# Empirical Evidence of the Effectiveness of Fiscal and Monetary Policies on Saudi Arabia GDP Sectors

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# Abstract

The economic framework of the Kingdom of Saudi Arabia (KSA) presents unique challenges because of its absence of taxation and peg to the United States dollar (USD). Accordingly, it is important for policy-makers to examine the effectiveness of monetary and fiscal policy to achieve their economic objectives. Specifically, this research examines the relative effectiveness of monetary and fiscal policies on Saudi Arabian total gross domestic product (GDP), oil GDP and non-oil GDP.

The data employed included GDP, money supply, interest rates, commercial bank claims on the private sector, inflation, merchandise exports, merchandise imports, government expenditure and government revenues. Annual data for the period 1980–2017 were employed for the analysis, obtained from the Saudi Arabian Monetary Authority (SAMA) and the General Authority for Statistics (GASTAT). An autoregressive distributed lag (ARDL) bounds test was estimated to investigate the effectiveness of monetary and fiscal policies on Saudi GDP sectors, in the short-term and long-term. Several robustness tests were also employed.

The estimation results for total GDP and oil GDP shared similarities. For instance, fiscal policy, represented by government expenditure and revenues, were shown to have a positive and significant impact in the long-term. In the short run, however, fiscal policy via government revenue was indeterminate for both total GDP and oil GDP, while government expenditure had a significant negative impact on total GDP. For oil GDP, government expenditure had a significant and positive effect in the first lag but a negative and significant impact in the second lag. For monetary policy, the estimation results demonstrated that the interest rate, commercial bank claims on the private sector and inflation had a significant positive effect in the long-term on total and oil GDP. However, in the short-term, monetary policy produced a significant negative impact only for inflation; for the other variables, it was shown to be indeterminate. In addition, money supply had a significant negative effect on oil GDP but an insignificant negative effect for total GDP in the long-term, while it was indeterminate in the short-term. Openness to the world was represented by merchandise exports and merchandise imports. The former had a positive and significant effect for the long-term and the short-term, while the latter

was shown to have a significant negative effect in the long-term as well as in the first lag of the short-term; however, the second lag of the short-term was positive and significant.

For fiscal policy, the estimation results for non-oil GDP had negative and significant effects in the long-term for both government expenditure and government revenues. However, in the short-term, government revenues had significant and negative effects in the first lag but significant and positive effects in the second lag, while government expenditure was indeterminate. With respect to monetary policy, money supply had a significant and positive impact for both the long-term and the short-term in the first lag, but a negative and significant effect in the second lag. For the variables interest rates and commercial bank claims, the results were positive and insignificant in the long-term, and indeterminate in the short-term. In addition, inflation was shown to have a significant and negative effect in both the long and short-term. With respect to openness to the world, merchandise exports and imports were found to have positive and significant effects on non-oil GDP in the long-term, and the short-term for merchandise exports; however, merchandise imports were indeterminate in the short-term.

The potential policy implications arising from the study include the following. First, fiscal policy should be enhanced to engender a significant impact in the short-term; for instance, fiscal policy should centre on attracting more private investors to mitigate crowding-out effect outcomes related to non-oil GDP. Second, further enhancement of monetary policy tools to assist the Saudi government in achieving economic diversity given their impact on non-oil GDP is required. Third, refining the use of fiscal policy to impact non-oil GDP is also required. This would contribute to achieving the goals of Vision 2030, and could take the form of the adoption of a modern taxation system that could provide a more stable source of income to help insulate the KSA from plunging oil prices. Finally, greater consideration should be given to the adoption of monetary policy tools that comply with Islamic principles. This could assist the government to assert greater control over its monetary policy.

# Declaration of Authenticity

I, Badr Abdulaziz A Binzaid, declare that the PhD thesis entitled 'Empirical Evidence of the Effectiveness of Fiscal and Monetary Policies on Saudi Arabia GDP Sectors' is no more than 100,000 words in length including quotes and exclusive of tables, figures, appendices, bibliography, references and footnotes. This thesis contains no material that has been submitted previously, in whole or in part, for the award of any other academic degree or diploma. Except where otherwise indicated, this thesis is my own work.

Signed: ___ [redacted] ___ On: 17th December 2019

# Dedication

I must praise Almighty God for the enormous blessings bestowing on me all the way through my life and studies. I would like to express my gratefulness to God Almighty for providing the opportunity, uncountable blessings and guidance for me in completing this PhD.

This work is dedicated to my wife, Norah, and daughters, Dyala and Lena. Thanks for all your support, patience and love. This is extended to my mentors in life and the persons responsible for providing me with the mental courage, support and challenges to overcome difficulties—my mother, Hessa Abonayan, and my father, Abdulaziz Binzaid.

It has been a long and challenging journey to undertake a higher degree, and therefore, I would like to express my deepest gratitude to my beloved family, to whom I dedicate my thesis. I have been tremendously fortuitous to have their unconditional love and continuous encouragement and prayers. Thanks to my brothers and sisters, to my wife, to my children, who were always there; thank you for always bringing happiness and for sometimes accompanying me while doing my thesis. It seems a trivial thing, but it strongly encouraged me in completing the thesis.

It was all impossible without the blessings from Allah the Mighty. I wish to cherish the gift of life by living it gratefully.

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# List of Abbreviations

| | |
|---|---|
| ADF | Augmented Dickey–Fuller |
| AIC | Akaike Information Criterion |
| A-J | Andersen and Jordan |
| ARDL | Autoregressive Distributed Lag |
| CBC | Commercial Banks Clams on the Private Sector |
| CCR | Canonical Correlation Regression |
| CPI | Consumer Price Index |
| CUSUM | Cumulative Sum |
| CUSUMSQ | Cumulative Sum of Squire |
| DOLS | Dynamic Ordinary Least Squares |
| ECM | Error Correction Models |
| EITI | Extractive Industries Transparency Initiative |
| FMOLS | Fully Modified Ordinary Least Squares |
| FP | Fiscal Policy |
| GASTAT | General Authority for Statistics |
| GAZT | General Authority of Zakat and Tax |
| GCC | Gulf Cooperation Council |
| GDP | Gross Domestic Product |
| GE | Government Expenditure |
| GNP | Gross National Product |
| GPFG | Norway's Government Pension Fund |
| GR | Government Revenues |
| HQ | Hannan–Quinn Information Criterion |
| I | Interest Rate |
| IMF | International Monetary Fund |
| MI | Merchandise Imports |
| IRF | Impulse Response Functions |
| IS | Investment—Savings |
| KAPSARC | King Abdullah Petroleum Studies and Research Centre |
| KSA | Kingdom of Saudi Arabia |
| LM | Liquidity Preference—Money Supply |

| | |
|---|---|
| ME | Merchandise Export |
| MENA | Middle East and North Africa |
| MFPU | Macro Fiscal Policy Unit |
| MP | Monetary Policy |
| MS | Money Supply |
| MTFF | Medium-Term Fiscal Framework |
| OECD | Organisation for Economic Co-operation and Development |
| OLS | Ordinary Least Squares |
| OPEC | Organization of the Petroleum Exporting Countries |
| PIF | Public Investment Fund |
| REDF | Real Estate Development Fund |
| SAAB | Saudi Arabian Agricultural Bank |
| SAMA | Saudi Arabian Monetary Authority |
| SAR | Saudi Riyal |
| SCB | Saudi Credit Bank |
| SIC | Schwarz Information Criterion |
| SIDF | Saudi Industrial Development Fund |
| SME | Small and Medium-sized Enterprise |
| UK | United Kingdom |
| US | United States |
| USD | United States Dollar |
| VAR | Vector Autoregressive |
| VAT | Value-Added Tax |
| VDC | Variance Decompositions |
| VECM | Vector Error Correction Models |

# Chapter 1: Introduction

## 1.1 Research Background

Fiscal and monetary policies play an important role in the internal and external functioning of a country's economy. Monetary policy involves the employment of tools to control inflation and the money supply to maintain full employment, stabilise inflation and promote economic growth, as measured by gross domestic product (GDP). Fiscal policy refers to actions taken to increase government revenue and to optimise government expenditure to achieve the economic goals of the country. These two primary policies are designed to achieve economic GDP growth, optimal interest rates, manageable inflation, optimal exchange rates, employment growth, investment and savings growth, sustainable international trade and internal and external economic stability (Alkhateeb et al. 2017; Kitous et al. 2016). Although the purpose is similar, for the Kingdom of Saudi Arabia (KSA), the means to implement these policies are different.

In line with its vast fossil-fuel reserves, the KSA depends significantly on petroleum products. Although this has been a crucial factor in the financial success of the KSA, it has also led to issues related to oil price instability and other concerns typical of a commodity-based economy. Specifically, oil price instability, attributable mainly to inflation, unemployment and general unfavourable economic conditions over the past decade, have posed major economic challenges in Saudi Arabia. For example, the oil price plummet of 2014 had a significant impact on the national economy (Abdel-Latif, Osman & Ahmed 2018). Tuama (2018) emphasised that reliance on oil revenues as a depleted economic resource has many risks in a country where revenues do not depend on taxes, such as Saudi Arabia. Specifically, in Saudi Arabia, personal income tax is not levied, although individuals contribute 2.5% of their wealth as a Zakat[1] to the community (Auty 2001).

One of the factors underlying this situation is the limited policy framework in the KSA, which lacks adequate distribution of surpluses generated by the largest economic sector, which is devoid of direct or indirect taxes, although the Government of Saudi Arabia

[1] Zakat is an Islamic financial concept implying an obligation of a person to donate a proportion of income to charitable causes annually.

introduced a value-added tax (VAT) in 2018. Akikina and Al-Hoshan (2003) describe the situation of the interest rate in KSA, which differs from most of the world since it is not officially recognised in their policy framework. This limits the availability of monetary tools and targets of the Saudi Arabian Monetary Authority (SAMA), which is responsible for implementing monetary policy in the KSA (Akikina & Al-Hoshan 2003; Auty 2001; Tuama 2018). This will be discussed in detail in Section 3.5.4 of this thesis.

Since both monetary and fiscal policies have significant effects on economic growth, the effectiveness of these policies depends greatly on the appropriate application of instruments, which in turn requires a deep and clear understanding of the underlying relationships among the major determinant factors. The present research aims to explore the effectiveness of monetary and fiscal policy for Saudi GDP from three perspectives: (i) total GDP, (ii) oil GDP and (iii) non-oil GDP. The results of such an approach will aid authorities to implement targeted policies.

In the KSA context, as there is no income tax, government revenue is sourced from a single resource (i.e. oil revenue), while monetary policy is employed via SAMA, which is subject to limitations on the use of the cash rate and the exchange rate being pegged[2] to the United States dollar (USD). Consequently, Saudi Arabia does not operate under a conventional interest-based monetary framework nor a conventional fiscal framework, and therefore, does not follow the macroeconomic policies of other economies.

### 1.1.1 Monetary and Fiscal Policy Context Settings

Researchers have dissected the operations of monetary policy and fiscal policy and the effects of these policies in traditional as well as Islamic economies. Previous studies have acknowledged the correlation between the implementation of monetary and fiscal policies to suit the major source of government revenue (Adegoriola 2018; Falade & Folorunso 2015; Musa, Asare & Gulumbe 2013). The effectiveness of fiscal policies differs depending on whether finances originate from oil-based industries or diversified industries (Céspedes & Velasco 2014). Fiscal policies are shaped by the economic development level of a country, tending to be either countercyclical or a-cyclical in developed economies and pro-cyclical in developing states (Afonso, Agnello & Furceri

[2] The terms fixed exchange rate and pegged exchange rate will be used interchangeably throughout the thesis to describe the status of the Saudi exchange rate policy since the pegging of the Saudi Riyal (SAR) to the USD in June 1986 (at a rate of SAR 3.75 per USD).

2010). The degree of economic development implies the analysis of different factors in terms of revenue, including government size, volatility, spending and taxation (Afonso & Furceri 2010; Tenhofen, Wolff & Heppke-Falk 2010). More particularly, the case of Saudi Arabia necessitates a different approach to fiscal policy evaluation because of the absence of a taxation system in the country.

With respect to monetary policy, numerous studies have been conducted on the effectiveness of traditional monetary policy tools such as the cash rate, reserve requirements, the interest rate and the discount rate (Atkin & La Cava 2017; Chen & Barnett 2015; Romer & Romer 2013); however, Saudi Arabia is under a fixed rate regime. As Amar, Hachicha and Saadallah (2015) pointed out, the pegged exchange rate remains an unattended problem that may have serious ramifications for the Saudi economy. On the positive side, a peg allows stability when it is credible and follows the interest rate of the base economy; lower interest rates, provision of a clear and easy-to-understand nominal anchor and moderate inflationary expectations for high-inflation countries are additional positive effects of a pegged exchange rate (Alkhareif, Barnett & Qualls 2017). On the negative side, an overdependence on this policy requires additional analyses to ascertain associated vulnerabilities, such as a lack of ability to absorb shocks in the economy (Shambaugh 2004). Alkhareif, Barnett and Qualls (2017) found that Saudi Arabia has more stable economic growth and inflation rates than countries with similar economic structures but other exchange rate regimes.

Although a plethora of studies focus on the peculiarities of Islamic economics, empirical evidence pertaining to Gulf Cooperation Council (GCC) countries (namely, oil-based economies) remains scarce. In fact, fiscal and monetary policy together have not been studied with reference to Saudi Arabia since Looney (1989)—three decades ago. Since that time, the KSA has undergone significant socio-political changes and implemented many economic policies and five-year plans, which have all resulted in a vastly different socio-economic structure. A component of this transformation is the plan to diversify the economy and to create a knowledge-based economy in line with Vision 2030 (Blazquez, Hunt & Manzano 2017). Other initiatives aimed at economic development include the Fiscal Balance Vision Realization Program and the Financial Sector Development Vision Realization Program. The first program covers foresight in fiscal performance, with an objective to maximise oil and non-oil government revenues, along with increasing

government spending efficiency and managing risks associated with these processes. The sustainability goal targets stability of the government reserve account while preserving the ability to borrow funds as per the medium-term debt strategy. The second program aims at the development of a diversified financial sector, with a specific focus on broadening sources of income and stimulating savings and investment. This aim is to be achieved through support for private sector growth, formation of advanced capital markets, and financial planning. The Saudi economy has strengthened significantly over the past decade because of the large increases in the price of oil, which has subsequently seen government spending increase to its highest-ever levels and government debt decline to extremely low levels (Pant & Behar 2015).

In line with oil revenues accounting for more than 80% of total Saudi government revenues, the 2014 oil price crash, coupled with high levels of government spending, resulted in a fiscal deficit of more than USD118 billion in 2016 (about 16% of GDP). This led to fiscal action, including cuts in government spending. The budget deficit for 2018 reached SAR136 billion (about 4.6% of GDP). Thus, a sharp and continuous drop in government revenues would certainly harm government development plans, as occurred during the 2004 oil price plunge (Ramady 2010). Since fiscal policy tools are key levers to influence the macroeconomy, a major reliance on oil revenues, along with an absence of taxation, generates important complications for KSA policy-makers (Hegazy 2015). However, as Al Rajhi et al. (2012) stated, in practice, it implies governmental budgeting corrections contrary to imposing taxation. According to Callen and Qu (2014), 80% of Saudi Arabia's fiscal revenues come from oil; hence, despite endeavours to broaden and expand the economy, the KSA is heavily exposed to external factors, such as the 2004 oil price plunge, exerting a negative impact on the economy (Ramady 2010).

Over the past two decades, oil prices have been characterised by an upward trend, such that they increased from USD17.48 per barrel in 1999 to the highest-ever level of USD109.45 per barrel in 2012—a trend that came to an end, with a sharp drop starting from 2014, and reaching a low of USD40.76 per barrel in 2016. Figure 1 presents average annual Organization of Petroleum Exporting Countries (OPEC) crude oil price during 1999–2018.

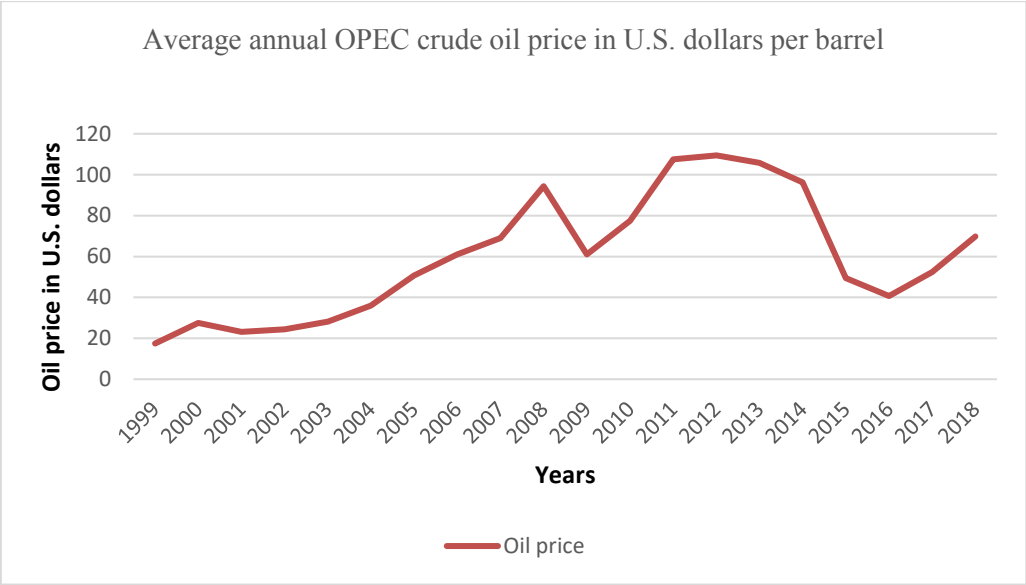



**Figure 1.1: Average Annual OPEC Crude Oil Price in US Dollars Per Barrel, 1999–2018**

**Note:** Adopted from SAMA's fifty-fourth annual report of 2018.

With a rich natural resource and oil-based economy, income generated from oil exports plays a critical role in the oil export-oriented policy adopted by the government accounting for approximately 90% of total merchandise exports (Samargandi, Fidrmuc & Ghosh 2014). Although this has resulted in substantial surpluses in its overall trade, this source of revenue is considered to be volatile. For instance, Afangideh, Ujunwa and Ukemenam (2018) suggested that crude oil prices have a significant negative effect on government revenue in the short term and the long term. Hence, expedient government actions to diversify the economy to other less-volatile sources of revenues should be considered. With regards to imports, the Saudi economy depends largely on imports for both capital formation and consumer goods. For example, Saudi Arabia imports nearly 70% of its food (The Embassy of the Kingdom of Saudi Arabia n.d.). With such reliance on a single sector in exports and imports of merchandise, Saudi Arabia should explore alternative opportunities for growth and expansion in non-oil and non-food sectors.

As the discussion above demonstrated, the Saudi economic structure and policy framework is somewhat different to most other nations. Non-employment of traditional fiscal and monetary policies have arisen because of a number of factors, including but not limited to (i) the significant revenue obtained from the government-owned oil industry, which has led to a lack of income tax policies; (ii) the Saudi currency being pegged to the

USD, which could neutralise the effectiveness of the monetary policy as the exchange rate fails to act as a stabiliser for external balances (Alkahtani 2013); and (iii) the Islamic legal framework, which limits receipt or payment of interest, affecting the use of traditional monetary policy tools (Looney 1989).

This atypical framework presents policy-makers with unique challenges because, apart from the aforementioned unusual features, the economy in general has adopted a free market approach, and follows a typical Western economic framework. This unusual combination of structural elements has made effective policy formulation a significant challenge for the economic managers of the nation.

From a theoretical perspective, there is overall agreement among scholars that the KSA primarily follows a Keynesian approach (Ferat 1979; Morgan 1979, cited in Loony 1989). In the context of assessment of the degree of influence of either monetary or fiscal policy, a debate exists between two major economic schools monetarists and fiscalists (Ajisafe & Folorunso 2002) with Keynesians (fiscalists) supporting the greater effectiveness of government expenditure and taxes.

Consequently, appropriate analysis for the investigation of the effectiveness of both monetary and fiscal policy on Saudi GDP is lacking in the literature. A review of the existing literature indicates several gaps, including:

1. Most empirical research does not combine monetary policy and fiscal policy for the KSA.
2. There is a lack of studies adopting a multi-sectoral GDP perspective in their analysis.
3. There has been little adaption of a monetary policy approach reflecting the economic framework and role of monetary policy in the KSA.

