample (adjusted): 1983 2017
Included observations: 35 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(PUD(-1))	-0.789043	0.170849	-4.618369	0.0001

R-squared	0.385220	Mean dependent var	0.005979
Adjusted R-squared	0.385220	S.D. dependent var	0.285321
S.E. of regression	0.223714	Akaike info criterion	-0.128742
Sum squared resid	1.701629	Schwarz criterion	-0.084304
Log likelihood	3.252992	Hannan-Quinn criter.	-0.113402
Durbin-Watson stat	1.852058		

ADF-URT at Level on Exchange rate

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

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.128284	0.2353
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(EXG)
Method: Least Squares
Date: 03/28/19 Time: 15:55
Sample (adjusted): 1982 2017
Included observations: 36 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EXG(-1)	-0.194019	0.091162	-2.128284	0.0406
C	0.898310	0.440217	2.040606	0.0491

R-squared	0.117561	Mean dependent var	-0.030628
Adjusted R-squared	0.091607	S.D. dependent var	0.360678
S.E. of regression	0.343761	Akaike info criterion	0.756215
Sum squared resid	4.017843	Schwarz criterion	0.844188
Log likelihood	-11.61186	Hannan-Quinn criter.	0.786920
F-statistic	4.529591	Durbin-Watson stat	1.432632
Prob(F-statistic)	0.040643		

ADF-URT at First Difference on Exchange rate

Null Hypothesis: D(EXG) has a unit root
Exogenous: None
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.538788	0.0000
Test critical values:	1% level	-2.632688	

	5% level	-1.950687
	10% level	-1.611059

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(EXG,2)
Method: Least Squares
Date: 03/28/19 Time: 15:56
Sample (adjusted): 1983 2017
Included observations: 35 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(EXG(-1))	-0.755553	0.166466	-4.538788	0.0001

R-squared	0.377258	Mean dependent var	-0.003499
Adjusted R-squared	0.377258	S.D. dependent var	0.451318
S.E. of regression	0.356153	Akaike info criterion	0.801242
Sum squared resid	4.312726	Schwarz criterion	0.845681
Log likelihood	-13.02174	Hannan-Quinn criter.	0.816582
Durbin-Watson stat	1.955457		

ADF-URT at Level on OPEN
Null Hypothesis: OPEN has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.831756	0.3597
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(OPEN)
Method: Least Squares
Date: 03/28/19 Time: 15:57
Sample (adjusted): 1982 2017
Included observations: 36 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.

OPEN(-1)	-0.166999	0.091169	-1.831756	0.0758
C	0.573415	0.310847	1.844689	0.0738

R-squared	0.089822	Mean dependent var	0.010320
Adjusted R-squared	0.063052	S.D. dependent var	0.285825
S.E. of regression	0.276668	Akaike info criterion	0.321954
Sum squared resid	2.602533	Schwarz criterion	0.409928
Log likelihood	-3.795181	Hannan-Quinn criter.	0.352660
F-statistic	3.355330	Durbin-Watson stat	2.226816
Prob(F-statistic)	0.075761		

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

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-7.410279	0.0000
Test critical values:	1% level	-4.243644	
	5% level	-3.544284	
	10% level	-3.204699	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(OPEN,2)
Method: Least Squares
Date: 03/28/19 Time: 15:58
Sample (adjusted): 1983 2017
Included observations: 35 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(OPEN(-1))	-1.256462	0.169557	-7.410279	0.0000
C	0.122767	0.102111	1.202282	0.2381
@TREND("1981")	-0.005436	0.004753	-1.143758	0.2612

R-squared	0.631828	Mean dependent var	0.014766
Adjusted R-squared	0.608818	S.D. dependent var	0.449164
S.E. of regression	0.280928	Akaike info criterion	0.380376
Sum squared resid	2.525449	Schwarz criterion	0.513692
Log likelihood	-3.656588	Hannan-Quinn criter.	0.426397
F-statistic	27.45799	Durbin-Watson stat	1.967132
Prob(F-statistic)	0.000000		

ADF-URT at Level on UMP

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

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.231009	0.4590
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(UMP)
Method: Least Squares
Date: 03/28/19 Time: 15:59
Sample (adjusted): 1982 2017
Included observations: 36 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
UMP(-1)	-0.239090	0.107167	-2.231009	0.0326
C	0.311655	0.128315	2.428823	0.0208
@TREND("1981")	0.002710	0.002227	1.216886	0.2323