## 1.2 Research Problem

These identified knowledge gaps yield the fundamental research problem this thesis aims to address:

To examine the effectiveness of fiscal policy and monetary policy on the Saudi economy.

## 1.3 Research Questions

The following research questions have been formulated to address the research problem:

**Research Question 1:** What is the long-term effect of fiscal policy on the Saudi economy, measured by GDP, oil GDP and non-oil GDP?

**Research Question 2:** What is the short-term effect of fiscal policy on the Saudi economy, measured by GDP, oil GDP and non-oil GDP?

**Research Question 3:** What is the long-term effect of monetary policy on the Saudi economy, measured by GDP, oil GDP and non-oil GDP?

**Research Question 4:** What is the short-term effect of monetary policy on the Saudi economy, measured by GDP, oil GDP and non-oil GDP?

**Research Question 5:** What is the long-term effect of merchandise trade on the Saudi economy, measured by GDP, oil GDP and non-oil GDP?

**Research Question 6:** What is the short-term effect of merchandise trade on the Saudi economy, measured by GDP, oil GDP and non-oil GDP?

The main objective of this study is to empirically examine the effectiveness of monetary and fiscal policy on Saudi GDP. The following research objectives correspond to the research questions above:

**Research Objective 1:** To estimate the effect of fiscal policy on Saudi Arabia's economy.

While Saudi Arabia aims to diversify and expand the contribution of non-oil industries to national income, the country will retain its dependence on petroleum-based production for some time (Yahia 2016). The new economic course does not reduce the validity of the claim that the KSA is highly susceptible to external international factors that influence price determination of products made from natural resources (Samargandi, Fidrmuc & Ghosh 2014). The current study aims to explore the KSA's position in the global market from a macroeconomic perspective, offering empirical findings for policy-makers in light of the diversification efforts.

**Research Objective 2:** To estimate the effect of monetary policy on Saudi Arabia's economy.

The fixed exchange rate (of the SAR to the USD) poses serious ramifications for the Saudi economy (Amar, Hachicha & Saadallah 2015). The research objective is to investigate monetary policy under a fixed exchange rate, with the aim to address this gap in knowledge to support the next course of action in revising the existent policy.

**Research Objective 3:** To estimate the effect of merchandise trade (imports and exports) on Saudi Arabia's economy.

The oil sector and export-oriented policies remain the dominant drivers of the national economy and real output growth in Saudi Arabia (Alhowaish 2014b). Given the uncertainty arising from dependence on the oil industry as the primary source of national revenue, the objective of this study is to explore the viability of the decision to diversify to a national export-oriented policy and substitute goods for oil and oil-related products.

To achieve these objectives, the study adopts a quantitative approach to investigate the relationships between the variables. An overview of the research method is summarised in Section 1.6.

The study contributes to the body of knowledge on monetary policy, fiscal policy and Saudi GDP from the following three perspectives:

1. This study fills a gap in the literature by systematically investigating the correlation between fiscal and monetary policies in terms of their positive or negative impact on the Saudi economy. A comprehensive approach integrates eight independent variables to examine effects on Saudi Arabia's GDP, including money supply, interest rates, commercial bank claims on the private sector, inflation, merchandise exports, merchandise imports, government expenditure and government revenues.
2. The evaluation of monetary and fiscal policies adds to the understanding of the short-term and long-term impacts on total GDP, oil GDP and non-oil GDP, with reference to the ongoing economic changes in the KSA economy.
3. The analysis of the lack of taxation, heavy dependence on a single sector (oil) and the pegging of the national currency to the USD offers empirical evidence for

policies and government taxation system development that may lead to economic diversification and stabilisation.

## 1.4 Definition of Key Terms

Table 1.1 provides definitions of the key concepts used throughout the present research.

**Table 1.1: Definitions of Key Concepts in this Study**

| Concepts | Description |
|---|---|
| Fiscal policy | Changes in government spending and the taxation system to manage economic activity (Langdana 2009, p. 7). |
| Monetary policy | Changes in money supply and, to some extent, in national interest rates set by a nation's central bank (Langdana 2009, p. 7). |
| Total GDP | Market value of final goods and services produced within a country in one year (Tuerck 2014, p. 13). |
| Oil-sector GDP | Formed by primary petroleum extraction and production, without processing and conversion into petroleum-related products (Choudhury & Al-Sahlawi 2000, p. 237). |
| Non-oil-sector GDP | Production activity in manufacturing, industry and services through private enterprise, including that segment of the non-oil sector in which government enterprises operate. Within the non-oil sector is also subsumed petroleum-related processing and other value-added activity (Choudhury & Al-Sahlawi 2000, p. 237). |
| Islamic finance | Financial institutions and products designed to fulfil central tenets of Sharia (or Islamic) law (Gait & Worthington 2007, p. 1). |
| Riba | Prohibited payment or receipt of interest on loans of money (Thomas 2006, p. 55). |
| Sukuk | Financial instruments similar to bonds and shares that are compliant with Islamic law (Zolfaghari 2017, p. 5). |
| Zakat | An obligation of any eligible payer and a full right, not a privilege, of the poor (Almarzogi, Mansour & Krichene 2018, p. 41) it is based on wealth, not income. |
| Mudarabah | A partnership between a dormant partner and an active partner (Kahf 2013, p. 172). |
| Musharakah | Implies partnership in a venture, a form of partnership whereby two or more persons combine either their capital or labour together to share the profits, enjoying similar rights and liabilities (Kettell 2011, p. 77). |

## 1.5 Statement of Significance

The current study contributes to the following aspects of existing knowledge and practice by examining the effects of fiscal and monetary policies on Saudi GDP using three GDP institutional sectors—total GDP, oil GDP and non-oil GDP. Although the oil sector is the key contributor to total GDP, it is significantly influenced by fluctuations in the global oil price and can be a misleading measure of growth for oil exporters, such as Saudi Arabia. Non-oil GDP is included in the analysis to ensure accuracy and completeness of the analysis. Choudhury and Al-Sahlawi (2000) argued that the nature of trends in non-oil GDP is a valid indicator of effective implementation of the economic diversification process.

Understanding of the specific effects of fiscal and monetary policies on different sectors empowers policy-makers to reach the goal of long-term macroeconomic stability. In addition, short-term stabilisation is a critical objective for a country with a fixed exchange system, where oil revenues are the major contributor of the national income. Results on policy effects on the non-oil sector will help reach the goal of diverting the economy away from oil and eventually attain Vision 2030.

## 1.6 Overview of the Research Method

An autoregressive distributed lag (ARDL) bounds test was employed to empirically investigate the effects of fiscal and monetary policies on Saudi Arabia's GDP. The ARDL approach is the most common method used in macroeconomics time series analysis (Ali, Irum & Ali 2008; Khosravi & Karimi 2010; Mahmood & Sial 2011; Okorie, Sylvester & Simon-Peter 2017). The main data source used in this study is annual reports gathered from the SAMA and the General Authority for Statistics (GASTAT) for the period 1980–2017.

The dependent variables for the study include total GDP, oil GDP and non-oil GDP. The independent variables for monetary policy are money supply, interest rates, commercial bank claims on the private sector and inflation; the variables for fiscal policy include government expenditure and revenues; and merchandise exports and imports comprise the variables for merchandise trade.

The ARDL bounds test is used to explore the relationships among the variables to identify long-term relationships and short-term dynamics through the integration of the error correction model (ECM). The research aims to explore both long-term and short-term effects of oil and non-oil GDP sectors in the KSA, and the ARDL framework is instrumental in producing new knowledge on this issue. Türsoy (2017) reported that the selected cointegration test provides information on long-term relationships, while the ARDL framework assists in analysing long-term and short-term dynamics. In addition, the ARDL is highly efficient in small samples for determining the cointegration relationships, applicable regardless of the degree of cointegration, involves estimation by ordinary least squares (OLS) if lag order is identified, and is absent of the pretesting of variables requirement. The ARDL technique does not require the employment of a complex system of equations, and allows derivation of the ECM with a simple linear transformation. The short-term adjustments in the ARDL model do not diminish the validity of the long-term data. The empirical analyses follow the appropriate pre-estimation and post-estimation diagnostic tests. These methods and tests form the basis of the current study, as detailed and justified in Chapter 4.

## 1.7 Organisation of the Thesis

This study is organised as follows. Chapter 1 introduces the general context of this study and presents the research problem and research questions. It also summarises the key terms and research method used in the study.

Chapter 2 focuses on the context of Saudi Arabia, justifying the claim that the KSA has a unique position in the global market. Specifically, the second chapter provides data on the history of the country and its economic structure. The knowledge generated in Chapter 2 is crucial to understanding the oil-dependent nature of Saudi Arabia and its course towards diversification It includes important information about the challenges that the economy faces and the agencies that employ fiscal and monetary policies to withstand those challenges.

Chapter 3 presents a comprehensive literature review that explores the existent knowledge on the variables under consideration. Particular attention is devoted to the relevant fiscal and monetary theories and their contribution to the economy, within the

context of rules and laws of Islamic banking; thus, the chapter focuses on the elements of Islamic finance and its instruments—Sukuk and Zakat.

Chapter 4 explores the research methodology and conceptual framework, along with the hypotheses developed for the study (discussed in Section 4.4). The research design is discussed in detail to create a thorough understanding of the methodology applicable to the case of Saudi Arabia and its fiscal and monetary policies. Chapter 4 includes information on the ARDL framework, the ARDL bounds test cointegration, impulse response and variation decomposition. This section of the thesis covers the dependent and independent variables.

Chapter 5 presents the results and discussion. It commences with descriptive statistics for the variables in the thesis, followed by the application of time series analysis to verify results via unit root tests, and long-term relationships via the ARDL model. The short-term ECMs are also discussed. The chapter concludes with a discussion of diagnostic tests for normality, serial correlation and heteroskedasticity, which are employed, along with stability tests, to ensure more accurate and exhaustive empirical outcomes. Chapter 6 consists of a summary of the thesis, including the main conclusion, policy implications and recommendations for future studies.

# Chapter 2: A Brief Introduction to the Saudi Economy

## 2.1 Introduction

This chapter provides a brief introduction to the key features and challenges that make the Saudi economy different from a typical Western economy, and how this influences the behaviour of fiscal and monetary policies. Section 2.2 reviews the structural features of the Saudi economy, with an emphasis on oil-based national revenue sources and economic growth patterns for the non-oil sector, including agriculture, tourism and sustainable energy development. It discusses Saudi merchandise trade, key economic objectives set by the Ministry of Finance and SAMA, financial intermediaries, public finance under fiscal policy, and credit restrictions under monetary policy. Section 2.3 explores the Saudi transformation plans, including the five-year plans and Vision 2030. Section 2.4 discusses the key challenges for the Saudi economy, such as the decline in income, government budget deficits, oil prices and consumption, unemployment, the SAR being pegged to the USD, and inflation. Section 2.5 situates the research problem in the KSA context, while Section 2.6 provides a summary of the chapter.

## 2.2 Structural Features of the Saudi Economy

The Saudi economy is structured into two major sectors, oil-based and non-oil based, with most income derived from the former. These two sectors are reviewed below.

### 2.2.1 Oil-based Economy

Saudi Arabia is the largest producer and exporter of oil in the world and one of the largest economies in the Middle East and North Africa (MENA) region. The country possesses approximately 18% of global petroleum reserves and is the biggest exporter of petroleum products. Other natural resources include gas, iron ore, gold and copper. Petroleum products account for 50% of total GDP and 70% of total export earnings (GASTAT 2018). Samargandi, Fidrmuc and Ghosh (2014) explained that, because of its oil dependency, Saudi Arabia is also dependent on the external factors of price determination, because prices for natural resources are decided by global markets rather than by national authorities. Thus, while the Saudi economy is built on large oil reserves and mineral deposits, this dependence on oil represents a challenge characterised by oil

price volatility and the increasing attention paid to renewable energy technologies, which have the potential to replace non-renewable industries. Therefore, the KSA cannot always control the prices offered for oil products.

Throughout the last decade, the economy of the kingdom has diversified non-oil sectors, however the oil industry still dominates. Although the government has decided to decrease the excessive reliance on petroleum via its Vision 2030 plan, the impact of oil and oil-related products and businesses will continue to dominate. Table 2.1 provides an overview of oil and oil-dependent industry statistics for Saudi Arabia.

**Table 2.1: Oil and Oil-dependent Industries, Saudi Arabia, 2011–2017 in Million Saudi Riyals**

| | Mining and Quarrying | Percentage of Total GDP | Manufacturing | Percentage of Total GDP |
|---|---|---|---|---|
| 2011 | 1,215,518 | 48.3 | 252,003 | 10.0 |
| 2012 | 1,311,448 | 47.5 | 270,180 | 9.8 |
| 2013 | 1,232,823 | 44.0 | 278,071 | 9.9 |
| 2014 | 1,130,054 | 39.8 | 306,189 | 10.8 |
| 2015 | 600,508.4 | 24.5 | 311,215 | 12.7 |
| 2016 | 533,636.1 | 22.1 | 312,160 | 12.9 |
| 2017 | 654,891.8 | 25.4 | 331,376 | 12.9 |

**Note:** Adapted from SAMA's fifty-fourth annual report of 2018.

Table 2.1 shows that the mining and quarrying contribution to the GDP had decreased from 48.3 % in 2011 of the total GDP to 25.4% in 2017, meanwhile, the manufacturing contribution to the total GDP had increased from 10% in 2011 to12.9% in 2017.

The Saudi economy relies on industries related to oil-product creation and export. It is a significant consumer of oil, consuming more than highly developed and industrialised countries such as Germany and Canada (Alkhathlan & Javid 2015), which clearly has an effect on its environment and industries. However, the most important immediate concern about Saudi oil dependency pertains to the country's need for diversification.

Almutairi (2016) emphasised that depleting this non-renewable reserve will have a major negative effect on the Saudi economy unless it can invest in diversification that will create new jobs and contribute to steady economic growth. Despite the progress towards

diversification, the oil sector will continue playing a major role. Alkhateeb et al. (2017) argued that the decrease in the GDP portion of the oil-based industries does not have an effect on unemployment, while Sultan and Haque (2018) elaborated that financial estimates indicate a positive long-term correlation between economic growth and oil exports and consumption. The authors recommended diversifying the economy to mitigate negative consequences. Although the reliance on oil is worrisome, this industry plays a part in the improvement of the KSA on the global scene. Table 2.2 below illustrates how the GDP portion of oil-based industries has been falling in recent years (50.7% to 28.5%) while the GDP portion of non-oil sectors has been increasing (48.6% to 70.6%).

**Table 2.2: Oil and Non-oil Statistics, Saudi Arabia, 2011–2017**

| Years | Oil sector to GDP, % | Oil revenue to total government revenue, % | Non-oil sector to GDP, % | Non-oil revenue to total government revenue, % |
|---|---|---|---|---|
| 2011 | 50.7 | 92.6 | 48.6 | 7.4 |
| 2012 | 49.9 | 91.8 | 49.3 | 8.2 |
| 2013 | 46.1 | 89.8 | 53.1 | 10.2 |
| 2014 | 42.2 | 87.8 | 57.0 | 12.2 |
| 2015 | 26.9 | 72.9 | 72.1 | 27.1 |
| 2016 | 24.6 | 64.2 | 74.3 | 35.8 |
| 2017 | 28.5 | 63.0 | 70.6 | 37.0 |

**Note:** Adapted from SAMA's fifty-fourth annual report of 2018

The overdependence of the Saudi economy on oil revenues represents a challenge for policy-makers responsible for the diversification program and expansion of the contribution of non-oil sectors to the national economy. With the major share of revenue provided by oil-related industries, the main concern is protection against the volatility of the global oil market. Oil is a depleted economic resource, which makes Saudi Arabia vulnerable to fluctuations in the market. The agriculture sector is not sustainable and the industry does not depend on national labour (Tuama 2018). The strategy of diversification has been repeatedly prioritised through development plans over the last 50 years, including a focus on development of industrial cities, such as Jubail and Yanbu.

### 2.2.2 Non-oil-based Economy

The non-oil-based sector of the Saudi economy is driven mostly by the Vision 2030 agenda, which aims to increase the share of non-oil exports of total GDP from 16% to 50%, with a particular emphasis on small businesses and industries such as mining and quarrying, utilities, natural gas and manufacturing[3]. Al-Ghalayini (2018) demonstrated that among OECD countries, small business enterprises form a large component of the economy, accounting for approximately 99% of all firms and 70% of total employment. In Vision 2030, Saudi Arabia aims to make small businesses a key driver of economic development, raising the contribution to the country's GDP from the current 20% to 35%. This is to be achieved by allocating up to 20% of overall government loans to small businesses, in contrast to the current 5% (Al-Ghalayinin 2018). Important steps are already in place to increase the role of small businesses in the economy, such as the establishment of the General Authority for Small Business Enterprises (Naushad 2018).

Historically, the role of the private sector in the country's industrialisation has been restricted to small and medium-sized manufacturing units (Mosa 2015). Table 2.3 shows the increase of all non-oil industries' contribution to GDP, with the highest contribution from the finance, insurance, and real estate industries. These figures demonstrate how the Saudi economy is beginning to diversify its revenue streams.

[3] Manufacturing industries are engaged in the transformation of materials and substances into new products. In Saudi Arabia, most oil manufacturing revolves around crude oil rather than production of goods for public consumption.

**Table 2.3: Non-oil Industries Statistics, Saudi Arabia, 2011–2017 in Million Saudi Riyals**

| | Construction | % of Total GDP | Wholesale & Retail Trade, | % of Total GDP | Finance, Insurance, Real Estate | % of Total GDP | Others | % of Total GDP |
|---|---|---|---|---|---|---|---|---|
| 2011 | 107,021 | 4.3 | 197,926 | 7.9 | 195,054 | 7.7 | 240,107 | 9.6 |
| 2012 | 118,513 | 4.3 | 219,144 | 7.9 | 232,438 | 8.4 | 257,712 | 9.4 |
| 2013 | 134,588 | 4.8 | 241,586 | 8.6 | 269,805 | 9.6 | 275,024 | 9.9 |
| 2014 | 152,965 | 5.4 | 266,649 | 9.4 | 292,991 | 10.3 | 293,963 | 10.3 |
| 2015 | 162,975 | 6.6 | 278,030 | 11.3 | 310,412 | 12.7 | 311,382 | 12.7 |
| 2016 | 159,575 | 6.6 | 276,086 | 11.4 | 324,848 | 13.4 | 321,305 | 13.3 |
| 2017 | 154,592 | 6.0 | 274,970 | 10.7 | 338,133 | 13.1 | 329,677 | 12.8 |

**Note:** Others: Agriculture, Forestry & Fishing; Electricity, Gas and Water; Transport, Storage & Communication; Community, Social & Personal Services.
Adapted from SAMA's fifty-fourth annual report of 2018.

Moreover, recent economic reforms have led to increases in sectoral diversification of the Saudi economy; for example, Spong (2018) and Khraiche and Noueihed (2018) concluded that the economy is rapidly diversifying towards non-oil-sector activity, with encouraging implications for economic efficiency, productivity and the social wellbeing of the population. Coupled with improved tax collection efforts from the government, aimed to reduce the economy's dependence on oil exports, these measures increased non-oil revenue by 63% in the first quarter of 2018, to SAR52.3 billion (Khraiche & Noueihed 2018). The non-oil sector is developing rapidly, towards making a significant contribution to the national economy.

### 2.2.3 Merchandise Trade

Saudi's merchandise trade is deeply connected to its oil reserves, such that these imports and exports shape the trade balance and fuel economic and social development by influencing economic growth (Bakari & Mabrouki 2016).

As Saudi Arabia is rich in natural resources, five-year development plans have previously focused on income generation through oil exports. This focus was based on the assumption that revenues would continue flowing. Currently, the oil export orientation plays a central role in real output growth. Table 2.4 highlights the overall trend in the reduction of imports, from 54.3% of total GDP in 2011 to 32.3% in 2017. Prior to 2014, petroleum products constituted 90% of total export revenue (Samargandi, Fidrmuc & Ghosh 2014). This distribution affected the GDP of the country and the GDP gained through the oil industry in particular. Oil exports and economic growth have a favourable long-term relationship (Sultan & Haque 2014), and the KSA has used this to support the economy and maintain quality of life. However, the earlier assumption of the long-term sustainability of income generated from oil exports has not always held true, as evidenced by the oil crisis of the mid-1980s and the sharp decline of prices (one-third) in 1997 and 2008.

**Table 2.4: Exports and Imports Statistics, Saudi Arabia, 2011–2017 in Million Saudi Riyals**

| | Exports | Percentage of Total GDP | Imports | Percentage of Total GDP |
|---|---|---|---|---|
| 2011 | 1,367,620 | 54.3 | 493,449 | 19.6 |
| 2012 | 1,456,502 | 52.8 | 583,473 | 21.1 |
| 2013 | 1,409,524 | 50.3 | 630,582 | 22.5 |
| 2014 | 1,284,122 | 45.3 | 651,876 | 23.0 |
| 2015 | 763,313 | 31.1 | 655,033 | 26.7 |
| 2016 | 688,423 | 28.5 | 525,636 | 21.7 |
| 2017 | 831,881 | 32.3 | 504,447 | 19.6 |

**Note:** Adapted from SAMA's fifty-fourth annual report of 2018

Table 2.5 below shows the diversification of the economy, where exports from other industries and their effect on Saudi GDP are increasingly important. However, oil continues to play a major role in Saudi merchandise trade, with petrochemical products accounting for the lion's share of exports.

**Table 2.5. Exports Statistics in Saudi Arabia from 2011 to 2017 in Million Saudi Riyals**

| | Oil Exports | Percentage of Total Exports | Non-oil Exports | Percentage of Total Exports |
|---|---|---|---|---|
| 2011 | 1,191,052 | 87.1 | 176,568 | 12.9 |
| 2012 | 1,265,550 | 86.9 | 190,952 | 13.1 |
| 2013 | 1,207,080 | 85.6 | 202,443 | 14.4 |
| 2014 | 1,067,091 | 83.1 | 217,031 | 16.9 |
| 2015 | 573,412 | 75.1 | 189,901 | 24.9 |
| 2016 | 510,729 | 74.2 | 177,694 | 25.8 |
| 2017 | 638,402 | 76.7 | 193,479 | 23.3 |

**Note:** Oil exports include Crude oil and refined products; Non-oil Exports include Petrochemicals, Construction materials, Agricultural, animal and food products, and other goods including re-exporting (SAMA Annual Report 2018).

In 2017, crude oil accounted for 80% of total oil exports (compared with 89% in 2011). Exports of refined oil products increased from 10.3% of GDP to 19.6% of GDP over the same period. Petrochemical products dominate non-oil exports (nearly 60% of the total). Further, Saudi imports play a role in the basic structure of the economy; in particular,

overreliance on imports may become an obstacle for the growth of the economy (Al-Eissa 2009; Ray 2015), as evidenced by the KSA importing 70% of its food (The Embassy of the Kingdom of Saudi Arabia n.d.). Saudi's merchandise trade will help it embrace the advantages of non-oil exports and the advantages of a reduction in reliance on imports of goods from non-oil sectors.

### 2.2.4 KSA Economic Objectives and Facilitation

Money and banking are critical aspects of the Saudi economy. The Ministry of Finance and the SAMA develop and implement monetary and fiscal policies to achieve economic objectives.

#### *2.2.4.1 Ministry of Finance*

The Ministry of Finance has a major influence on the Saudi economy. According to the official website (Ministry of Finance 2017b), the government is responsible for supervising the implementation of fiscal policy. Specifically, the Macro Fiscal Policy Unit (MFPU) uses a Medium-Term Fiscal Framework (MTFF) for implementation (Ministry of Finance 2017b); this is discussed further in Section 3.4. Although it has many other duties, the activities associated with fiscal policy are of paramount importance to the entire nation since fiscal policy, and the activities undertaken by the Ministry, contribute to general macroeconomic stability.

#### *2.2.4.2 Saudi Arabian Monetary Authority (SAMA)*

Previously known as the Saudi Arabian Monetary Agency, the SAMA functions as the central bank of the KSA. While the Ministry of Finance and SAMA share some responsibilities, SAMA is accountable for the development and adequate implementation of a comprehensive monetary policy, which covers issues of interest rates, money supply and money demand. According to Seznec (2016), the Ministry of Finance and SAMA are important agencies for fiscal and monetary policy, respectively, and take leadership roles in the financial policy decision-making of Saudi Arabia.

According to its Economic Research Department (2013), SAMA actively pursues monetary policy that aims to attain financial and price stability, while different spheres of the economy receive support from the government. In their monetary efforts, SAMA's primary goal is price stability. The monetary policy implemented by SAMA is mainly

focused on the pegged exchange rate between the SAR and the USD and the control of money supply/demand (Amar, Hachicha & Saadallah 2015); this is discussed further in Section 3.6. The functions of SAMA also include the issue of banknotes, the regulation/supervision of financial sectors, the management of foreign exchange reserves, the provision of innovative and reliable payment systems, the rendering of financial services to the government and the conducting of financial analyses. Based on the functions of SAMA, its objectives are handling the banking affairs of the government, printing the national currency, stabilising its value, managing foreign exchange reserves and supervising financial institutions accountable to the authority (Almounsor 2015).

#### *2.2.4.3 Financial Intermediaries*

Apart from the aforementioned financial establishments, commercial banks and specialised lending institutions provide individuals and businesses with the loans necessary for consumption and investment activities. With respect to GCC countries, Gani and Al-Muharrami (2016) argued that the quality of lending institutions is positively correlated with their lending tendencies, and that respect for the law and government effectivity are also important factors that contribute to bank lending; therefore, these factors could be used to improve bank lending. Compliance with the Islamic economic framework is also an important consideration in terms of finances in Saudi Arabia. Nasir, Ali and Khokhar (2014) reported that the lending rate is an essential concept in the KSA because there is a nascent tendency in the financial field to generate financial services that add value, and the lending rate plays a crucial role in these. Government-lending institutions are important in the development of the economy because they provide business entities with loans that can help them to begin a start-up that will subsequently contribute to sustainable economic growth in Saudi Arabia.

Further, businesses rendering financial services in Saudi Arabia also have a significant effect on the population and economy. Samargandi, Fidrmuc and Ghosh (2014) explained that the financial sector comprises mostly banking institutions, although other financial businesses exert an influence on the economy; however, segments of the financial sector such as the stock market, Sukuk (Islamic bonds) and insurance companies are not powerful yet because these organisations are relatively new. Faisal, Tursoy and Resatoglu (2017) pointed out that the Saudi stock market was only founded in 1984. With changes in governmental policies, the number of listed companies rose from 72 businesses in 2008

to 152 in 2010 (Faisal, Tursoy & Resatoglu 2017). As for insurance companies, only one business entity operated in 2004, while in 2018, there were 33 such companies in the fifty-fourth annual SAMA report of 2018. Despite the relative infancy of parts of the financial sector, their importance is expected to increase in line with the KSA's focus on diversification via Vision 2030.

#### *2.2.4.4 Public Finance Under Fiscal Policy*

The agencies operating in public finance, which deal with revenue sources and expenditures within fiscal policy, encapsulate other governmental influences on the economy. The Government of Saudi Arabia has been heading towards long-term strategies for economic growth. As the government and monarchy plan to decrease reliance on oil resources, public finance is imperative in exploring how the Saudi government addresses the issue of government expenditure to enhance the economy (Alshahrani & Alsadiq 2014).

In particular, Whitley and Makhijan (2014) specified that the public finance domain makes decisions regarding the investment of the oil revenue surplus. While the KSA is still capable of exporting a great quantity of petroleum products to other nations, and receives generous compensation for these goods and services, the authorities have the ability to use excess profits to help Saudi Arabia to gain a competitive advantage. Table 2.6 overleaf shows the annual government revenues and expenditures.

**Table 2.6: Annual Government Revenues and Expenditure, Actual Values (Million Riyals)**

| Year | Total Revenues | | | Total Expenditures | | | Deficit / Surplus (Actual) | Ratio of Deficit/Surplus to GDP |
|---|---|---|---|---|---|---|---|---|
| | Oil Revenues | Other Revenues | Total | Current Expenditure | Capital Expenditure | Total | | |
| 2011 | 1,034,362 | 83,165 | 1,117,527 | 583,895 | 242,805 | 826,700 | 290,827 | 11.6 |
| 2012 | 1,144,818 | 101,720 | 1,246,538 | 713,330 | 203,868 | 917,198 | 329,340 | 11.9 |
| 2013 | 1,035,048 | 117,564 | 1,152,612 | 731,873 | 262,861 | 994,734 | 157,878 | 5.6 |
| 2014 | 913,347 | 126,794 | 1,040,141 | 821,160 | 319,443 | 1,140,603 | -100,462 | -3.5 |
| 2015 | 446,432 | 166,261 | 612,693 | 790,979 | 210,313 | 1,001,292 | -388,599 | -15.8 |
| 2016 | 333,699 | 185,749 | 519,448 | 696,358 | 134,155 | 830,513 | -311,065 | -12.9 |
| 2017 | 435,900 | 255,605 | 691,505 | 722,208 | 207,791 | 929,999 | -238,494 | -9.3 |

**Note:** Adapted from SAMA's 54th annual report of 2018

Based on the statistics reported in Table 2.6, total revenues decreased by more than 45% over 2011–2017 and oil revenues decreased by more than 60%, whereas revenues from non-oil sectors have been steadily increasing. In addition, the ratio of the deficit to GDP has grown in recent years, with the decrease in oil revenues having a strong effect on the Saudi budget. This trend provides evidence of diversification in the national economy, especially with regard to sources of revenue. However, in line with the changing balance in revenue sources and gradual decrease in dependency on oil revenues, current and capital expenditures exhibit an upward trend, causing a deficit for the period 2014–2017. This deficit can be attributed to the drop in oil revenues because of oil price decreases and governmental investment in economic diversification, which may eventually lead to a return on investment and a surplus (Alkhateeb, Sultan & Mahmood 2017).

Most Saudi banks are state-owned, which implies that the government has the control needed to manage public finances for a direct impact on long-term economic stability and development. According to public finance theory, the role of the government is to promote an efficient allocation of funds (Cottarelli 2015). Therefore, the authorities are expected to take measures to select the most appropriate use of resources to contribute to the general wellbeing of the country and its people. Albassam (2015) raised a concern regarding the unpreparedness of Saudi financial systems, including public finance, to manage the massive investments flowing into the kingdom. Thus, economic stability and growth depend on the abilities of the government to balance the expenditure of resources in the correct manner, so as not to have deleterious effects on the country.

The Government of Saudi Arabia acknowledged that revenue expectations had tightened with the decrease in oil prices in 2014, and that it was necessary to lower expenditures on subsidies (Algahtani 2016). To mitigate damages associated with the decline in oil prices, the authorities recognised that it was necessary to implement a public finance unit to supervise an acceptable level of expenditures. Although the National Project Management Agency monitors the situation, there are several establishments that use the public finance system to the advantage of the kingdom (Algahtani 2016).

The General Authority of Zakat and Tax (GAZT) is an essential element of the public finance system. This governmental authority is responsible for the collection of Zakat and VAT, the revenues of which are instrumental in efforts to stabilise the economy. VAT is

a recent development in the government's efforts to introduce new instruments to maintain economic balance. Alshahrani (2016) explained that VAT, identified by some economists as a tax on consumption, strengthens the tax structure because it increases the government's accountability, diversifies the government's income, and allows the KSA to employ international standards for taxation. Although the implementation of the VAT (on 1 January 2018) has the potential to have a positive effect on both fiscal policy and monetary policy, it is outside the time period of this study.

#### *2.2.4.5 Credit Restrictions*

To guarantee that credit is dealt with in an appropriate manner in Saudi Arabia, the country has specific credit organisations that do not compete against commercial banks because the two groups of entities have different roles (Al-Eissa 2009; Waked 2016).

Specifically, Al-Eissa (2009) pointed out that commercial banks are usually interested in short-term lending, while the specialised credit establishments offer 'long-term and interest-free lending to industry, agriculture, and real estate' (Al-Eissa 2009, p. 24). These establishments serve an important purpose in the economy, because many Saudi businesses experience difficulties obtaining credit from Saudi banks (Waked 2016), resulting in inefficiency in credit operations in Saudi Arabia.

Commercial banks can work and develop the terms that they consider suitable; for example, Waked (2016) pointed out that commercial banks prefer to give credits of varying durations to large companies because large companies are likely to maintain, or even augment, their status. Credit organisations also have an opportunity to fulfil their purpose of providing credit that can be repaid over the long term. Hence, the existence of credit institutions, including Saudi Arabian Agricultural Bank (SAAB), Saudi Industrial Development Fund (SIDF), Real Estate Development Fund (REDF), Public Investment Fund (PIF) and Saudi Credit Bank (SCB) (Al-Eissa 2009, p. 24), is justified and important to the kingdom. The authorities can monitor the situation and guarantee that credit laws are respected by businesses.

Waked (2016) argued that there are many factors that can prevent small and medium-sized businesses from receiving credit, including 'lack of collateral, poor financial performance, infeasible business plans, incomplete information and projects not qualifying for the Kafalah programme' (p. i), and recommended that restrictions be

alleviated because many start-ups have no access to the loans that would enable them to succeed. It is important to recognise the problem that arise from credit restrictions, because, to diversify the economy, the kingdom needs small and medium-sized enterprises to increase in number and develop.

Thus, commercial bank claims on the private sector (CBC) are an important source of credit allocation. Suhartono, Mongid and Notodihardjo (2010) explained that banking is vital for the development and enforcement of monetary policy. Saudi commercial banks are regarded as basic in structure, and comply with Western banking standards only partially; for example, the law does not allow Saudi banks to own property other than specifically required for banking functions (Al-Bassam 1990). For economic diversification, Vision 2030 requires a reduction in restrictions to empower the private sector to participate in economic development (Reuters 2017). Al-Bassam (1990) suggested that CBC have insignificant long-term and short-term effects on money supply, and thus, policy-makers should abolish laws that prevent banks from diversification and increasing their loans to diverse industries of the KSA economy.

Moreover, CBC also affect the non-oil diversification and expansion of the private sector. The ability of commercial banks to diversify their income is crucial in the overall attempts to decrease Saudi dependence on petroleum products (Alnowahi 2012). When commercial banks have the freedom to flexibly provide services, the private sector and the financial sector grow, thus helping with the stabilisation of a non-oil-dependent economy. The claims of commercial banks on the private sector increased by 1.4% (SAR 19.9 billion) in the second quarter of 2018 in comparison with the preceding quarter (Research and International Affairs Deputyship 2018). Therefore, the influence of CBC is growing and forms a vital part of monetary policy in KSA, and hence, should be explored in research.

The review of the structural features of the Saudi economy focusing on oil-based and non-oil-based drivers of economic growth revealed a number of unique aspects. As an oil-based economy, Saudi Arabia derives the majority of its national income from oil-related industries, products and businesses. Oil is projected to continue to dominate in the upcoming decades, even though the non-oil economy is gaining more attention in line with Vision 2030, which emphasises small businesses as key drivers of economic development. Merchandise trade is dominated by exports of oil-related products and

imports of food. The economic objectives of the KSA include diversification of the financial sector, as part of a strategy aimed at support of small businesses and reduction in credit restrictions.

## 2.3 Saudi Arabia Transformation Plans

To encourage diversification, the KSA has embraced the need for the development and implementation of transformation plans to facilitate change. These transformation plans, which may potentially affect monetary policy and fiscal policy, are intended to mitigate the negative effects of the transition from an oil-based economy to a more diversified one.

### 2.3.1 Five-Year Plans

The KSA is endeavouring to diversify its economy because dependency on oil may lead to detrimental results for the nation if it fails to sufficiently develop other sectors. Currently, Saudi authorities emphasise that the country should pursue diversification through a knowledge-based economy (Banafea & Ibnrubbian 2018).

Although economic diversification is challenging, as the KSA depended on oil for decades, the government is concentrating on developing strategies to pursue diversification, including the diversification of exports (Sultan & Haque 2014). Overall, economic diversification is important to the development of a country and achievement of macroeconomic stability because the country needs to compete with other economies and prove itself a strong market that has much to offer. Alghamedi (2014) explained that the majority of companies and other establishments are connected to the public sector, which prevents them from evolving. Governmental control and bureaucracy are serious hindrances in the pursuit of diversification because government ownership is vast and embraces many entities that cannot put into action innovative ideas without approval. In a similar vein, small businesses have few opportunities for funding and growth in such an environment (Alghamedi 2014). Since small enterprises are the driving force for economic development and diversification, it is not surprising that Saudi Arabia now faces a necessity to create favourable conditions for such businesses.

Moreover, Qureshi (2014) stated that five-year development plans have been spurring growth in all sectors since their inception. It is notable that different five-year plans have focused on specific areas that required enhancement; specifically, the first plan

concentrated on the development of infrastructure, the second plan aimed to develop human resources, while the third plan focused on the diversification and expansion of the economy, as even decades ago, the authorities understood that there was a need to decrease dependency on oil (Qureshi 2014). From the fourth to the seventh plans, the focus was on the growth and development of the private sector. Table 2.7 provides an overview of the objectives of each five-year plan implemented in KSA.

**Table 2.7: Five-year Plans and their Objectives**

| | Years | Purposes and objectives |
|---|---|---|
| Third five-year plan | 1980–1985 | Introduce diversification strategies;<br>Encourage private sector growth;<br>Stabilise oil revenues |
| Fourth five-year plan | 1985–1990 | Improve civilian development spending;<br>Stimulate private sector investments;<br>Improve infrastructure, operations and maintenance |
| Fifth five-year plan | 1990–1995 | Targeted government investment in human resources development, healthcare and other social services;<br>Strengthen agricultural and light manufacturing sectors |
| Sixth five-year plan | 1995–2000 | Focus on private sector growth |
| Seventh five-year plan | 2000–2005 | Focus on private sector growth |
| Eighth five-year plan | 2005–2010 | Focus on private sector growth;<br>Enhance human resources;<br>Encourage internal and external investments |
| Ninth five-year plan | 2010–2014 | Expand the non-oil sectors;<br>Improve the sustainability of the oil industry: create grounds for the further development of human resources and the female labour force |
| Tenth five-year plan | 2015–2019 | Continue oil industry sustainability course with new programs;<br>Increase GDP share of non-oil industries and the private sector;<br>Increase public investment and infrastructure. |

**Note**: Provided by Qureshi (2014) and the General Authority for Statistics

The eighth plan attempted to increase the standard of living by enhancing human resources and boosting internal and external investments, while the ninth plan created grounds for the further development of human resources and the female labour force,

which has been underrepresented in the activities of the country (Qureshi 2014). Although all five-year plans have helped improve the economy of Saudi Arabia, the plans have failed with respect to diversification. Sfakianakis (2014) argued that there was a need to create a tenth development plan that would launch the nation forward. Ultimately, the final plan focuses on many issues, including the intelligent use of petroleum-related sectors and enhancement of other sectors via a comprehensive growth strategy.

### 2.3.2 Vision 2030

In April 2016, the country announced its strategic plan to achieve national and international success under the name Vision 2030 (Blazquez, Hunt & Manzano 2017). Vision 2030 is designed to implement significant changes to KSA's economic structure (Blazquez, Hunt & Manzano 2017). According to Abdel-Latif, Osman and Ahmed (2018), the Government of Saudi Arabia has the objective to triple non-oil revenues by lowing taxes and fees on public services, while at the same time adding a VAT by 2030. The non-oil sectors targeted for expansion and development include mining, tourism and education. Vision 2030 pursues an objective to reduce subsidies and the public wage bill by 5% in an effort to decrease public spending. The implementation of these objectives will generate USD53 billion in revenue for the national budget by 2020. Another aim is to diversify the national wealth and investment portfolio of Saudi Arabia abroad.

According to the official governmental website for the Vision 2030 strategic plan, the Saudi authorities believe that envisioning a thriving future is paramount for citizens to become united by similar long-term goals and move towards success together (Blazquez, Hunt & Manzano 2017; Vision 2030 n.d.). Vision 2030 encourages an increase in investment in sustainable sources of energy to cut the use of oil resources and become a knowledge-based economy (Blazquez, Hunt & Manzano 2017; Mitchell & Alfuraih 2018). Another pillar of the strategic plan is the Saudi resolution to draw large investments through partnerships with major companies (Vision 2030 n.d.); such investments do not compete with the private sector, but rather, are necessary to bring capital inputs into strategic sectors in need of financial support. This investment will help develop new economic sectors and facilitate the emergence of national corporations. Because of the leading position of Saudi Arabia in the region, long-term partnerships and economic collaboration in knowledge transfer and trade agreements have the potential to maximise the benefits of investment. Saudi Arabia aims to become a market maker and a

leader in management of assets and funding. The achievement of these Vision 2030 goals requires the formation of a more advanced financial and capital market.