R-squared	0.131643	Mean dependent var	0.032786
Adjusted R-squared	0.079015	S.D. dependent var	0.115436
S.E. of regression	0.110782	Akaike info criterion	-1.482850
Sum squared resid	0.404997	Schwarz criterion	-1.350890
Log likelihood	29.69129	Hannan-Quinn criter.	-1.436792
F-statistic	2.501392	Durbin-Watson stat	1.929167
Prob(F-statistic)	0.097393		

ADF-URT at First Difference on UMP

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

	t-Statistic	Prob.*

Augmented Dickey-Fuller test statistic		-6.282901	0.0000
Test critical values:	1% level	-3.632900	
	5% level	-2.948404	
	10% level	-2.612874	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(UMP,2)
Method: Least Squares
Date: 03/28/19 Time: 16:00
Sample (adjusted): 1983 2017
Included observations: 35 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(UMP(-1))	-1.079260	0.171777	-6.282901	0.0000
C	0.032569	0.020635	1.578292	0.1240

R-squared	0.544670	Mean dependent var	-0.003901
Adjusted R-squared	0.530872	S.D. dependent var	0.171042
S.E. of regression	0.117152	Akaike info criterion	-1.395248
Sum squared resid	0.452910	Schwarz criterion	-1.306371
Log likelihood	26.41684	Hannan-Quinn criter.	-1.364568
F-statistic	39.47484	Durbin-Watson stat	2.005411
Prob(F-statistic)	0.000000		

ADF-URT at Level on CIT
Null Hypothesis: CIT has a unit root
Exogenous: None
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.850623	0.0618
Test critical values:	1% level	-2.630762	
	5% level	-1.950394	
	10% level	-1.611202	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(CIT)

Method: Least Squares
Date: 03/28/19 Time: 16:01
Sample (adjusted): 1982 2017
Included observations: 36 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CIT(-1)	-0.003320	0.001794	-1.850623	0.0727

R-squared	0.007406	Mean dependent var	-0.011263
Adjusted R-squared	0.007406	S.D. dependent var	0.038135
S.E. of regression	0.037993	Akaike info criterion	-3.675428
Sum squared resid	0.050522	Schwarz criterion	-3.631442
Log likelihood	67.15771	Hannan-Quinn criter.	-3.660076
Durbin-Watson stat	2.188425		

ADF-URT at Level on INF

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

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.002989	0.0014
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(INF)
Method: Least Squares
Date: 03/28/19 Time: 16:03
Sample (adjusted): 1982 2017
Included observations: 36 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INF(-1)	-0.776083	0.155124	-5.002989	0.0000
C	2.287229	0.594653	3.846323	0.0005
@TREND("1981")	-0.019668	0.015032	-1.308391	0.1998

R-squared	0.439584	Mean dependent var	-0.082790

Adjusted R-squared	0.405620	S.D. dependent var	1.098088
S.E. of regression	0.846583	Akaike info criterion	2.584438
Sum squared resid	23.65119	Schwarz criterion	2.716398
Log likelihood	-43.51989	Hannan-Quinn criter.	2.630496
F-statistic	12.94242	Durbin-Watson stat	1.847117
Prob(F-statistic)	0.000071		

ADF-URT at Level on FDI

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

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.474249	0.0007
Test critical values:	1% level	-4.339330	
	5% level	-3.587527	
	10% level	-3.229230	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(FDI)
Method: Least Squares
Date: 03/28/19 Time: 16:06
Sample (adjusted): 1991 2017
Included observations: 27 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FDI(-1)	-2.516694	0.459733	-5.474249	0.0001
D(FDI(-1))	1.580617	0.343759	4.598037	0.0003
D(FDI(-2))	1.629508	0.320118	5.090337	0.0001
D(FDI(-3))	1.683677	0.303313	5.550955	0.0001
D(FDI(-4))	1.557513	0.294099	5.295874	0.0001
D(FDI(-5))	1.485097	0.286670	5.180503	0.0001
D(FDI(-6))	1.228966	0.287552	4.273884	0.0007
D(FDI(-7))	0.877904	0.242122	3.625870	0.0025
D(FDI(-8))	0.715111	0.192871	3.707713	0.0021
D(FDI(-9))	0.466564	0.125382	3.721132	0.0020
C	47.77556	8.677847	5.505463	0.0001
@TREND("1981")	0.246715	0.046819	5.269547	0.0001

R-squared	0.753145	Mean dependent var	0.066044
Adjusted R-squared	0.572119	S.D. dependent var	0.340225

S.E. of regression	0.222550	Akaike info criterion	0.133776
Sum squared resid	0.742930	Schwarz criterion	0.709704
Log likelihood	10.19402	Hannan-Quinn criter.	0.305030
F-statistic	4.160409	Durbin-Watson stat	2.386524
Prob(F-statistic)	0.006044		

ADF-URT at Level on ECM

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

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-7.828771	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(ECM)
Method: Least Squares
Date: 03/29/19 Time: 07:55
Sample (adjusted): 1982 2017
Included observations: 36 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ECM(-1)	-1.295522	0.165482	-7.828771	0.0000
C	-0.007549	0.066923	-0.112804	0.9108

R-squared	0.643193	Mean dependent var	0.005542
Adjusted R-squared	0.632699	S.D. dependent var	0.662340
S.E. of regression	0.401413	Akaike info criterion	1.066303
Sum squared resid	5.478512	Schwarz criterion	1.154276
Log likelihood	-17.19345	Hannan-Quinn criter.	1.097008
F-statistic	61.28965	Durbin-Watson stat	2.022084
Prob(F-statistic)	0.000000		

Table E: ARDL Model Estimation Result

Dependent Variable: CTR
Method: ARDL
Date: 03/29/19 Time: 08:51
Sample (adjusted): 1982 2017
Included observations: 36 after adjustments
Maximum dependent lags: 1 (Automatic selection)
Model selection method: Schwarz criterion (SIC)
Dynamic regressors (0 lag, automatic): PCGDP PUD EXG OPEN UMP CIT INF FDI
Fixed regressors: C @TREND

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
CTR(-1)	0.004071	0.165979	0.024529	0.9806
PCGDP	-0.892352	0.364331	-2.449286	0.0217
PUD	-0.351958	0.370430	-0.950134	0.3511
EXG	1.071051	0.182092	0.390194	0.6997
OPEN	-0.308264	0.345534	-0.892139	0.3808
UMP	-1.764527	0.714419	-2.469879	0.0207
CIT	1.854588	1.864961	0.994438	0.3295
INF	-0.133616	0.105542	-1.266000	0.2172
FDI	0.048811	0.210085	0.232338	0.8182
C	8.107918	12.71766	0.637532	0.5296
@TREND	0.121722	0.046557	2.614484	0.0149

R-squared	0.620054	Mean dependent var	-0.161057
Adjusted R-squared	0.468076	S.D. dependent var	0.593188
S.E. of regression	0.432631	Akaike info criterion	1.408603
Sum squared resid	4.679230	Schwarz criterion	1.892456
Log likelihood	-14.35485	Hannan-Quinn criter.	1.577481
F-statistic	4.079890	Durbin-Watson stat	2.242128
Prob(F-statistic)	0.002075		

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

Table F: ARDL Bounds Test

ARDL Bounds Test
Date: 03/29/19 Time: 08:55
Sample: 1982 2017
Included observations: 36
Null Hypothesis: No long-run relationships exist

Test Statistic	Value	k
F-statistic	10.14897	8

Critical Value Bounds

Significance	I0 Bound	I1 Bound
10%	2.26	3.34
5%	2.55	3.68
2.5%	2.82	4.02
1%	3.15	4.43

Test Equation:
Dependent Variable: D(CTR)
Method: Least Squares
Date: 03/29/19 Time: 08:55
Sample: 1982 2017
Included observations: 36

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	31.37117	10.90539	2.876666	0.0081
@TREND	0.084792	0.041397	1.323578	0.0976
PCGDP(-1)	-0.662581	0.308706	-2.146321	0.0417
PUD(-1)	-0.460898	0.312178	-1.476395	0.1523
EXG(-1)	-0.168341	0.166410	-1.011603	0.3214
OPEN(-1)	-1.054870	0.292577	-3.605442	0.0014
UMP(-1)	-1.952041	0.707909	-2.757475	0.0107
CIT(-1)	-3.574550	1.565922	-2.282713	0.0312
INF	-0.201529	0.094063	-2.142480	0.0421
FDI(-1)	0.146387	0.172704	0.847617	0.4047
CTR(-1)	-1.369153	0.163644	-8.366650	0.0000

R-squared	0.785156	Mean dependent var	0.032544
Adjusted R-squared	0.699218	S.D. dependent var	0.661474
S.E. of regression	0.362776	Akaike info criterion	1.056406
Sum squared resid	3.290161	Schwarz criterion	1.540259
Log likelihood	-8.015303	Hannan-Quinn criter.	1.225283
F-statistic	9.136333	Durbin-Watson stat	2.475609
Prob(F-statistic)	0.000004		

Table G: ARDL Equations

ARDL Cointegrating And Long Run Form
Dependent Variable: CTR
Selected Model: ARDL(1, 0, 0, 0, 0, 0, 0, 0, 0)
Date: 03/29/19 Time: 09:03
Sample: 1981 2017
Included observations: 36