Another perspective found in Vision 2030 (n.d., p. 1) is the confidence that oil is not the only valuable resource; the KSA is abundant in 'gold, phosphate, uranium, and many other valuable minerals' that can be used to diversify the economy. Citizenship, health, sustainability, stable economy, transparency, intelligent investment and high ambitions are additional constituents of the plan (Mitchell & Alfuraih 2018).

Vision 2030 is ambitious, and has triggered criticism from Khashan (2017), who explained that the International Monetary Fund (IMF) expressed concerns about the boldness of the plan because the time frame is limited and will hardly provide for the successes envisioned. Khashan (2017) argued that the plan will fail, unless all people accept the austerity policies implemented by the government. Discussion of Vision 2030 is relevant for this study because it deepens the understanding of government investments to improve economic affairs, and because it will affect the development and implementation of fiscal and monetary policies in the upcoming decade.

### 2.3.3 The Saudi Vision of the Future

The decision to peg the SAR to the USD, which has been enforced since 1986, has been useful for the maintenance of a healthy economy reliant on a single commodity. Nevertheless, the evolution of the Chinese economy has created obstacles for the strategy of pegging and created some uncertainty as to whether policymakers should continue to focus on a single currency. As Salah (2019) points out, the SAR peg to the USD has been beneficial since the USD has not entered a phase of continuous depreciation. In addition, the USD has managed to stay strong during the Gulf Wars of 1990-1991 and 2003-2004 as well as the declines in oil prices that lasted from 1993 to 2000 and from 2013 to 2016 (Sassoon, 2016).

Alternatively, Mirza, Naqvi and Kumail (2013) concluded that a managed float exchange rate would have served as a more effective option because this method would allow the market to identify the real value of SAR and provide an opportunity for SAMA to initiate changes when other financial movements appear inconsistent with the needs and goals of the KSA. In this way, SAMA will be able to influence the pre-determined tolerance

thresholds. Furthermore, the strong basics on which the Saudi economy rests would ensure that SAR behaves positively when authorities remove the peg.

As Wang (2012) claims, China has been on a similar economic trajectory to the U.S. for the last 40 years following the abrupt ending of the Bretton Woods Agreement. China has been increasingly influential in the global economy and financial system. In the wake of the 2008 economic crisis and recession, China was the first nation to recover from its destructive consequences and provide support to other economies that tried to overcome the challenging period.

The KSA has been China's leading partner in the Middle East and North Africa (MENA) region for the past twenty years. The commercial ties between the KSA and China have strengthened between 1990 and 2013 with an increase in trade from $1.28 billion to about $73 billion. Crude oil and petrochemicals have been the main Saudi exports to China, which is the second-largest Asian destination for the KSA exports, after Japan (Alkhareif, Barnettand & Qualls, 2017).

Alkhareif, Barnettand and Qualls (2017) revealed that the strategy of a floating currency is an option for economies to consider, but this approach holds little merit in the case of the KSA for several reasons. Firstly, the possibility of real shocks that result in high exchange rates would not unsettle the economy since an overvalued SAR would not negatively influence Saudi exports denominated in USD. Secondly, the KSA economy is not sensitive to high real interest rates that might accompany these shocks. Thirdly, a strong exchange rate would diminish the cost of imports, which would keep inflation low.

However, as for the immediate future, as long as oil transactions are USD denominated, the costs related to alternative currency pegging are significant enough to reinforce SAMA to continue with the USD peg (Salah, 2019). Hence, the SAR peg to the USD is expected to help the economy until the country attains its multiple goals of becoming a versatile and diversified economy where exports are denominated in different currencies.

## 2.4 Potential Key Challenges for the Saudi Economy

For economists and policy-makers, it is critical to identify potential key challenges that could adversely affect the economy. The key challenges facing the KSA economy are (i) a decline in income, (ii) the government budget deficit, (iii) oil prices and consumption,

(iv) unemployment, (v) the pegged exchange rate and (vi) inflation. These are reviewed briefly below.

### 2.4.1 Decline in Income

Income levels, an important indicator of the wellbeing of a country and its fiscal policies, influence aggregate demand and can also indirectly influence personal and family incomes. Incomes are high in Saudi Arabia because of the oil income received, which has helped it transition from a subsistence to a high-expenditure economy (Al-Eissa 2009; Ray 2015). Although diversification efforts started years ago, oil remains the main source of income, generating 60% of the national budget (GASTAT 2018). A potential decline in income is a challenge for fiscal policy to address because the government should create a taxation system that enables it to increase its revenues without impoverishing people. Studies suggest that public expenditure has a positive effect on income and employment of the KSA (Sultan & Haque 2018). Thus, regulatory bodies need to design effective fiscal policies to mitigate the possibility of a decline in incomes at a personal and household level.

### 2.4.2 Government Budget Deficit

With the expected decline in revenue from oil, it is foreseeable that the Saudi government will encounter budget deficits, unless steps are taken to diversify sources of revenue (Whitley & Makhijan 2014). Ouertani, Naifar and Haddad (2018) stated that the current Saudi fiscal policy focuses on mitigation of damages stemming from sharp fluctuations in oil prices; hence, the guarantee that oil revenues are used efficiently by political leaders will have to expand to include a guarantee that revenues from diversified sources will also be used efficiently. Therefore, in taking into account new revenue sources, the KSA is likely to face complex issues regarding fiscal policy.

The context of Islamic banks raises interesting implications for government budget deficits. For Boumediene (2015), this issue is associated with the management of liquidity. Since liquidity cannot be invested because of the peculiarities of Islamic laws, banks face the problem of overly elevated liquidity; however, this problem can be overcome if Islamic banks fund governmental financial needs (Boumediene 2015). As a result, in the context of Islamic laws, the banking system can cooperate with the government and eliminate two problems with one action. If Islamic banks invest their

surplus cash, caused by high liquidity, to help fund budget deficits, their excess liquidity problem will be mitigated. Appropriate fiscal policy would help the government to deal effectively with budget deficits.

Previous research has shown that government budget deficits have caused a decrease in growth in Saudi Arabia (Alkhateeb, Sultan & Mahmood 2017; Van & Sudhipongpracha 2015). This is a problem for an emerging economy such as Saudi Arabia that is taking steps to move away from oil dependency. The government has started to address the challenge of budget deficits through the implementation of new Islamic bonds (Sukuk). The Sukuk was introduced by the SAMA on 20 July 2017 to allocate sufficient funds to new projects, including governmental investments in infrastructure. The Information Memorandum on Sukuk released by the Ministry of Finance (2017a) detailed that the Sukuk Issuance Program will issue these bonds in an unlimited amount with the objective to standardise industry practices and facilitate international transactions.

### 2.4.3 Oil Prices and Consumption

Energy prices and consumption are also key challenges faced by the Saudi economy. Alshehry and Belloumi (2015) claimed that energy prices are the most important determinant of economic growth for Saudi Arabia; notably, oil prices and consumption in KSA play a significant role in determining government income, signifying the importance of effective fiscal policy. Decreases in government expenditures reflect declines in oil prices (Sultan & Haque 2018). For the KSA, accustomed to the availability of this resource (Krane 2019), high energy consumption remains a serious problem.

Nakov and Nuno (2013) pointed out that energy price shocks exert an influence on the economy by disrupting customers' spending on other consumer items via the household budget allocation process. While the energy sector can use this to its advantage, other sectors of the economy may suffer significantly. Energy prices and consumption remain issues that should be explored and resolved while there is sufficient time (i.e. while the kingdom possesses spare production capacity) to decide what measures would be most beneficial to the Saudi economy (Nakov & Nuno 2013). To this effect, KSA introduced an Energy Pricing Reform that included an increase in electricity prices. The reform was enforced from 1 January 2018, and effectively doubled electricity tariffs for residential, commercial, agricultural, healthcare, private education and charitable properties (Gulf

Business 2017). For Fattouh (2018), the changes to energy pricing in the KSA should boost the economy by increasing government revenues, which can then be used for important national purposes. Ouertani, Naifar and Haddad (2018) argued that this reform has already helped the government to increase funds for projects related to education, health and infrastructure.

### 2.4.4 Unemployment

The government budget affects projects to battle unemployment and enhance KSA's position as a knowledge-based economy. Fiscal policy, in particular, is preoccupied with the improvement of employment dynamics (Battaglini & Coate 2016), as Saudi Arabia is characterised by relatively high unemployment rates. According to Albassam (2015), the overall workforce in the kingdom was 11.36 million, of which 5.34 million, or 47%, were Saudi citizens and 6.02 million, or 53%, were foreigners. Farhan, Brevetti and Laditan (2016) stressed that the prevalence of foreign workers is a problem that requires policy-making efforts.

The unemployment rate in the kingdom increased from 8.1% in 1999 to 12.1% in 2012 (Albassam 2015); SAMA (2018) reported an increase to 12.8% in 2017. This internal factor may exert a critical influence on Saudi Arabia's future, and officials are using expansionary fiscal policies to overcome this problem. Alfarran (2016) stated that the lack of female employees represents a major concern as 35% of women remain unemployed despite the majority having university degrees. The government has created policies to facilitate female transition into labour roles, while the authorities have also encouraged women to become engaged in the private sector (Alfarran 2016). Alhamad (2014) posited that the employment of women is increasing because wages are lower for women in the KSA. The kingdom must establish a balanced system that meets the needs of different populations and counter unemployment in a positive way. Currently, 85% of the Saudi workforce are males, of which 47% are non-Saudis, whereas of the 15% of the workforce who are female, 6% are non-Saudis (Farhan, Brevetti & Laditan 2016, p. 26). Another important finding from empirical research revolves around the population of young adults. Albader (2015) found that individuals belonging to the 20–29-years age group suffer from high unemployment rates. Taylor and Albasri (2014) pointed out that nearly half of unemployed Saudis hold a bachelor's degree; this discourages the educational programme and public support for educational scholarships, because many

students fail to procure employment on graduation. Thus, though the government invests in higher education, students cannot find work on graduation, and the government must then provide unemployment benefits. The government has included an objective of battling unemployment in the latest strategic plan of development (Waked 2016). The unemployment rate can be decreased when 'national human power participation rates' are raised (Waked 2016, p. 22). The support given to small and medium-sized companies is crucial to the fight against unemployment, as such enterprises will create new jobs, adding value to the economy.

This overview of the challenge of unemployment in the KSA highlights the importance of effective fiscal policies to mitigate this situation.

### 2.4.5 Pegged Exchange Rate

When a government pegs its currency to another, it reduces the uncertainty in exchange rates but impairs the government's ability to combat inflation or to realise the anticipated impacts of controlling money supply (Feenstra & Taylor 2012). Pegging local GCC currencies to the dollar is a long-standing practice (Looney 2008); Saudi Arabia and the UAE, for example, have had USD pegs since June 1986 and January 1978, respectively, and, for the most part, dollar pegs have worked well as the sole nominal anchor for inflation control. The pegging regime in the KSA has not undergone significant change since its inception (Mirza, Naqvi & Rizvi 2013).

Advantages of a pegged exchange rate include stability, because of the credibility of the peg, relatively low interest rates, a clear nominal anchor and moderation of inflationary expectations (Alkhareif, Barnett & Qualls 2017). There are also disadvantages such as being more vulnerable to currency crises as capital markets may be open to international flows. A high level of international reserves and a low ability to absorb shocks are other flaws to the pegging regime (Alkhareif, Barnett & Qualls 2017). For this reason, the effect of pegging on an economy may be double-edged; authorities must enhance the strong points of the strategy and avoid the pitfalls.

Hence, appropriate fiscal and monetary policies are required to mitigate the potential adverse effects of a pegged exchange rate. Consequently, this study will evaluate the efficacy of interest rates in light of the KSA's peg to the USD. The findings of the present thesis will provide useful information to policy-makers regarding the relationship among

the important determinants of economic growth considering a pegged rate regime in order to facilitate the formulation of optimal monetary policies under a pegged exchange rate regime.

### 2.4.6 Inflation

One of the key challenges the Government of Saudi Arabia aims to address is stabilisation of prices and curbing of inflation. Measurement of prices and monitoring of inflation are essential assignments for every central bank (Alkhareif & Barnett 2015). To accomplish this, SAMA collects necessary data on domestic inflation to understand what direction is most appropriate for the specific situation. Since economies are dynamic, policy-makers need to be aware of fluctuations to implement adjustments to ensure control over or adjustment to the potentially negative effects on the economy caused by inflationary situations.

In addition, inflation is subject to problems such as 'inherent noise, oscillations, and other temporary shocks' (Alkhareif & Barnett 2015, p. 258); thus, SAMA must develop and employ measurement techniques that are also predictive. Another important finding in the empirical literature is that central banks must address fundamental concepts in their monetary policies (Almounsor 2015). Picking the best solution to manage inflation is imperative because the economy depends on the choices made by SAMA, as is also the case in other countries for their central banks. SAMA utilises the year-on-year growth rate of the consumer price index, released monthly, to measure inflation (Alkhareif & Barnett 2015).

## 2.5 Relevance to the Research Problem

The context of the KSA informs the potential challenges and solutions that the country faces in its pursuit of diversification. The efforts of the Ministry of Finance and SAMA can, however, help the country to overcome its economic issues. Income decline and oil prices/consumption are challenges to consider in the discussion of fiscal policies, whereas the pegging of the SAR to the USD is an important monetary issue. Both types of policies are interlinked with the challenge of government budget deficits and unemployment. The interconnectedness among these factors suggests that this study should make a comprehensive assessment of the Saudi situation.

Knowledge on the functioning of these policies will help policy-makers to develop and maintain a secure and stable economic environment in Saudi Arabia. Recent developments such as creating new Islamic bonds, introducing Hafiz[4] to battle unemployment, implementing Energy Pricing Reform and shifting towards merchandise trade suggest that new studies should explore this topic to produce findings on this transformative stage of KSA growth.

## 2.6 Summary

This chapter has provided scholarly and governmental information on the economy of Saudi Arabia. This knowledge is crucial for the understanding of how monetary and fiscal policies work in a specific context—a context that differs from most other economies. This chapter expanded on the information provided in Chapter 1 and set the foundation for the literature review in Chapter 3. Together, these components of the thesis laid solid empirical groundwork for further research of the role of monetary and fiscal policies in the changing economic environment of the KSA.

[4] Hafiz is the *Searching for Employment* programme provides training and motivational services as well as financial assistance of up to SAR 2,000 monthly to support and enable the job search.

# Chapter 3: Literature Review

## 3.1 Introduction

Chapter 2 provided insights into the history and economic system of Saudi Arabia, focusing on the current course towards diversification. The previous chapter also specified the agencies responsible for monetary and fiscal policy. Chapter 3 offers an explanation for the variables used in the study and justifies their importance for policy-making efforts. It discusses the key economic schools of thought shaping the perceptions on and interaction of fiscal and monetary policies. Tools of both fiscal and monetary policies are addressed, including a discussion on differences in applications in the Islamic and non-Islamic worlds. The chapter emphasises the viability of coordination between fiscal and monetary policies and addresses potential concerns that may arise if policies are not efficiently coordinated.

Specifically, section 3.2 explores the main fiscal policy approaches, including classical, neoclassical, Keynesian and New Keynesian theories. Section 3.3 overviews the main fiscal policy tools, while Section 3.4 introduces fiscal policy instruments, implementation and framework in Saudi Arabia. Section 3.5 analyses monetary policy approaches, including exogenous, endogenous and modern monetary theory. Section 3.6 offers details on the effects of fiscal and monetary policies on GDP. Section 3.7 discusses interactions between monetary and fiscal policies. Section 3.8 critically reviews the independence of each policy, respectively. Section 3.9 offers key practical considerations of the study. Section 3.10 summarises the gaps in the literature while Section 3.11 summarises the chapter.

## 3.2 Main Fiscal Policy Approaches

This section provides a comprehensive discussion on the Keynesian economics model applicable to Saudi Arabia, which is a suitable theory, with sound fiscal policy instruments to achieve balanced economic development. The following section provides a discussion of the findings in the literature on the tools of fiscal policies, including a focus on tax and expenditure, which may play a role in the improvement of fiscal policy in the KSA.

### 3.2.1 Classical Theory

The classical school of thought argues in favour of free economic activities and, as such, views fiscal policies as ineffective (Negishi 2014). The laissez-faire market framework excludes government intrusion almost entirely and does not believe that fiscal policies are effective because prices are flexible and the supply curve is vertical (Hebous 2011). Thus, fiscal policies does not support the vision of the free market where entities use economic resources in a manner that benefits the economy (Arestis 2012).

Similarly, classical economists support the idea that individual expenditures play a prominent role in economic activity, with government spending often 'excessive' as it deprives businesses of resources; thus, the public sector grows at the expense of the private sector (Cullis & Lewis 1997). In addition, since fiscal policies are often used to mitigate the damages from an economic crisis, as soon as possible, fiscal policy methods employed by policy-makers are typically of a temporary nature (Cullis & Lewis 1997).

### 3.2.2 Neoclassical Theory

The neoclassical school is another significant school of economic thought. Ali (1998) indicated that the neoclassical school emphasises the linkages between governmental spending, debt and tax policies—by shifting taxes to future generations, budget deficits raise total lifetime consumption. Additionally, McGrattan and Ohanian (2010) found that the neoclassical approach quantitatively accounts for macroeconomic activity in the US during World War II. Real GNP, investment, consumption, labour supply and returns to capital and labour outlined by the theory make the approach an accurate tool for the assessment of fiscal policy.

Goodfriend and King (1997) pointed out that the neoclassical perspective marries both classical and Keynesian ideas, with the New Neoclassical Synthesis supporting the existence of considerable gains from eliminating inflation and implying a trade-off between inflation and real activity. Kanaginis and Phelps (1994) analysed the dynamic effects of fiscal policy in a two-sector general equilibrium model and demonstrated that increased national debt increase employment but also drives up the real interest rate.

Moreover, Nattrass and Varma (2014) emphasised that the main idea of neoclassical theory is that 'under conditions of perfect competition, the operation of market forces will

ensure that all resources are optimally allocated' (p. 19). The neoclassic approach is likely to succeed in the time of crises because a well-functioning economy with a low rate of inflation and low tax rates could benefit from policies based on this framework.

### 3.2.3 Keynesian Theory

The Keynesian economics framework emphasises the significant role fiscal policies play in directing economic activities, especially during economic downturns. This school of thought considers that aggregate demand, including governmental expenditures, is essential to the stabilisation of an economy (Negishi 2014). For this reason, Keynesian economics embraces the idea that it is necessary to utilise effective fiscal policies to overcome problems associated with recessions. The framework is built on the belief that economic activity usually requires correcting, which can be achieved via government expenditure. Hebous (2011) asserts that the Keynesian model believes that current consumption is a function of current income; therefore, economists and policy-makers adopting the Keynesian approach are preoccupied with ideas about boosting the economy immediately instead of creating prerequisites for long-term growth.

According to Hebous (2011), current empirical evidence shows that society has had a propensity for economic recessions, which calls for the development of fiscal policies to help withstand economic shocks, but also improve the economy in times not characterised by crises. While the classical school suggests that government spending is destructive to the economy, the Keynesian school believes that the economy depends on both the public and the private sectors, and that it necessary arises to control individual entrepreneurs and businesses that may have a negative effect on the overall economy. Afonso and Sousa (2012) agreed that government spending has an expansionary Keynesian influence on economic activity, while there is a beneficial impact on the average cost of debt and the price level. Empirical evidence supports the need for fiscal policies promoted by the Keynesian school of thought (Afonso & Sousa 2012).

Nonetheless, opinions differ as to the effectiveness of fiscal policy instruments and their impact on economic development. Fazzari, Morley and Panovska (2015) expressed the idea that it is not a given that governmental expenditures play an essential role in the economic environment; debates are ongoing on whether government spending has an effect on aggregate output and the components of output. Nevertheless, the proponents of

Keynesianism claim that the economic environment depends heavily on the ability of the government to give it a significant boost. Specifically, the most important idea of this philosophy pertains to the possible role of the government as an entity to take over the roles of the private sector and investments when they are unable to perform during a recession (Fazzari, Morley & Panovska 2015); thus, the government has the potential to enable a nation's economic growth.