Cointegrating Form

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(PCGDP)	-0.892352	0.364331	-2.449286	0.0217
D(PUD)	-0.351958	0.370430	-0.950134	0.3511
D(EXG)	1.071051	0.182092	0.390194	0.0697
D(OPEN)	-0.308264	0.345534	-0.892139	0.3808
D(UMP)	-1.764527	0.714419	-2.469879	0.0207
D(CIT)	1.854588	1.864961	0.994438	0.3295
D(INF)	-0.133616	0.105542	-1.266000	0.2172
D(FDI)	1.048811	0.210085	0.232338	0.0812
D(@TREND())	0.121722	0.046557	2.614484	0.0149
CointEq(-1)	-0.995929	0.165979	-6.000327	0.0000

Cointeq = CTR - (-0.8960*PCGDP -0.3534*PUD + 0.0713*EXG -0.3095
*OPEN -1.7717*UMP + 1.8622*CIT -0.1342*INF + 0.0490*FDI + 8.1411 +
0.1222*@TREND)

Long Run Coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
PCGDP	-0.896000	0.429202	-2.087596	0.0472
PUD	-0.353397	0.382572	-0.923740	0.3645
EXG	1.071342	0.183317	0.389172	0.0704
OPEN	-0.309524	0.349751	-0.884986	0.3846
UMP	-1.771740	0.789021	-2.245493	0.0338
CIT	1.862170	1.944729	0.957547	0.3475
INF	-0.134162	0.106990	-1.253969	0.2215
FDI	1.049010	0.211019	0.232256	0.0812
C	8.141062	12.903031	0.630942	0.5338
@TREND	0.122219	0.052146	2.343778	0.0273

Table H: Diagnostic Tests

Ramsey RESET Test
Equation: UNTITLED
Specification: CTR CTR(-1) PCGDP PUD EXG OPEN UMP CIT INF FDI C
@TREND
Omitted Variables: Squares of fitted values

	Value	df	Probability
t-statistic	3.010737	24	0.1060
F-statistic	9.064537	(1, 24)	0.1060

F-test summary:

	Sum of Sq.	df	Mean Squares
Test SSR	1.282796	1	1.282796
Restricted SSR	4.679230	25	0.187169
Unrestricted SSR	3.396434	24	0.141518

Unrestricted Test Equation:
Dependent Variable: CTR
Method: ARDL
Date: 03/29/19 Time: 09:10
Sample: 1982 2017
Included observations: 36
Maximum dependent lags: 1 (Automatic selection)
Model selection method: Schwarz criterion (SIC)
Dynamic regressors (0 lag, automatic):
Fixed regressors: C @TREND

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
CTR(-1)	-0.003996	0.144350	-0.027685	0.9781
PCGDP	-0.256058	0.380825	-0.672378	0.5078
PUD	-0.158697	0.328437	-0.483189	0.6333
EXG	-0.087758	0.166891	-0.525841	0.6038
OPEN	-0.104826	0.307959	-0.340388	0.7365
UMP	-0.728104	0.710218	-1.025184	0.3155
CIT	1.346852	1.630400	0.826087	0.4169
INF	-0.187902	0.093527	-2.009067	0.0559
FDI	0.080822	0.182986	0.441686	0.6627
C	0.412704	11.35002	0.036362	0.9713
@TREND	0.053035	0.046469	1.141297	0.2650

FITTED^2	-0.768900	0.255386	-3.010737	0.0060

R-squared	0.724215	Mean dependent var	-0.161057
Adjusted R-squared	0.597814	S.D. dependent var	0.593188
S.E. of regression	0.376189	Akaike info criterion	1.143751
Sum squared resid	3.396434	Schwarz criterion	1.671591
Log likelihood	-8.587517	Hannan-Quinn criter.	1.327981
F-statistic	5.729492	Durbin-Watson stat	2.508221
Prob(F-statistic)	0.000177		

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

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	1.061576	Prob. F(2,23)	0.3623
Obs*R-squared	3.042351	Prob. Chi-Square(2)	0.2185

Test Equation:
Dependent Variable: RESID
Method: ARDL
Date: 03/29/19 Time: 09:12
Sample: 1982 2017
Included observations: 36
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CTR(-1)	0.345585	0.291572	1.185246	0.2480
PCGDP	0.160390	0.405357	0.395676	0.6960
PUD	0.064437	0.373241	0.172641	0.8644
EXG	-0.049231	0.185441	-0.265482	0.7930
OPEN	-0.080179	0.356838	-0.224693	0.8242
UMP	0.357271	0.767142	0.465717	0.6458
CIT	-1.153271	2.100909	-0.548939	0.5883
INF	-0.006178	0.105395	-0.058619	0.9538
FDI	0.020923	0.211925	0.098730	0.9222
C	1.791309	12.94528	0.138375	0.8911
@TREND	-0.040222	0.056744	-0.708841	0.4855
RESID(-1)	-0.524985	0.393925	-1.332703	0.1957
RESID(-2)	0.133821	0.237071	0.564474	0.5779