Keynesianism endeavours to produce short-term results because fiscal policies are efficient during times of recessions. When a country cannot function because of an economic crisis, the ideas of the classical school might be powerless because classical philosophy identifies solutions for lasting effects; however, countries that are failing now require immediate measures to improve their standing before the economy collapses (DeLong & Summers 2012). When the private sector cannot contribute, the government is the only entity that can provoke changes to create economic growth. DeLong and Summers (2012) suggested that fiscal policies, in particular, discretionary fiscal policies, have the power to mitigate severe recessions that force 'interest rates down to the zero nominal lower bound' (p. 233). Consequently, fiscal policies can serve as effective stabilisation tools under the Keynesian model.

### 3.2.4 New Keynesian Theory

With respect to fiscal policy, New Keynesian theory offers an adjusted approach, with divisive differences from traditional Keynesian theory. However, it is important to bear in mind that there is no single model that can be considered representative of the entire New Keynesian School (Knoop 2009). New Keynesian thought does not believe in large fiscal policy multipliers as measures to stabilise an economy; on the contrary, monetary policy may serve as an effective output stabilisation tool (Knoop 2009). In general, unlike traditional Keynesian models, New Keynesian models are considered forward-looking. Kogan et al. (2006) noted more rational expectations by individuals and firms as a part of the New Keynesian approach, considering a certain role of price rigidity, usually in the form of a staggered price or wage setting. Therefore, New Keynesian models are viewed as better for fiscal policy evaluations.

Further, some scholars point to the similarities between Keynesian and New Keynesian approaches to evaluating the effectiveness of fiscal policy; for example, Fatas and Mihov

(2001) found that both theories predict a positive relationship between increases in government spending and economic activity because of the expansionary effect, which raises output and real interest rates. In the New Keynesian model, the fiscal multiplier functions entirely by creating expected inflation, which lowers real interest rates and consumption growth, raising the present consumption level. Cochrane (2017) agreed that consumption depends on expected future consumption and real interest rates, while the level of consumption is essential for all future growth rates.

## 3.3 Main Fiscal Policy Tools

The fiscal policy tools selected by the KSA depend on the peculiarities of public finance, which deals with the distribution of revenue and expenditure within the KSA. The distribution of revenues from the oil sector is dictated by public finance decisions (Whitley & Makhijan 2014); for example, decisions such as the allocation of large subsidies and payments to the private sector as support during rapid changes. Krimly (1999) added that such decisions are characterised by an emphasis on human development, as demographic explosion affects public finance allocation to education and health. According to Albassam (2015), the KSA may be not ready for an inflow of investments unrelated to petroleum products in the wake of its diversification strategy (see Section 2.3). Within this context, a review of the main fiscal policy tools used in KSA is provided below.

Fiscal policy is an instrument that governments employ to improve economic activity. In the case of the KSA, governmental revenues mostly come from the oil sector. The oil revenue surplus provides finances for the KSA to invest in areas of the economy or social life that require an inflow of funds (Whitley & Makhijan 2014). While expenditure is an essential component of the government's fiscal policy to improve living conditions of its citizens and develop the country, it could not exist without income from taxes – another important instrument of fiscal policy. Fiscal policy can behave pro-cyclically and possibly even counter-cyclically (Céspedes & Velasco 2014). Governments should take into account the peculiarities of their revenues to make sound decisions and predict the behaviour of fiscal policies. Afonso, Agnello and Furceri (2010) noted that fiscal policies are usually countercyclical or a-cyclical in the majority of developed countries, and pro-cyclical in developing countries. Indirect taxes, social contributions, government

consumption, subsidies and government investment are the elements of governmental income and expenditure that may drastically influence the economy in a negative manner.

Government spending is imperative to the general process of stabilising the economy, and it is important to know how government spending affects GDP; for instance, a 1% increase in government spending increases real GDP by 1.6% based on modelling for US economy. (Cogan et al. 2009). Government spending heavily relies on adjustment of expenditures because the government provides specific goods and services that the private sector cannot deliver, such as roads, hospitals and welfare assistance. To boost the economy, government expenditure should focus on increasing aggregate demand.

## 3.4 Fiscal Policy Framework in Saudi Arabia

The Government of Saudi Arabia is currently aiming to smooth the effects of price volatility and diversify the national economy towards reduced reliance on oil revenue (Westelius 2013). According to Westelius (2013), Saudi Arabia's fiscal policy has been increasingly successful in smoothing spending, regardless of continuing volatility in oil revenues, because of its commitment to the USD peg and growing interconnectedness with developing Asian countries. There has been a significant improvement in fiscal management over the past decade; nonetheless, managing volatility of oil prices remains a key challenge. Fiscal policy instruments used to achieve this goal are government spending and taxes (Tanzi 2008); Saudi Arabia imposes a tax that is unique to Islamic countries – Zakat. Given that Saudi oil reserves will eventually be exhausted, taxation is the foundation of the sustainability of the KSA economy.

### 3.4.1 Government Expenditure

Previous studies have not identified any correlation between fiscal expenditure policy and non-oil real GDP in GCC countries (Fasano-Filho & Wang 2001). The absence of an effect of government spending on the non-oil economy is influenced by national fiscal policies. During 1960–1996, Ghali (1997) also found no effect of government spending on output in Saudi Arabia; however, Kireyev (1998) and Albatel (2000) provided evidence that growth in GDP and public spending were positively correlated for the non-oil sector for 1969–1997 and 1964–1995, respectively. A long-term positive relationship between total government spending and real GDP was also reported by Al-Obaid (2004) for Saudi Arabia. In another study, Alshahrani and Alsadiq (2014) researched economic

growth and government spending in Saudi Arabia and identified a correction of 34% in the annual long-term equilibrium, suggesting a positive correlation between government expenses and private sector GDP. However, the empirical evidence on a short-term correlation between the government/private sector and GDP showed no correlation in Alshahrani and Alsadiq (2014).

Researching the causal relationship between defence spending and economic growth for the period 1970–2003, Al-Jarrah (2005) noted the existence of bidirectional causality, suggesting that an increase in defence spending resulted in a decrease in economic growth in the long term. Mann and Sephton (2015) conducted research on public spending on defence and healthcare and reported similar results for Saudi Arabia, providing evidence that this type of expenditure contributes to the decrease in real non-oil GDP. Other types of government expenses (on education and housing) had little or no impact on GDP and economic growth.

### 3.4.2 Government Revenue

The secondary literature on government revenues and their impact on GDP has also produced contradictory results and findings. In particular, Kabir (2016) analysed government revenues from oil and identified that oil-related revenues were used to finance GDP and economic growth programs. However, the impact of this type of revenue is unstable and unsustainable in the long term. Higher oil prices imply higher revenues; when oil prices increase, the Saudi government should use excess revenues to address the issue of low savings (Dreger & Rahmani 2016). The low impact of oil-based government revenues on GDP can be attributed to the insufficient absorptive capacity of Saudi Arabia, and oil-related revenues being highly volatile (Cavalcanti, Mohaddes & Raissi 2012; Mohaddes & Pesaran 2013).

Saudi Arabia is rich in natural resources, but its heavy dependence on oil as the major source of government revenues is a challenge for long-term economic growth. Lane and Tornell (1996) argued that high oil prices facilitate an increase in fiscal redistribution, but GDP growth may slow if the oil industry is controlled by the private sector or governmental institutions are not efficient. Mehlum and Moene (2006) and Robinson, Torvik and Verdier (2006) added that dependence on natural resources may decrease overall income in countries where governmental institutions are weak. Moreover, it

should be added that oil prices are not controlled by the Government of Saudi Arabia, rendering the national budget vulnerable to diverse risks. In a scenario of decreasing oil prices, government revenues are adversely affected, and the impact may be significant if the government does not diversify the economic base (Alhateeb et al. 2017). The Government of Saudi Arabia is aiming for diversification in government revenues via Vision 2030 (Al Rasasi, Qualls & Alghamdi 2018). The diversification of government revenues requires the government to engage in funding and development of the private sector and infrastructure, and reduced dependence on oil-focused economic models (Raifu & Raheem 2018).

Understanding the finite nature of fiscal revenue from oil, the Saudi government has recently introduced a set of changes to its taxation legislation, aiming to increase revenue from taxes. On 1 January 2018, following a decrease in oil prices, the government introduced a VAT (D'Cunha 2018). The new taxation legislation was backed by the IMF and implies imposing a 5% levy on most goods and services, which should help to boost revenue in light of crude oil price falls since 2014. As part of economic diversification, the government announced its plans to spend USD261 billion on broadening the investment base and boosting other non-oil income, which should be compensated by the newly introduced VAT. As an additional way to increase non-oil revenues, the government introduced a 100% tax on tobacco products and energy drinks and a 50% tax on soft drinks in the summer of 2017 (D'Cunha 2018). Although such measures could slow economic growth, it is important for Saudi Arabia to diversify its economy and finds sources of revenues other than oil.

Based on the discussion above government expenditure and government revenue will be used as the fiscal policy variables in the research.

### 3.4.3 Instruments of Saudi Fiscal Policy

A heavy reliance on the oil sector encourages the decision-makers of Saudi Arabia to develop sensible fiscal policy to achieve governmental goals. Saudi fiscal instruments include government expenditure and government revenues. Therefore, the variables related to these instruments will provide insights into the effectiveness of fiscal policy in its influence on GDP (total, oil and non-oil). Instruments can be divided into public investment carried out by state-owned firms and through government expenditures, with

the latter consisting of two types—current and capital (Alshahrani & Alsadiq 2014). Current expenditures include salaries, wages, subsidies, transfers and other consumption expenses, while capital expenses include spending on human resources, social services and health care, telecommunications, economic resources and increasing the availability of municipal and housing services. Given that Saudi Arabia derives more than 90% of its fiscal revenues from oil (Callen & Qu 2015), the volatility of oil revenue poses a substantial challenge for fiscal management.

### 3.4.4 Implementation of Fiscal Policy in Saudi Arabia

Unlike the majority of global economies, Saudi Arabia withstood the financial crisis of 2008–2009. The main reason for this was the large account surplus that had accumulated in the years preceding the crisis, which enabled the kingdom to adjust fiscal policy and stimulate the economy to counter the effects of the global recession. Joharji and Starr (2010) pointed out that, because of its experience in dealing with a crash in oil prices in the 1980s, the SAMA was able to address this latest economic downfall efficiently by combining available monetary and fiscal tools. As a result, the countercyclical fiscal policies chosen by the Ministry of Finance and the fiscal stimulus plan targeted towards infrastructure enabled Saudi Arabia to achieve growth of real GDP of 0.6% in 2009, while economies of other oil-exporting counties struggled with the steep drop in oil prices. Overall, fiscal policy in Saudi Arabia affects economic conditions through government spending and through countercyclical approaches.

Moreover, the lack of taxation has important implications (Malik 2015), influencing governmental revenues and expenditures because the government receives less revenue from people who could potentially provide the government with more. Yet the Government of Saudi Arabia has resolved to use other ways to achieve short-term objectives and long-term goals for the economy, such as the VAT. The fiscal decisions are ruled by the necessity to uphold the high standard of living throughout the nation, with the country performing effectively in the global market. Since Saudi GDP has been steadily increasing, the current direction of fiscal policy development fits the economic context of Saudi Arabia.

In the case of Saudi Arabia, increased government spending may positively influence growth of non-oil GDP. According to a recent study that analysed economic data over

1969–2005, whenever the government increased its spending, it had a significant long-term effect on the rate of non-oil GDP growth (Joharji & Starr 2010). The effects of government spending on growth turn out to be more significant than those of capital expenditures, which suggests that government investments in improving the operation and administration of government entities, as well as supporting purchasing power, have more effect on the GDP growth rate than investments in productive capacity and infrastructure. Another approach to mitigate the impact of shifts in government non-oil spending is the expansion of the role of the private sector in the Saudi Arabian economy, as well as sustaining prudent fiscal policies (Joharji & Starr 2010). The private sector can contribute to the increase in GDP by engaging in economic activity in non-oil sectors. Considering this, the growth of the private sector should be further encouraged by the government through the introduction of structural adjustment efforts to further diversify the economy, remove domestic price distortions and broaden financial markets.

## 3.5 Main Monetary Policy Approaches

While fiscal policy in the KSA is akin to a Keynesian approach, according to Ferat (1979) and Morgan (1979) cited in Loony (1989), monetary policy is based on a hybrid system, with elements of exogenous and endogenous frameworks (Al-Jasser & Banafe 1999; Almounsor 2015). An exogenous framework allows the control of money supply by an external agency, such as a central bank. Within the domain of the endogenous approach, policies are based on the assessment of diverse economic factors. The current study takes an exogenous approach to monetary policy, in line with the assumption that SAMA has the potential to set Saudi monetary policies in practice (Al-Hamidy 2011).

Monetary policy in Saudi Arabia should play a central role in business cycles to smooth fluctuations in system liquidity. Because of the fixed exchange regime, SAMA monitors the federal funds rate to minimise any pressure on the exchange rate. The current course of the monetary policy in Saudi Arabia is closely correlated with policies of the Federal Reserve (Almounsor 2015). SAMA uses a number of tools, such as altering reserve requirements to targeted prudential guidelines with respect to affecting the volume of various types of bank credit available in the economy, to maintain economic stability and achieve its objectives (Almounsor 2015). The specific objectives pursued by SAMA include maintaining price stability and development of the financial sector. These

economic goals require strong supervision and control from SAMA (Al-Jasser & Banafe 1999).

### 3.5.1 Exogenous Approach

#### *3.5.1.1 Keynesian Model*

The Keynesian approach holds that monetary policy is a powerful economic tool that may have unexpected consequences. By these standards, monetary policy is transmitted through the interest rate mechanism in an economy (Mishkin 1995). In the Keynesian model, a contraction in monetary policy leads to a rise in real interest rates, raising the cost of capital and decreasing investment spending. As a result, aggregate demand and economic output decline.

Long-term contracting and sticky prices influence monetary policy. Barro (1977) pointed out that a key element in any Keynesian-type analysis of economic fluctuations is the assumption of stickiness in the adjustment of prices to excess demands. Barro (1977) questioned why long-term contracting theory is able to account for wage or price stickiness without supporting Keynesian conclusions and found that stickiness is not fundamental to the Keynesian approach; instead, a more important element is the non-execution of some trades that are perceived as mutually advantageous.

Wray (2010, p. 232) noted that instead of highlighting the 'lubricating' role of money in exchange, Keynes emphasised the unit of account and the role of the state in what he called 'writing the dictionary' of an economy. As Atesoglu (2009) argued, the neutral interest rate approach of Keynes is more likely to provide better prediction of forthcoming developments in monetary policy; in the period 1992–2007, the Keynesian monetary policy rules provided a better explanation of the federal funds rate as the primary monetary policy instrument.

#### *3.5.1.2 Chicago School*

The Chicago school of thought differs from Keynesians since followers of this school, known as 'monetarists', suggest that the government and central banks 'give up' trying to adjust the economy (Officer 2009, p. 19). Overall, followers of the Chicago school are strong advocates of free trade, both domestic and international, and of very limited governmental intervention into the economy. They maintain that monetary policy should

follow a simple pattern of increasing the supply of money at a predefined rate, regardless of the actual state of the economy. Milton Freidman argued that rejection of this fixed-quantity rule of monetary policy could lead to unpredictable outcomes, increasing volatility of the economy (Van Overtveldt 2009). He also maintained, in his seminal article on the role of monetary policy, that the traditional Keynesian view of monetary policy is far too optimistic, as it fails to take into account changing behaviours of those who expect wages or prices to change and ignores the crucial difference between real and nominal values (Friedman 1968).

According to Broten and Collins (2017), Friedman's work paved the way for the widespread adoption of the monetarist approach to macroeconomics, from which the impact continues. Studying 13 developed market economies during the 1950s and 1960s, Starleaf and Floyd (1972) concluded that there is a significant positive correlation between the stability of money stock growth and the stability of national income growth, and a positive intercountry correlation between the trend rate of growth of the money supply in the domestic economy and the trend rate of growth of domestic national income. These features make the Chicago school model of monetary policy more relevant in the current dynamically changing economies compared with the traditional Keynesian school of thought.

### 3.5.2 Endogenous Approach

#### *3.5.2.1 New Keynesian*

Among endogenous theories, a New Keynesian perspective has emerged to interpret the impact and benefits of monetary policy. Clarida, Gali and Gertler (1999) explained that the New Keynesian School of thought believes that 'temporary nominal price rigidities provide the key friction that gives rise to non-neutral effects of monetary policy' (p. 1662). Sticky-price models are paramount to this economic philosophy because monetary policy is critical for the development of real activity (Goodfriend & King 1997). New Keynesians take into consideration microeconomic realities, to ensure that even minute details are accounted for.

In this school of thought, money becomes endogenous either through management of liabilities or assets, or when households make a decision to hold fewer securities and more demand deposits (Rochon 1999). The New Keynesians' approach is one of the most

influential and prolific areas of research in macroeconomics, as it combines the theoretical rigour of Real Business Cycle theory with classic Keynesian ingredients such as nominal rigidities and monopolistic competition (Hossein & Yazdan 2012). The advantages of the model include the benefits of price stability, the gains from commitment to future monetary policies, the significance of natural variables as essential benchmarks for policy and a credible anti-inflationary stance (Hossein & Yazdan 2012). For instance, households consume a certain basket of goods, while supplying labour to imperfectly competitive firms; firms tend to change prices only after random intervals of time ('price stickiness'); and price stickiness implies that monetary policy could have real effects, even in the short-term.

### 3.5.3 Modern Monetary Theory

Modern monetary theory, or neo-chartalist theory, differs significantly from the conventional schools of Keynesianism and monetarism. According to this theoretical approach, debt in an economy is created by an obligation imposed by the state in the form of a unit of account in which this obligation is measured (Todorova 2009). This theory describes and analyses the economies of modern countries where the national currency is fiat money established by a sovereign government. As Tymoigne and Wray (2013) explained, as long as a sovereign government is a sole supplier of a national currency and is able to issue currency in any denomination and any physical form, it has an unrestricted ability to fulfil promised future payments and pay for things it wants to purchase.

Under such premises, modern monetary theory appears an ideal theory for sovereign governments that issue their own currency. Tymoigne and Wray (2013) also pointed out that a government that is not financially constrained, such as non-sovereign states, could focus on important issues such as employment and price stabilisation. Neo-classicists argue that there will always be demand for a local currency because citizens have to use it to pay taxes and pay for local purchases (Tymoigne & Wray 2013). However, modern monetary theory is only relevant to a limited number of countries, such as the US, where the national currency is also a world reserve currency—Saudi Arabia would not benefit from this approach.

*3.5.3.1 Main Monetary Policy Tools*

The main monetary policy tools include the cash rate, reserve requirements and the discount rate. The central bank uses the cash rate as a primary tool to meet their inflation target (Atkin & La Cava 2017). By adjusting the cash rate, the central bank affects interest rates for households and businesses and, thus, the country's economic activity and inflation rate. Reserve requirements are the components of deposits that banks have to keep in their vaults or in a deposit at a central bank. Lowering reserve requirements means that authorities have chosen to pursue an expansionary monetary policy. Conversely, when the central bank resolves to pursue contractionary monetary action, authorities increase reserve requirements, which prevents commercial banks from offering more loans to personal and business entities. Reserve requirements are connected with bank claims on the private sector and contribute to research on the factors influencing monetary policy.

Another monetary policy tool that could have a substantial impact on an economy is the discount rate. According to Chen and Barnett (2015), the discount rate is the tool via which the central bank selects the appropriate interest rate to charge commercial banks for short-term borrowings. The central bank's behaviour regarding the discount rate can result in either expansionary or contractionary monetary policies; for example, lowering the discount rate implies that authorities have selected to employ an expansionary monetary policy while increasing the discount rate would indicate that the monetary policy is contractionary.

### 3.5.4 Monetary Policy Framework in Saudi Arabia

The monetary policy framework in Saudi Arabia adheres to the framework of Islamic finance (Khatat 2016). This subsection focuses on instruments employed by Saudi monetary policy and implementation. The topics of money supply, interest rates and CBC on the private sector are relevant in the shaping of KSA monetary policy.