R-squared	0.084510	Mean dependent var	-3.03E-15
Adjusted R-squared	-0.393137	S.D. dependent var	0.365640
S.E. of regression	0.431569	Akaike info criterion	1.431418
Sum squared resid	4.283790	Schwarz criterion	2.003245

Log likelihood	-12.76553	Hannan-Quinn criter.	1.631001
F-statistic	0.176929	Durbin-Watson stat	1.948134
Prob(F-statistic)	0.998336		

Heteroskedasticity Test: Breusch-Pagan-Godfrey

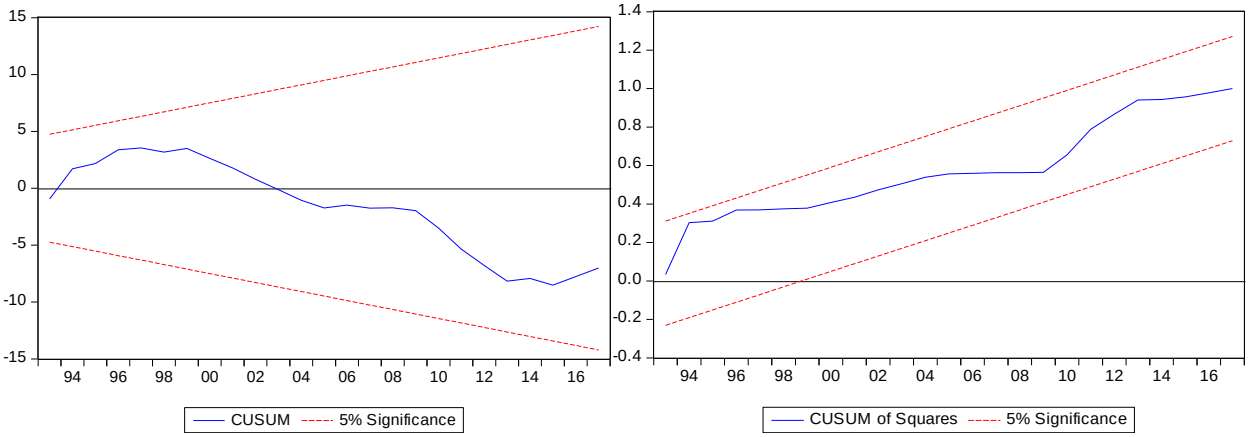
F-statistic	1.480702	Prob. F(10,25)	0.2046
Obs*R-squared	13.39092	Prob. Chi-Square(10)	0.2026
Scaled explained SS	36.52982	Prob. Chi-Square(10)	0.1001

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 03/29/19 Time: 09:14
Sample: 1982 2017
Included observations: 36

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3.577831	12.22163	0.292746	0.7721
CTR(-1)	0.052985	0.159505	0.332184	0.7425
PCGDP	0.649949	0.350121	1.856353	0.0752
PUD	-0.103001	0.355982	-0.289344	0.7747
EXG	-0.269304	0.174990	-1.538963	0.1364
OPEN	0.184453	0.332057	0.555487	0.5835
UMP	1.897131	0.686554	2.763264	0.0106
CIT	-1.249469	1.792222	-0.697162	0.4921
INF	0.001986	0.101425	0.019583	0.9845
FDI	-0.075244	0.201891	-0.372698	0.7125
@TREND	-0.079435	0.044741	-1.775454	0.0880

R-squared	0.371970	Mean dependent var	0.129979
Adjusted R-squared	0.120758	S.D. dependent var	0.443389
S.E. of regression	0.415757	Akaike info criterion	1.329035
Sum squared resid	4.321343	Schwarz criterion	1.812888
Log likelihood	-12.92264	Hannan-Quinn criter.	1.497913
F-statistic	1.480702	Durbin-Watson stat	2.054957
Prob(F-statistic)	0.204578		

Stability Tests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10
5
0
-5
-10
-15
94 96 98 00 02 04 06 08 10 12 14 16
CUSUM
5% Significance
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-0.2
-0.4
94 96 98 00 02 04 06 08 10 12 14 16
CUSUM of Squares
5% Significance