*3.5.4.1 Money Supply*

The overall ineffectiveness of monetary policy in Saudi Arabia has been historically attributed to the absence of well-developed markets (Al-Yousif 2000). Previous studies have provided extensive empirical evidence of an insignificant negative effect of money

supply on economic growth in Saudi Arabia, as well as in other developing countries. For example, Adusei (2013), reporting on money supply in Ghana for the period 1971–2010, concluded that inefficient management of financial development—money supply, in particular—hindered economic growth. Researching Nigeria in the period 1973–2013, Gatawa, Abdulgafar and Olarinde (2017) reported that broad money supply and interest rates were negatively correlated to economic growth. In a study of Pakistan for the period 2000–2011, Ihsan and Anjum (2013) identified a negative impact of money supply on GDP. In the case of non-oil GDP, money supply tends to have a positive effect only in the short term; this becomes negative in the long term (Adusei 2013; Al-Yousif 2000; Gatawa, Abdulgafar & Olarinde 2017; Ihsan & Anjum 2013).

#### *3.5.4.2 Interest Rates*

The correlation between interest rates and real output growth across different countries tends to be positive and significant only for countries with pegged exchange rates, including Saudi Arabia, as confirmed by evidence gathered for the period 1973–2002 (Giovanni & Shambaugh 2008). Pegging implies a loss of monetary autonomy, but tends to have a significant impact on the national economy. When the exchange rate is floating, the risk of volatility is high because of changes in nominal exchange rates. While pegging does not eliminate volatility entirely, it forces interest rates to follow the base country rates, rendering impossible the option of countercyclical monetary policy. Interest rates can have a positive effect on total and oil GDP but are not supported by the Islamic financial framework. In Saudi Arabia, interest rates exist only in the form of private sector commercial banks paying interest on savings, deposits or loans (Akikina & Al-Hoshan 2003). Over the past five decades, interest rates in Saudi Arabia have exhibited a downward shift, in line with the international tendency among developed countries (Al-Hamidy 2009).

#### *3.5.4.3 Commercial Bank Claims on the Private Sector*

The literature review does not reveal a consensus among researchers on positive or negative impacts of commercial bank claims on the private sector (CBC) on economic growth. While finances do play the central role in economic development of any country, and banks have the capacity to shape the economy through financial management of assets, capital formation facilitation and crediting the private sector, the correlation

between CBC and economic growth has not been confirmed. Molapo and Damane (2015) noted that an efficient private sector is vital for economic development, and commercial banks play an important role in this chain.

Despite debate on whether CBC has direct effects on economic growth, the current discussion revolves around the basic principles of the early works of Schumpeter (1912), which are still valid. Schumpeter pioneered the concept of finance-led economic growth, according to which the financial sector plays the role of financial intermediation and turns savings into investment. Deposit-taking financial institutions source funds to stimulate private sector consumption and investment; thus, CBC, as the variable, shapes the development of financial sector.

In the case of Saudi Arabia, Ibrahim (2013) and Osman (2014) confirmed the significant positive relationship between financial development and economic growth. Ibrahim's (2013) study, conducted for the period 1989–2008, reported that domestic bank credit to the private sector had long-term positive effects, but negative impacts in the short-term. Osman (2014) researched the same question but for the period 1974–2012, and traced positive short-term and long-term relationships between private sector credit and economic growth. Thus, the findings of these two studies do not agree in terms of a short-term relationship, but both confirmed the contribution of commercial banks to economic development in Saudi Arabia.

*3.5.4.4 Inflation*

The findings reported in the secondary literature differ as well. In particular, the research on the correlation between inflation and economic growth by Erbaykal and Okuyan (2008) for Turkey for the period 1987–2006 did not confirm a statistically significant relationship for the long term, but did identify a negative relationship for the short term. A study by Saaed (2007) on Kuwait for the period 1985–2005 suggested a positive long-term correlation between inflation and economic growth. In the case of Pakistan, Ahmed and Mortaza (2005) reported a negative long-term relationship between these two variables, whereas Faria and Carneiro (2001) found no long-term correlation for Brazil but noted a negative short-term effect. Mallik and Chowdhury (2001) noted a positive relationship between inflation and economic growth, both in the long term and short term, for Bangladesh, India, Pakistan and Sri Lanka.

For Saudi Arabia, researchers have suggested a positive relationship between inflation and economic growth. Alkahtania and Elhendy (2014) examined these two variables for the period 1980–2010 and traced a non-linear relationship, claiming that inflation of 4% has a positive effect on real GDP growth, but that when inflation is higher, the effect on GDP becomes negative. The major influence on inflation in Saudi Arabia is inflation in the global economy (Al Khathla 2011). Altowaijri (2011) attributed price increases and inflation in Saudi Arabia to foreign prices and exchange rates. Ramady (2009) explained inflation in the kingdom via money supply, interest rates and the national currency depreciation. Domestic causes of inflation include fiscal consolidation, which slows non-oil economic development and leads to a negative output gap. The positive outcomes of long-term inflation on total and oil GDP, as highlighted by Al-Hamidy (2009), included intensification of economic activity.

Based on the discussion above, money supply, interest rate, CBC and inflation will be used as the monetary policy variables in the research.

*3.5.4.5 Instruments of Saudi Arabian Monetary Policy*

The monetary policy of Saudi Arabia is shaped by SAMA, money supply, interest rates and the USD-pegged exchange rate. This section outlines the four instruments of monetary policy in Saudi Arabia—the minimum reserve policy, repurchase agreements (repos), foreign exchange rate swaps and the placement of public funds. The key objectives of monetary policy, including stabilisation of inflation, free movement of capital and currency, and the sustained fixed exchange rate to the USD, are discussed. Finally, the section highlights the instruments and implementation of fiscal policy.

The instruments of KSA monetary policy revolve around the variables of money supply, interest rates, CBC on the private sector, and inflation. These factors anticipate changes that affect monetary policy and, subsequently, the Saudi economy. In Saudi Arabia, open market operations are the main tool to control the supply of bank reserves. Kiyotaki and Moore (2012) stated that open market operations change the mix of assets possessed by the private sector. In addition, it is possible that recent recessions have modified the effect of monetary policies that use open market operations. Because of the unique position of the KSA in the market, it cannot resort to traditional instruments, such as the central bank's policy interest rate, that conventional economies embrace (Friedman 2015). The

KSA must respect Riba and subsequently develop monetary instruments that uphold the prohibition of interest rates.

However, in the case of Saudi Arabia, there are important limitations to consider in terms of effective application of monetary policy instruments. One is the fact that the SAR has effectively been pegged to the USD since the suspension of the Special Drawing Right (SDR) and SAR link in May 1981 (Al-Jasser & Banafe 1999). Practically speaking, this has resulted in riyal interest rates closely following dollar rates since the mid-1980s, often with a small premium. In essence, Saudi interest rates and, accordingly, its monetary policy are closely related to an external central bank; specifically, that of the US (Al-Jasser & Banafe 1999).

For Saudi Arabia, the exchange rate sets the foundation for the long-term orientation of monetary policy. With relative flexibility in shaping national monetary conditions through changing interest rates and adjusting reserve requirements, SAMA carries out monetary policy and pursues some degree of operational independence in meeting the following objectives (Al-Hamidy 2011):

- strengthening the national currency and stabilising its value
- managing banking affairs of the government
- regulating commercial banks.

Since 2003, SAMA also regulates insurance companies as well. Reflecting on monetary policy choice, Al-Hamidy (2011) emphasised that exchange rate targeting was selected for a number of reasons. First, Saudi Arabia is a resource-based economy with foreign payments conducted in USD. Second, the stability of the exchange rate is vital for stimulating investment and diversifying economic planning. Third, given that the export sector is dominated by oil and related products, any shifts in the USD/SAR exchange rate do not contribute to Saudi trade. For these reasons, exchange rate targeting is the key monetary policy objective.

The specific tools of monetary policy in Saudi Arabia include a minimum reserve policy, repos, foreign exchange rate swaps and the placement of public funds (Al-Jasser & Banafe 1999), as explained below.

3.5.4.5.1 Minimum Reserve Policy

A minimum reserve policy is set by Article 7 of the Banking Control Law, according to which banks are required to maintain a certain percentage of deposits with SAMA. This policy ensures that banks have the liquidity required to cover customers' deposits, as well as acting as a tool of monetary policy. Even though this tool is powerful, it only serves the purpose of implementing structural changes in bank liquidity. The current reserve requirement system is no longer effective with regard to liquidity and monetary policy—repos and swaps have attracted attention as potentially more effective instruments.

3.5.4.5.2 Repurchase Agreements (Repos)

The current bond market serves as an additional policy instrument for SAMA; particularly as represented by repos. According to Al-Jasser and Banafe (1999), the Saudi Arabian bond market is still in its early stages of formation, as the major part of public debt is held by several banks and institutions. The primary risk for SAMA in engaging in secondary market transactions is the accumulation of government debt. Using repos as the tools of temporary additions to bank reserves, SAMA satisfies the demand for short-term inflows of reserves. The process of allocation of repos is correlated to bank holdings of securities. With reference to monetary policy, repos offer the advantage over a definitive purchase of financial assets as they are reversible in the short term and this type of transaction has no effect on bond market prices. Instead, repos are used to regulate the money market.

3.5.4.5.3 Foreign Exchange Swaps

The primary purpose of foreign exchange swaps is to influence capital flows and reduce disruptions to monetary policy. Foreign exchange swaps are of equal important to monetary policy via repos, but are more flexible in terms of maturities and trading volumes (Al-Jasser & Banafe 1999). Foreign exchange swaps are carried out at the ruling market rates and have a direct impact on liquidity but not on exchange rates. Similar to the mechanisms employed by the minimum reserve policy, foreign exchange swaps are an effective option to provide emergency liquidity.

3.5.4.5.4 Placement of Public Funds

SAMA has the power to use the funds of government institutions to place with the banks. This tool of monetary policy is entirely at SAMA's discretion and complements the

effectiveness of repos and foreign exchange swaps (Al-Jasser & Banafe 1999). Unlike repos and foreign exchange swaps, placement of public funds as a tool provides longer-term liquidity support because it does not imply purchases of securities in developed markets. Placement of public funds is a long-term liquidity-providing tool with predictable patterns based on seasonal fluctuations, and is used in crisis management.

*3.5.4.6 Implementation of Monetary Policy in Saudi Arabia*

SAMA, KSA's central bank, is solely responsible for the formulation and implementation of monetary policy—SAMA is free to select its operating procedures and select the range of instruments to apply and the appropriate time to use them (Al-Jasser & Banafe 1999). SAMA functions autonomously from other governmental agencies and only requires prior approval in exceptional cases, such as the changing of the statutory reserve requirement for banks, for which approval from the Minister of Finance and National Economy is needed. The majority of the transfers of public sector deposits from and to commercial banks and vice versa are made by SAMA itself, at its own discretion, while the size and frequency of such transfers are dependent on the exigencies of the situation. Al-Jasser and Banafe (1999) pointed out that SAMA, which manages government debt, does not extend credit to the Saudi government, except when a very short-term remedy is required to meet the cash flow needs of the government. SAMA also has full authority over deciding the terms and timing of debt issuance, and closely monitors the impact that fund raising from the market has on system liquidity.

The key objectives of Saudi monetary policy are to stabilise the level of inflation and the general level of prices, to allow free movement of capital and currency, and to sustain the fixed SAR/USD exchange rate. However, SAMA does not apply direct controls with respect to the control of interest rates and foreign exchange. The former is reasoned by the charter of the Authority, which is based on Islamic law and does not allow the payment and receiving of interest (Ramadi 2010). Because of that, interest rates play a marginal role, affected only by USD interest rates. However, Saudi Arabia has adapted to the limitations of the Islamic framework and successfully used the 'repo' policy, in the form of a proxy, to implement an interest rate benchmark despite the absence of a formal discount policy.

As a country with an oil-based economy, Saudi Arabia relies heavily on oil revenues from foreign partners, and the creation of money supply typically has the following structure. As receipts of oil revenues are nearly all in USD, they directly produce a rise in government deposits that are maintained by SAMA. The variables used for this research related to monetary policy are money supply, interest rates, CBC on the private sector and the consumer price index. However, these foreign revenues do not have an immediate impact on the supply of domestic liquidity because, by definition, domestic liquidity is only held by the private sector. The inflow of foreign currency is only translated into domestic Saudi liquidity when the government makes payments to contractors—the government draws checks on SAMA, in this way, shifting SAMA's liabilities to and facilitating credit creation by the banks. Ramadi (2010) noted that, as far as the KSA represents an open economy with no capital restrictions, a substantial portion of domestic currency received by households is converted into foreign currencies to pay for investments abroad, imported goods and remittances. Therefore, the process of money creation is reversed, and the money creation effects of the government are partially offset. From a practical perspective, this information suggests that monetary policy could be effective in the KSA, but there is a need to test the current monetary tools that determine their positive or negative influence on Saudi GDP.

## 3.6 Effects of Fiscal and Monetary Policies on GDP

Fiscal and monetary policies may have direct or indirect, significant or insignificant, or no impact on GDP, depending on the structure of the economy and the scope of the implemented policies, along with factors within and outside of the national government's control. This section of the thesis offers a general discussion on the effects of fiscal and monetary policies worldwide, before progressing towards an analysis of the Saudi context.

### 3.6.1 Gross Domestic Product

The aims of macroeconomic policy are maintaining the stability of progress and real output, while ensuring a reasonably low level of unemployment and inflation. This subsection considers only expansionary fiscal and monetary policies. Expansionary fiscal policy occurs when a government either increases government expenditure or reduces taxation; monetary expansion occurs as a direct effect of money supply increases

(Hussain 2011). The effects of the exchange rate also play an important role on open macroeconomic variables, with floating and fixed exchange rates having different effects.

The effects of fiscal and monetary policy on GDP differ from country to country; what is appropriate depends heavily on the level of development of a county's fiscal, monetary and exchange rate policies. For example, Hussain (2011) applied the methods of variance decomposition and impulse response functions to analyse the impact of fiscal and monetary policies on GDP and concluded that the evidence on the elasticity of real government expenditure is mixed for all analysed countries. Moreover, the influence of the real exchange rate on GDP was significantly positive for countries such as India, Sri Lanka, the Philippines and Thailand, but significantly negative for countries such as Pakistan, Indonesia, Singapore, South Korea and Hong Kong (Hussain 2011). The differences in these countries' economic environments played the key role in defining the impact of exchange rates on output.

However, there are also common observations that may better explain how GDP is affected by fiscal and monetary policies. Hussain (2011) found solid evidence of the stable long-term relationships that GDP has with key explanatory variables including real money supply, real government expenditure, the real exchange rate and the nominal foreign interest rate for all studied countries. The study also found that the long-term elasticity of GDP with respect to the real money supply of the majority of these counties was significantly positive. Thus, variance decomposition and the impulse resource function demonstrated mixed results regarding the influence of monetary and fiscal policies on GDP.

Studies of the effects of fiscal policy on GDP have investigated the smoothing effect of temporary increases in government expenditure. For example, Aschauer (1985) stressed that the new classical school of macroeconomic policy focuses on the real effects of government spending, instead of the way in which this spending is financed. The primary effect of increases in government spending on output arises from the attempt made by economic agents to smooth effective consumption levels over time (Aschauer 1985), which induces a reallocation of resources to the present period from other periods, which increases return rates and causes an intertemporal substitution of work effort and a contemporaneous expansion of output.

#### *3.6.1.1 Impact of Fiscal and Monetary Policies on GDP*

There has been a lively discussion among economists regarding which policy, fiscal or monetary, has a more powerful influence on aggregate demand. Indalmanie (2016), for example, found that impulse response functions in Jamaica show that expenditure has an initially positive impact, which then turns negative, while money supply affects output entirely positively. In another study, Kaur and Kaur (2008) investigated the interactions between monetary and fiscal policies in India and concluded that these are complementary to, rather than substitutes for, one another. The fact that monetary and fiscal policies should be applied concurrently was also confirmed in a study by Adegoriola (2018), who analysed attempts to stabilise the Nigerian economy during 1981–2015 and concluded that there is a long-term equilibrium relationship between monetary and fiscal policies and economic growth. Thus, it is clear that closed and open economies, as demonstrated in the previous subsection, differ in their reactions to fiscal and monetary shocks under floating and fixed exchange rates. From that, a set of conclusions can be stated. First, in an open economy, fiscal policy has a greater effect on income under fixed exchange rates than floating exchange rates. In contrast, monetary policy is effective at influencing income under floating exchange rates, but has little impact under fixed exchange rates. The important advantage of a floating exchange rate is that it sustains prices and the employment level, but the disadvantage is that it increases uncertainty, making international payments more difficult.

With a wide range of other factors that may act to influence the main endogenous variables, a full set of assumptions to arrive at a theoretical conclusion cannot be realistically applied to the KSA economy. SAMA has lost its monetary autonomy because of the fixed exchange rate, but remains empowered to control economic variables (Al Shathri 2017; SAMA 2018).

#### *3.6.1.2 Effect of Fiscal and Monetary Policies Under a Fixed Exchange Rate*

To analyse the impact of fiscal and monetary policies in a small open economy under fixed exchange rates, it is necessary to consider the conventional investment and saving (IS) model and equilibrium equation. First, considering fiscal policy's effects, an increase in government spending will initially lead to an excess demand for money, which will push up domestic interest rates. This will lead to an incipient capital inflow, improving

the balance of payments and increasing reserves. In contrast to the ordinary flexible exchange rate case discussed above (where no debt servicing or real wage resistance was present), fiscal policy would have a multiplier effect, without any signs of crowding out because of increased interest rates, as discussed in Section 3.7.7.

Turning to monetary policy impacts under fixed exchange rates in a small economy, in an IS and liquidity preference money supply (LM) model, expansionary monetary policy initially depresses interest rates, which leads to an outflow of capital and a reserve loss proportional to the rise in money supply. As the central bank is obliged to buy domestic currency only at a fixed rate for foreign exchange reserves that flow out, reserves decline. Under such conditions, monetary policy levers do not work; unlike when exchange rates are flexible. Expansionary monetary policy endogenises the supply of money in a small economy, which means that a small economy cannot conduct independent monetary policy when exchange rates are fixed and capital is perfectly mobile.

Pegged exchange rates may yield the benefit of stability if the peg is credible, interest rates are low, there is a clear nominal anchor and inflationary expectations are moderated (Alkhareif, Barnett & Qualls 2017). The disadvantage of pegging relates to vulnerability in the case of a crisis and low ability to absorb shocks (Alkhareif, Barnett & Qualls 2017). As discussed in Section 2.5.5, the effects of pegging may differ in their scope and impact, which in turn necessitates sound strategic planning by authorities and recognition of the fact that the pegging regime has remained unchanged since its inception (Mirza, Naqvi & Rizvi 2013).

Using a fixed exchange rate makes international payments easier and, consequently, reduces exchange rate uncertainty. However, it is important to note that monetary policy is not a means to achieve stability in prices and income in an economy with a fixed exchange rate system.

Considering that, fiscal policy demonstrates poor effectiveness both in the long term and in the short term under a floating exchange rate system, but is effective in the short term under a fixed exchange rate. Therefore, applying fiscal policy manipulation under a floating exchange rate would not help to stabilise an economy, while in conditions of a fixed exchange rate, fiscal policy could be an efficient tool, especially in the short term. Monetary policy has proven to be completely ineffective, both in the long term and in the

short term, under a fixed exchange rate; however, under a floating exchange rate, it may have a positive impact on stabilisation of an economy in the short term, but still, a non-significant impact in the long term.

*3.6.1.3 Fiscal and Monetary Policies and the Crowding-out Effect*

Crowding out describes a situation when personal consumption and investment by businesses are lowered by an increase in government spending along with deficit financing absorbing financial resources and a higher interest rate. There are three arguments on fiscal policy ineffectiveness with reference to the crowding-out effect.

First, crowding out in IS–LM analysis occurs when interest rate increases are the result of fiscal expansion (Arestis & Sawyer 2004); this follows from an exogenous money supply and the interest rate equating the demand for and supply of money. An increase in money supply combined with an increase in government expenditures could potentially prevent elevated interest rates (Afonso & Sousa 2012). In the endogenous money scenario, when the central bank sets the interest rate, crowding out results from the direct actions of the central bank, responding to fiscal expansion through elevated interest rates. The crowding-out effect is directly linked to the proportional interest rate increase, responsiveness of the interest rate to expenditures, and the specific phase of the business cycle. Even though the effect on government expenditure tends to be insignificant in this case, crowding out is affected by the actions and decisions of monetary authorities.

Second, the crowding-out effect may occur as a result of the combination of supply-side equilibrium and the level of aggregate demand adjusted for consistency. In the case of exogenous money supply and a real balance effect, shifts in the price level cause changes in the real value of the money stock, stimulating modification in aggregate demand. In the case of endogenous money supply, the crowding-out effect is the outcome of the central bank's adjustment of the interest rate ('Taylor's rule'). The crowding-out effect occurs only in the presence of the assumption of mandatory attainment of supply-side equilibrium to ensure inflation rate constancy (Arestis & Sawyer 2004). When no potent monetary policy or automatic market forces are present to ensure the adjustment of aggregate demand is consistent with the supply-side equilibrium, the role of fiscal policy is clear. The path of aggregate demand affects the supply-side equilibrium. Productive capacity of the economy is determined by the size and distribution of the capital stock.

Consequently, larger capital stock results in higher output and employment, whereas aggregate demand affects investment expenditure and the size of the capital stock. The supply-side equilibrium may serve as the inflation barrier but is affected by aggregate demand.

Third, crowding out can be explained through the 'Ricardian equivalence' proposition, which implies that expansion of government expenditures results in reduction in private expenditures without affecting the level of demand (Alcidi & Thirion 2016). For example, a reduction in taxation today has a future orientation and may stimulate consumer expenditure immediately, but the projection for future taxation tends to reduce consumer expenditures equivalently (Afonso & Sousa 2012).

In an open economy with a flexible exchange rate and perfect capital mobility, the crowding-out effect would be complete, making fiscal policy ineffective. However, when the exchange rate is fixed, as in the case of Saudi Arabia, fiscal policy is effective (Alkahtani 2013).

#### *3.6.1.4 Secular Stagnation and Income Inequality*

The lack of economic growth, or secular stagnation, raises concerns for many economies since it prevents countries from development and improved living standards. For the KSA, secular stagnation is a potential issue that must be addressed in order to diversify the economy. Baldwin and Teulings (2014) explained that the term secular stagnation was reintroduced into macroeconomics in the wake of the Great Recession. Since the KSA relies heavily on a single commodity and is in the initial stages of economic diversification, secular stagnation is a potential concern. As Hudecz (2017) and Lavdas (2014) assert, secular stagnation could potentially be a worse crisis than a debt crisis, which should motivate policy-makers to develop policies to circumvent this outcome.

Lavdas (2014) noted that the lack of coordination in monetary policy and an extreme focus on national perspectives would be risk factors for the development of secular stagnation. Ayres (2014) elaborated that energy constraints might also be a reason for the initiation or reinforcement of secular stagnation, which suggests that the KSA may play a part in the development of this phenomenon.

As Bibi and Nabli (2009) state, inequality is a significant topic of concern for the KSA, however according to Sayfayn (2018) even though the KSA has limited information on income inequality, the existent data are sufficient to suggest that the country should acknowledge and address issues related to income inequality. In particular, Safyan adds that that the Saudi Gini index was 51.3% in 2007 and 45.9% in 2013. Further, the while the monthly salary, or wages, for non-Saudi employees in the KSA are $1,000 while Saudi employees tend to receive $2,650 monthly. Although this uneven distribution of income is mainly due to lack of education in the non-Saudi labour force, the same level of education in the same position does not give an advantage to foreigners employed in Saudi companies. This characteristic of the internal economy leads to the creation of problems associated with income inequality that, in turn, also results in negative consequences for the economy.

Income inequality is a serious issue that policy-makers should take into account in their efforts to overcome fiscal and monetary problems. Cingano (2014) emphasised that a significant level of inequality can reduce growth and lead to political instability and unrest, which have not currently been the case for the KSA. However, an understanding of potential issues would help policy-makers to create effective solutions. Moreover, Cingano (2014) stated that financial market imperfections prevent many people from investing. While investment boosts economy, income inequality limits the number of people and businesses capable of investment. The human capital theory is one of the frameworks that guide economists in the identification of tools and measures to decrease income inequality that prevents people from investing in their education as well. The KSA would benefit from improved equality via investment in education that could help individuals acquire expert skills and knowledge that would later cater to the needs of the country. Neaime and Gaysset (2018) recommended that MENA countries embrace financial inclusion as a means to reduce income inequality via the facilitation of banking and financial services to diverse populations as a greater number of banking facilities mitigates incomes inequality. Thus, such a development could prepare the KSA for such macroeconomic changes.

## 3.7 Interaction of Monetary Policy and Fiscal Policy

Monetary policy and fiscal policy have the power to influence or the propensity to interact with each other. For this reason, decision-makers must be aware of empirical evidence on the functioning of these policies separately and in combination. This section provides academic information on the importance of developing one type of policy before the other, because of the complex relationship that these policies have. The impact of these policies on each other demands a careful examination of the situation to determine the optimal course of action. The case of Saudi Arabia is no exception—the unique position of the country in the global market means that the interaction between its monetary policy and fiscal policy could lead to unexpected outcomes, which leaders should strive to identify in advance. The following subsection offers insight into a historical debate on the issue.

### 3.7.1 Historical Debate

Since the 1960s, the debate about the effectiveness of monetary policy and fiscal policy has been intensifying. Within the macroeconomic framework, particularly over the past 20 years, a major shift has occurred considering the relative importance of fiscal and monetary policies, such that the importance of the latter has significantly increased, while the former is rarely mentioned within the scope of macroeconomic debate. Beginning with the fundamental work of Friedman and Schwartz (1963), the debate has shifted in several important directions. In the 1980s, monetary policy focused on attempts to control the monetary aggregate; now, it is more focused on the setting of interest rates as the pivotal monetary policy instrument. Also, there has been a noticeable shift of focus towards the adoption of inflation targets.

The analysis of the relative effectiveness of monetary and fiscal policies in empirical studies and the literature has produced different results. Chingarande (2012) examined the impact of monetary and fiscal policies on economic activity in Zimbabwe by employing a modified version of the St. Louis equation, and concluded that monetary policy is stronger and more predictable than fiscal policy in terms of determining economic activity. Similarly, Sanni, Amusa and Agbeyangi (2012) investigated the effectiveness of monetary and fiscal policies in Nigeria in the period 1960–2011 using an ECM and emphasised that monetary policy instruments are more effective. These

findings demonstrate the domination of monetary policy in the macroeconomic landscape, while fiscal policy's significance has been diminishing in scholarly debate. Research focusing on the root causes of this shift maintains that monetary policy is a more complex controlling tool, with variables that can change unpredictably.

However, in Asia and Africa, the balance of influence between monetary policy and fiscal policy has been tilting towards fiscal since the end of the 20th century. Kaur (1995) investigated the effectiveness of monetary and fiscal policy in India, and concluded that fiscal policy is stronger, faster and more predictable. This conclusion might have stemmed from the fact that Indian financial markets are underdeveloped. Studies conducted in the US tend to favour monetary policy as stronger and more efficient. A ground-breaking study by Andersen and Jordan (1968) analysing the performance of the US economy over 1952–1968 using the OLS method suggested that monetary policy has more influence on a country's economy than fiscal policy. Waud (1974) disagreed with these findings, claiming that in the US, both fiscal and monetary influences on economic activity represented by GNP are significant and important. It is necessary to note that Andersen and Jordan (1968) and Waud (1974) studied almost exactly the same period (starting from 1953–1954, until 1968) and used the same OLS method. The contradiction of their conclusions might be due to different interpretations of major economic events.

### 3.7.2 The Independence of Both Policies

Good policy generally endorses the separation of fiscal and monetary powers. The major implication of such separation is expressed by the mix of monetary and fiscal policies. The independence of monetary and fiscal policies enables researchers to distinguish clearly the tools used to influence an economy; however, it also leads to a number of practical problems. In particular, the biggest impacts from fiscal regulations tend to emerge in the first quarters after implementation, while lags in monetary policy effects can extend up to 12–15 months after implementation.

One distinguishing feature that contributes to the independence of fiscal and monetary policies is the independence of central banks. Wyplosz (2015) discussed a concrete case when less-than-full independence of the central bank could lead to negative consequences. However, Bossone (2015) indicated that central bank independence could be called into question in times of financial crisis. The rule regarding the independence

of fiscal and monetary policies should be suspended in times of crises, when the government and the central bank need to act in concert to prevent far-reaching negative impacts on an economy, and focus on reducing the output gap and supporting prices.

### 3.7.3 Historical Timeline of Coordination

Historically, the coordination of monetary policy and fiscal policy has been the key to establishing a well-functioning economy in various countries, especially during recent crises. To avoid conflict in implementation, policy-makers have had to ensure that monetary policy does not affect fiscal policy negatively, and vice versa. Sims (2016) accentuated that both periods of rapid inflation and periods of slow inflation require coordination of monetary and fiscal policies. This finding is particularly important because monetary policies always have fiscal consequences (Sims 2016). This relationship signifies that the two policies are indeed interconnected, and repercussions should be identified in advance.

Arestis (2015) acknowledged that coordination between fiscal policy and monetary policy can reduce unemployment rates and eliminate income inequality—an important goal pursued by global governments. However, not all policy coordination efforts are beneficial. Eichengreen (2013) pointed out that international policy coordination does not provide for substantial positive results because of the small changes that are made during the so-called currency wars create new issues. Dosi, Fagiolo, Napoletano, Roventini and Treibich (2015) explained that a lack of coordination could lead to limited stabilisation, while a more comprehensive approach could improve an economy on several levels. Edwards (2015) stated that traditional theory believes that monetary policy independence can be pursued, but there are still reservations about the idea; powerful institutions such as the US Federal Reserve have the power to influence monetary policies of other countries. Therefore, the level of coordination is lower than traditional economists and theorists consider it to be.

Further, inflation targeting is another important issue discussed in the literature review. Inflation targeting belongs to the instruments employed in monetary policy-making. Woodford (2013) acknowledged that many economists believe that inflation targeting is archaic, and should be forgotten by global policy-makers because it does not produce

satisfactory results, but disagreed, because inflation targeting continues to have a positive effect, even after a major crisis such as the global financial crisis (GFC).

Flexible inflation targeting may help central banks to control this monetary policy model (Woodford 2013). In addition, Almounsor (2015) discussed the application of inflation targeting by such countries as Turkey and Israel, which consider controlling inflation a very important goal. However, inflation targeting is not an alternative for Saudi Arabia because of the fixed exchange rate. Thus, at the moment, inflation targeting cannot be considered useful to the kingdom.

### 3.7.4 Outcomes of Interactions of Monetary Policy and Fiscal Policy

As established above, monetary policies and fiscal policies produce different results in a variety of combinations, and thus, affect one another. A thorough study of the negative impact of one policy on the other is particularly required by economists and leaders because scholarly literature can provide comprehensive information about how damages might be mitigated. For example, Bech, Gambacorta and Kharroubi (2014) pointed out that monetary policy can be useful in the wake of a crisis, while fiscal policies could be employed after the economy is partially recovered.

Adam and Billi (2014) claimed that fiscal and monetary policies incite spending and losses that should be mitigated. In the case of a crisis, it is necessary to take a conservative approach by trying to prevent inflation while avoiding welfare losses caused by both fiscal and monetary discretionary policy-making, by identifying and implementing the correct monetary policy after setting fiscal policy at every stage (Adam & Billi 2014); there is little use in determining monetary policy before fiscal policy is selected. For this reason, economists should work on understanding how fiscal and monetary policies can prevent each other from functioning effectively.

### 3.7.5 Implications of Interactions of Monetary Policy and Fiscal Policy

Unlike monetary policies, which are developed to establish steady control over the economy and the inflation rate, fiscal policies are developed by governments to mitigate the damages of a financial crisis. Kliem, Kriwoluzky and Sarferaz (2016) discovered that relationships between different policies and their instruments may vary by country or across periods. The interaction between monetary and fiscal policies has the power to

influence the relationship between inflation and the fiscal stance in the short term (Kliem, Kriwoluzky & Sarferaz 2016). Research has also shown the ability of the government to introduce fiscal control and changes into an economy is related to the level of development and growth of the economic activity of that country (Afonso, Agnello & Furceri 2010). These important recommendations will help Saudi policy-makers revisit their decisions on enforcing specific policies aimed at improving the economic and financial performance of the kingdom. The application of these policies should reflect the necessity of the country reaching its short-term and long-term goals. Whereas short-term objectives are likely to encourage the tailoring of monetary policies, long-term objectives will call for the development of fiscal measures.

### 3.7.6 Empirical Research on the Effectiveness of Fiscal Policy and Monetary Policy

Monetarists believe in the effectiveness and power of monetary policy; conversely, fiscalists (Keynesians) have faith in government expenditure and taxes, rather than monetary policy (Cyrus & Elias 2014). Empirical discussions related to the comparative usefulness of monetary and fiscal policies date back to the 1960s, with the two revolutionary and seminal papers by Friedman and Meiselman (1963) and Andersen and Jordan (1968) the foundation stones.

Friedman and Meiselman (1963) used a simplified form of the OLS regression equation to assess the differences between monetary and fiscal policies, including their efficacy, and to compare Keynesian and monetarist theories. Their equation was created to demonstrate that monetarism prevails over Keynesianism as the truest macroeconomic concept (Bias 2014). In contrast, Andersen and Jordan (1968) examined the comparative usefulness of monetary and fiscal policies by employing a dynamic econometric model, and resolved that monetary policy was much more certain, beneficial and rapid in affecting the economy (as published by Federal Reserve Bank of St. Louis). Since then, the comparative efficacy of monetary and fiscal policies has become the subject of numerous studies (Sen & Kaya 2015). The interconnection between these policies was reported by Kretzmer (1992), who argued that although monetary policy is more effective than fiscal policy, the former becomes less effective with the passage of time. There is much research on the effectiveness of fiscal and monetary policies; here, we concentrate on empirical studies.

Earlier studies on the effectiveness of monetary and fiscal policies focused on industrialised countries, especially the US. For instance, Waud (1974) examined the effects of monetary and fiscal policy on activity in the US, and found that both policies had significant relative efficacy on economic activity and appeared to be equally important. These results are in sharp contrast to Anderson and Jordan (1968), as discussed above. Later, Batten and Hafer (1983) investigated the comparative effect of monetary and fiscal actions on economic activity in an international comparison of the UK, the US, Canada, France and Germany—all industrialised countries—and concluded that while monetary actions had a permanent and significant impact on growth of nominal GNP, fiscal activities exerted no statistically significant influence. A more recent study by Dungey and Fry (2009) applied new methods to the empirical evaluation of the interaction between monetary and fiscal policies and economic shake-ups over a 20-year period in New Zealand. They found that ordinary fiscal policy shake-ups have been more significant than monetary policy shake-ups, while taxing and debt policy shake-ups were more influential than government expenditure shake-ups, and that inflation shocks also played a key role. However, a breakdown of monetary policy shake-ups revealed that, primarily, the economy is affected by inflationary shocks, which offered reassuring confirmation of the operation of monetary policy in New Zealand. A recent study by Senbet (2011) investigated the comparative effect between fiscal and monetary actions in the US, and concluded that monetary policy has a greater impact on real output than fiscal policy.

Over the past years, there has been an escalation in the number of studies examining this topic in the context of developing countries. For example, Aljisafe and Floloruso (2002) investigated the relative efficacy of fiscal and monetary policies in Nigeria during 1970–1998, and found that monetary policy has a greater influence on the economy than fiscal policy. In Indonesia, Fatima and Iqbal (2003) discovered a unidirectional causality between monetary policy and economic growth, as well as a unidirectional causality between fiscal policy and economic growth. At the same time, in Malaysia, only unidirectional causality exists between the variables that represent both policies and economic growth. Cyrus and Elias (2014) examined policy shocks in Kenya, and indicated that fiscal policy has a considerable positive influence on real output growth. Meanwhile, Hussain (2014) examined the relationship between fiscal and monetary policies and output in five South Asian Association of Regional Cooperation countries

(Bangladesh, India, Nepal, Pakistan and Sri Lanka) between 1974 and 2007. The findings reveal that monetary policy was more efficient in terms of output than fiscal policy in the cases of Pakistan and Sri Lanka, while fiscal policy had a greater influence in Bangladesh, India and Nepal. Havi and Enu (2014) examined the effect of fiscal and monetary policy in Ghana from 1980–2002, and concluded that although fiscal policy affected growth positively, monetary policy was more impactful. Saqib, Yasmin and Körner (1987) in their study of Pakistan noted that while monetary policy has a larger effect and greater reliability as an influencing tool, fiscal policy is 'important in its own right' (p. 548). A recent study by Jawadi, Mallick and Sousa (2016) on the macroeconomic impact of fiscal policy and monetary policy shake-ups in five principal nascent market economies (Brazil, Russia, India, China and South Africa) from 1990–2013 found that both monetary and fiscal policies positively affect these economies; moreover, they showed that policy coordination could prove useful in boosting recovery from economic downturns or avoiding inflationary pressures during economic booms.

In contrast, some evidence radically differs from the greater body of literature discussed in the sections above. For example, Cardia (1991) cast doubt on the importance of both fiscal and monetary policies as stimulating economic tools, but rather, argued that persistent shocks to productivity play the decisive role. In an open economy, shocks to productivity work remarkably well, while monetary and fiscal shocks play only 'a minor role' (Cardia 1991, p. 411). However, such non-traditional empirical results are exceptions, while empirical evidence finds that both monetary and fiscal policies are important for economic growth (Hasan, Islam, Hasnat & Wadud 2016). Atchariyachanvanich (2007) took this argument further and assessed the relative monetary–fiscal influence on macroeconomic variables in 12 countries, concluding that no specific consensus could be made across these countries.

For the KSA, the first paper on the efficacy of monetary and fiscal policies was Looney (1989), who investigated the relative effectiveness of these policies for the Saudi economy by utilising a macroeconomic simulation model for the period 1956–1985. The evidence suggested that in Saudi Arabia, it is easier to predict the relationship between money and economic activity than that caused by changes in independent expenses. An unrestricted monetary policy is less powerful than a stable increase of inflowing funds. Looney's (1989) research was revolutionary, in that it did not specify an ideal policy with

which to overcome economic difficulties. Alkahtani (2013) investigated the impact of fiscal policy on the KSA economy between 1993 and 2011; he applied a similar analysis to Indonesia, Malaysia and Norway to validate his results, and used this as a robustness check. The results show that governmental shocks related to spending have a beneficial effect on GDP and personal consumption; however, these have an unsatisfactory effect on private investment, exports and imports. Net tax revenue for Indonesia, Malaysia and Norway did not exert a positive influence on GDP. As this paper took into account inflation and interest rates to account for volatility in prices and because government revenue and government expenditures might be influenced by nominal factors. The results gathered from research conducted thus far are important, but monetary policy has not yet been examined—this is the gap this research aims to fill.

Overall, the vast majority of existing studies provide inconclusive results regarding the effectiveness of fiscal and monetary policies. Some studies, such as Senbet (2011) and Havi and Enu (2014), found that monetary policy exerts a greater influence on economic activity, whereas others, such as Cyrus and Elias (2014), offered the opposite finding. In some cases, such as Jawadi, Mallick and Sousa (2016), research found that both policies are powerful tools to alter the path of economic variables. As Makum (2015) concluded, even though both policies are effective, relative dependence varies depending on country-specific characteristics.

Appendix A provides a summary table of the main empirical studies of the relative effectiveness of monetary and fiscal policies from 1968 to 2018.

*3.7.6.1 Empirical Research on Fiscal Policy*

The effectiveness of fiscal policy as a tool has been studied relatively infrequently over the last decades. Capet (2004) produced a comprehensive survey of the literature on fiscal policies, distinguishing two approaches to assessing effectiveness: the assessment of multipliers associated with discretionary measures and the smoothing power of automatic stabilisers. In the first scenario, the expansionary effects of large fiscal contractions were emphasised, particularly when the government cut expenditures. In the second scenario, automatic fiscal stabilisers were found to mitigate macroeconomic shocks, but not to the full extent (Capet 2004). Masood and Ahmad (1980) also stressed the dominating role of

autonomous expenditures over variations in money supply in their study of the Pakistan economy.

European scholars have assessed the effectiveness of fiscal policy in addressing the consequences of the recent economic crisis. For example, Ricci-Risquete and Ramajo (2015) used Spain in crisis as a case study to assess the effectiveness of fiscal policy, and found that the shocks to total Spanish governmental receipts and expenditures were permanent for real variables, while nominal variables were affected by the shocks only temporarily. From the Keynesian perspective, the results of the study suggest non-Keynesian effects related to a disturbance to public receipts and the presence of short-term Keynesian effects in relation to a disturbance to public expenditure.

With the multilayered effects that fiscal policy adjustments had on the Spanish economy during the crisis, more evidence exists on how fiscal policy could be applied in combination with monetary policy in North American countries. For example, Raj and Siklos (1988) attempted to assess the effects of fiscal policy on aggregate demand and the relationships between income and policy instruments. When combined with monetary policy in a developed country such as Canada, fiscal policy has a long-lasting effect on aggregate demand and fosters bidirectional causality between policy instruments and income. In the developing countries of South Asia, on the other hand, the variables of fiscal policy have a different level of significance for different countries—for Nepal and Sri Lanka, they are insignificant, while for India, they are significant (Kumar 2017; Upadhyaya 1991). In Kenya and Pakistan, fiscal policy also has a significant positive effect of real output growth and inflation, while monetary policy shocks are completely insignificant (Cyrus & Elias 2014; Memon & Ghumro 2014). Further, for beta coefficients of the monetary variable, the level of significance is substantially higher in Nepal and Pakistan, where monetary policy proves to be more efficient. Upadhyaya (1991) demonstrated how different political goals and the level of economic development in different countries influence whether a country's economy is more efficiently adjusted through fiscal or monetary policy.

Overall, from the body of knowledge on the effectiveness of fiscal policy as an economic adjustment tool, fiscal policy has more significance in developing countries (Bokreta & Benanaya 2016). However, it should be noted that fiscal policy could be made more effective for improving economic growth by eliminating corruption and leakages of

resources (Saqib & Aggarwal 2017). Alesina, Campante and Tabellini (2008) added that corrupt economies tend to employ pro-cyclical fiscal policies; this information may help in the overall attempts to formulate fiscal policy that does not give rise to corruption. As a tool for stimulating an economy, especially in the short term, fiscal proved to be more efficient in Vanuatu. In their study, Jayaraman (2012) confirmed (using the St. Louis equation VAR model) that fiscal policy has a stronger effect on the Vanuatu economy in the short term, but monetary policy has stronger long-term effects. Jayaraman (2001) studied four South Pacific nations—Fiji, Samoa, Tonga and Vanuatu—and confirmed that fiscal policies are more effective than monetary policies for promoting economic growth in all four countries. In the developing countries of Europe, the significance of fiscal policy over monetary policy seems to be even more prevalent, even in the long-term (Topcu, Kuloglu, & Lobont 2015). Malawi (2009) demonstrated that fiscal policy has a stronger effect on economic activity than monetary policies in Jordan and Tunisia. Fiscal policy is more efficient in countries where the complexity of the monetary system is circumscribed by challenging economic conditions, weaknesses and general economic crises. For a majority of Asian and African countries, fiscal policy is the most effective way to stabilise the economy in critical conditions.

Given that developing countries experience economic shocks more frequently, the body of literature proves that the influence of fiscal policy is greater than monetary policy in such countries. Darrat (1984) used a modified St. Louis single-equation approach to empirically examine how fiscal policy affects decision-making in five major Latin American nations—Brazil, Chile, Mexico, Peru and Venezuela. The significant influence of fiscal policy on the growth of GDP was confirmed for all five participating nations, and fiscal actions 'substantially dominate monetary actions in explaining changes in nominal income' (Darrat 1984, p. 278). Olaloye and Ikhide (1995) employed the same method and confirmed that fiscal policy exerts more influence on the economy of Nigeria than monetary policy; in other words, fiscal policy tools are much more likely to retrieve Nigeria from economic depression. This finding adds more depth to the argument that fiscal policy regulatory levers are more suitable in developing countries.

#### *3.7.6.2 Empirical Research on Monetary Policy*

Regarding the body of literature on the effects of monetary policy on economic indicators such as GDP, there is a widely accepted consensus among scholars that monetary policy

has its maximum influence in the long term. Hasan et al. (2016) explored the relative effectiveness of monetary and fiscal policies and economic growth in Bangladesh over the 31 years 1974–2015 and concluded that monetary policy has a greater long-term positive impact on economic growth than fiscal policy. Similar findings were produced by Hussain (2014), Havi and Enu (2014) and Richard, Muriu and Maturu (2018). It is worth noting that these authors employed a broad money supply and reserve money as proxies for monetary policy, and total government revenue and total government expenditure as proxies for fiscal policy. Similarly, Saqib and Aggarwal (2017) confirmed a positive long-term relationship between monetary and fiscal policy in Pakistan, while stressing that monetary policy is more concerned with economic growth than fiscal policy. Ajayi and Aluko (2016) also indicated that monetary policy has a greater growth-stimulating effect on the economy and recommended using monetary policy over fiscal policy as a primary economy stabilisation tool for Nigeria. Iyeli, Uda and Akpan (2012) also studied how money supply influences economic health in Nigeria and found that it significantly influences GDP. As per the St. Louis equation, variation in money supply influences variation in real economic activity, making monetary policy a more influential approach. This finding contradicts the majority of studies, which have demonstrated the use of fiscal policy as an economic stabilisation tool in developing counties, indicating the specific nature of the Nigerian economy, which differs from other developing countries of Africa and Asia.

The effectiveness of monetary policy is attributed to a wider range of instruments to attain higher output growth. The mechanisms of monetary transmission such as the interest rate, the exchange rate, credit and asset price channels are employed as potent policy tools by decision-makers. Studies such as Adeniji and Evans (2013) and Rakic and Radenovich (2013) concurred with the predictions of Milton and Schwartz (1963) and other advocates of the method of the St. Louis equation, and demonstrated that monetary policy stimulates economic growth better than fiscal policy. The outcomes of these studies support Keynesian and monetarist positive policy assertions. Governments should create deficits to keep citizens fully employed, as lower aggregate expenditures contribute to a decline in income and poor employment. One of the most famous examples of economic crisis, the Great Depression, was caused by the contractionary monetary policy and inaction of the US Federal Reserve (Adeniji & Olaniyi 2013)—had the US Federal Reserve acted

more decisively in 1929–1933, the money supply would not have shrunk as it did, and the recession would not have turned into the Great Depression.

While the evidence on the effectiveness of monetary policy in developing countries varies from one study to another, the case of European countries seems more univocal. Studies such as Batten and Hafer (1983) and Chowdhury (1988) investigated the effectiveness of monetary policy in the developed European countries from the 1960s to the 1980s and pointed to the importance of money growth over fiscal actions in affecting GDP growth. Moreover, Batten and Haffer (1983) specifically noted that this result is robust across both the 'fixed' and 'flexible' exchange rate regimes that were characteristic for the two analysed decades. The connection between exchange rate flexibility and the effectiveness of monetary policy in its influence on GDP growth demonstrates the universality of the exchange rate as a monetary tool, even in industrialised countries. Chowdhury (1988) concluded, after applying the St. Louis approach to analyse six European nations, that the influence of monetary policy varies from country to country, having a stronger and more predictable effect on GDP in Denmark, Norway and Sweden; for Belgium and the Netherlands, fiscal policy had a greater influence.

As for other methods and models of assessment of the effect of monetary policy on economic indicators, the OLS method has also demonstrated the prevalence of monetary policy. Chowdhury (1986) studied the economy of Korea through monetary policy variables and concluded that real income is affected more by changes in monetary policy than in fiscal policy. Saqib, Ysamin and Körner (1987) complemented the OLS method with a reduced form of Anderson–Jordan model in their study of Pakistan and confirmed that monetary policy is more efficient and dependable as a tool of influence on GDP. Overall, the analysed studies on monetary policy mostly demonstrate that the influence of monetary policy on GDP growth prevails in most industrialised countries, where levers such as the exchange rate can be efficiently applied.

#### *3.7.6.3 Effects of Merchandise Trade on GDP*

The correlation between exports/imports and economic growth in developed and developing countries has been of interest to numerous researchers. The export-led hypothesis rests on three types of relationships between exports and economic growth—export-led growth, growth-led exports and the two-way causal relationship. The export-

led hypothesis suggests that export growth is positively correlated with economic growth. Exports, as a component of aggregate output, can also indirectly stimulate economic growth through efficient resource allocation, greater capital utilisation, economies of scale, employment creation and technological spillover (Ito 2013; Mah 2011). The causality can also run in the opposite direction, such that output growth contributes to an export increase; for example, innovations and technologies, as the effects of growth, can potentially enhance export growth and facilitate trade, as noted by Oberhofer and Pfaffermayr (2012).

#### 3.7.6.3.1 Merchandise Exports

Saudi Arabia currently has export-led growth, with oil exports remaining the key driver (Haque & Khan 2019). This implies that economic growth affects increases in imports via export growth channels. Alhowaish (2014b) noted that, in the case of Saudi Arabia, growth in exports has a positive effect on output growth and, consequently, results in higher demand for imports. In an earlier study, Al-Yousif (1997) suggested a positive relationship between exports and economic growth for Saudi Arabia. This assumption was confirmed by more recent findings in Altaee, Al-Jafari and Khalid (2016) and Alodadi and Behin (2015). Within the context of oil-dependent GDP, economic growth is based on oil exports, government expenditures and investment in oil-related sectors of the economy (Alodadi & Behin 2015). Scholars emphasise the importance of noting the feedback relationship between imports and exports, postulating that imports of technologies are essential for long-term growth and diversification (Ahmed & Uddin 2009; Din 2004; Ramos 2001; Tan, Brewer & Liesch 2007).

#### 3.7.6.3.2 Merchandise Imports

The role of imports in stimulating economic growth has also caused debate in recent research. Li, Greenaway and Hine (2003) confirmed the negative effect of merchandise imports on economic development for 82 countries worldwide, including Saudi Arabia. For Turkey, Uğur (2008) reported a positive short-term impact of merchandise imports but a significant negative long-term impact. In Saudi Arabia, Altaee, Al-Jafari and Khalid (2016) generated evidence suggesting a negative contribution of merchandise imports to growth, both in the long term and the short term. Alhowaish (2014b) claimed that imports do not play any role in export growth because of their insignificant effect on economic

development. Karamelikli, Akalin and Arslan (2017), in the study on 12 OPEC member countries, investigated the correlation among oil exports, economic growth, imports and non-oil exports, and concluded that higher oil exports stimulate public consumption and imports. Thus, for OPEC countries, an oil exports increase has a positive impact on economic activities.

Based on the discussion above, merchandise exports and merchandise import will be used in the research as the variables for merchandise trade.

## 3.8 Islamic Economics

In its application of fiscal and monetary policies, Saudi Arabia differs from traditional economies. The unique properties of Islamic finance ensure the importance of a discussion of prohibitions and financial instruments in line with the Islamic framework. One of the central points of discussion in Islamic finance is the monetary issue of interest rates. Uddin and Halim (2015) emphasise that Islam does not accept interest rates, which makes this tool to manage money inappropriate. However, the Islamic system of finance offers a number of alternatives to interest rates, including a socially agreed filter mechanism, a motivation system for individuals to render their own interest, restructuring the entire economy to realise a *maqasid* (aim) with scare resources, and a positive role for the government as viewed by society. Reflecting on the Islamic banking system, Rafay and Farid (2019) conducted a study on Islamic banks channelling monetary policy decisions to the real economy (for the case of Pakistan). In most Muslim states, the banking system is dual, such that Islamic banks coexist in parallel with conventional banks. The key objectives of monetary policy in Islamic finance include the following:

- sustained economic growth and mobilisation of resources
- stability in the value of money and equitable distribution of income.

The current state of the Islamic financial market is influenced by expansionary monetary policy with a focus on a lower rate or return and higher output (Yungucu & Saiti 2016). Debt is replaced with equity financing and profit-sharing instead of interest. Commercial banks serve the role of investment houses and wealth management systems. Yungucu and Saiti (2016) further argued that monetary policy offers an opportunity for Islamisation and modification, and confirmed the relative effectiveness of an interest-free monetary policy system over an interest-based system. The challenges that are common for

conventional and Islamic financial institutions remain the same: high correlation of profit rates and yields and flexibility of fund flows (Yungucu & Saiti 2016).

### 3.8.1 Theoretical Overview

In the context of Islamic countries that strictly adhere to the Islamic framework principles, it is understandable that monetary and fiscal policies can be different from policies used in other economies. Saudi Arabia is in a unique position because institutions that have the power to use monetary and fiscal tools to stabilise and control the economy must also be especially careful regarding the innovations that they implement. According to Askari, Iqbal and Mirakhor (2014a), the KSA requires fiscal and monetary policies that align with Islamic laws. Since Islamic economies have become stronger, there has been a need to explore the effect of the Islamic framework on the development and implementation of fiscal and monetary policies.

According to Faridi (cited by Tahir 2013), an Islamic economy should have three sectors—conventional private and public sectors and a less-conventional voluntary sector. In such a three-sector economy, the government would be expected to play the roles of an allocator, stabiliser and distributor traditional for a body that uses fiscal instruments to control the macroeconomy. The sustenance of resources and the improvement of the service quality of companies in the voluntary sector are the main issues that these organisations encounter (Almaiman & McLaughlin 2018). Islamic economies should develop special monetary policies that consider that interest is prohibited and yet still useful to the economy.

The goals of Vision 2030 include the diversification of the economy, with an ultimate shift from dependency on petroleum products to an increase in other sectors' value. The key economic objectives and key policy commitments focus on stabilisation and improvements in the production sector. The short-term macroeconomic objectives, as outlined in G20: Australia (2014), are the enhancement of the fiscal and monetary stability necessary for a low inflation rate, extension of the absorptive capacity of the economy achieved through competition and growth, and development of the small and medium-sized enterprises (SME) sector, with an increase in its share of GDP. The specific strategies to improve the production sector include empowerment of the National Competition Council and improvement of the general business climate and investment

environment. The short-term goals also include the improvement of labour and capital productivity and overall betterment of economic competitiveness.

The medium-term objectives build on the sustainable economic growth goals through accelerated diversification of the economy and expansion in the renewable energy sector. The long-term objectives focus on continued efforts to improve the business climate and privatisation of public sector services along with a commitment to promote merchandise trade. Fiscal policies are directing the gradual consolidation with streamlined recurrent spending, expansion of non-oil revenue sources, and improved efficiency of public investment.

According to Askari, Iqbal and Mirakhor (2014a), from an Islamic perspective, governments should use fiscal policy in a fair manner, and the government should consider whether all people should pay an income tax because some individuals may have a limited amount of money that is not sufficient for daily living. Because of this, the Islamic view also requires taxing wealth because those who hoard wealth have the capacity to pay taxes, while 'wealth generally represents a much larger tax base than income' (Askari, Iqbal & Mirakhor 2014a, p. 115).

Monetary policy should be accompanied by risk-sharing instruments. These tools are indispensable to an Islamic economy that functions in line with the Islamic framework principles. As specified in the previous chapter, Mudarabah and Musharakah[5] are excellent tools to address the issue of risks and returns. Monetary and fiscal policies have many opportunities to maintain an Islamic economy, despite unconventional approaches to managing finances. Islamic framework principles do not prevent the economy of Saudi Arabia from developing and achieving positive results based on Islamic principles.

### 3.8.2 Prohibitions

There are a number of prohibitions in an Islamic economy that are dictated by the Islamic framework, including unacceptability of interest and prohibition of risk and uncertainty, wastefulness and gambling. Although limitations to economic activities may be perceived

[5] Appendix B provides more insight about the Islamic economy with specific reference to Gharar, Israf, along with financial instruments such as Mudarabah, Musharakah, Murabahah and Ijarah.

as burdens, Islamic banking is not less efficient than conventional banking (Gheeraert & Weill 2015).

#### *3.8.2.1 Prohibition of Interest Rate (Riba)*

The interest rate prohibition, or *Riba*, has an immense impact on how an Islamic economy functions. Banking establishments cannot lawfully offer a fixed rate of return on deposits or charge interest on loans (Chong & Liu 2009). Riba imposes prohibitions on the banking system and commerce that encourage investors to use their funds on joint ventures. Although Islamic laws in finance seem restrictive, business ventures operate in a less stressful economic environment. Riba prevents businesses from being founded and from developing, many companies and entrepreneurs have few opportunities to improve their position, while prohibition of interest rates creates a foundation for more comfortable conditions. It follows that Saudi Arabia must create its own effective monetary policies based on the Riba prohibition and cannot follow the examples of Western economies, where the interest rate is a typical occurrence both in banking and in commerce. What is important about the Riba prohibition is that Islam societies require replacing interest with an alternative financing mechanism because the mere abolishment of interest is not the main goal of the Islamic framework (Ariff 1982). The creation of monetary policy tools depends on the existence of this prohibition, which affects the development and implementation of related policies.

### 3.8.3 Islamic Finance and Implementation of Fiscal Policy and Monetary Policy

#### *3.8.3.1 Wealth Tax (Zakat)*

Wealth tax, or Zakat, is an important concept in an Islamic economy. Askari, Iqbal and Mirakhor (2014a) emphasised that Zakat is a way of redemption for the wealthy for their wealth, as Zakat is 'the means through which idiosyncratic risks of the poor are shared by the rich as an act of redemption of the former's property rights in the income and wealth of the latter' (p. 77). As a mandatory 2.5% levy on asset-based wealth, Zakat is one of the most important pillars of the religion, and aims to secure finances for the welfare of the poor. The Islamic framework obligates the state to collect Zakat (An-Nabhani & Tahrir 2008). The wealth tax should be considered from the perspective of monetary wealth, as in former times, Zakat was applicable only to certain produce types, such as 'barley, wheat, raisins and dates' (An-Nabhani & Tahrir 2008, p. 138). Zakat

funds also have limits that bind the state to spend these finances on specific areas of Muslim life.

While individuals should pay Zakat, companies with surplus wealth are also subject to this kind of taxation because monetary wealth pertains to companies as much as to individuals. Zakat on wealth is 2.5%, while Zakat on production may be 5% or 10% (Uddin & Halim 2015). Such concepts as Zakat are important to the overall management of the economy because Zakat can have an impact on the allocation and distribution of resources and wealth. Since the state is the main allocator and distributor, it is important for authorities to ensure that the strictures of the Qur'an are respected by Muslims, and Zakat is paid by those who are subject to payment.

#### *3.8.3.2 Islamic Bonds (Sukuk)*

Sukuk are Islamic bonds in the sense that these financial certificates adhere to the Islamic framework. Sukuk is used to signify indebtedness in a relationship between a bond issuer and a bond holder. Askari, Iqbal and Mirakhor (2014b) specified that Sukuk belongs to financial assets that make up a financial market that plays a vital role in an Islamic economy. Askari, Iqbal and Mirakhor (2014b) added that Sukuk can equally mean an investment certificate or a trustee certificate. The profits of Sukuk holders are not fixed or predetermined because profits rely on the profit created by this process and the asset. Sukuk bonds can be used by the government, businesses and other institutions, as the instrument offers liquidity to financial projects, whereas the costs are relatively insignificant (Al-Tally 2014). Although relatively new, the Sukuk market is a fast-growing field—the Saudi Sukuk market increased from USD45 billion in 2011 to USD118.8 billion in 2014 (Rizvi, Bacha & Mirakhor 2016). Uddin and Halim (2015) pointed out that Sukuk influences GDP growth; hence, Sukuk has the power to improve the economic situation of Islamic countries.

#### *3.8.3.3 Direct and Indirect Instruments*

For monetary policy, a number of instruments have been determined, which comprise 'credit ceilings (in particular, goal-oriented allocation of credit), equity-based instruments, changes in profit-and-loss sharing ratio and moral suasion', which are commonly used in Islamic banking in general and Saudi Arabia in particular, where banks have a similar arrangement and refer to these as Islamic products (Tahir 2013, p. 6).

Askari, Iqbal and Mirakhor (2014b) emphasised 'open market operations, the buying and selling (from the investment bank type of Islamic institutions and not from the safekeeping category of institutions) of equity or securitised assets in projects (participation papers), and asset-linked Sukuk' as the principal instruments to attain monetary goals (p. 130). In addition, market operations can be used by the central bank as an instrument, but Ariff (1982) mentioned that absence of interest makes this tool less effective than in traditional Western economies. Overall, Islamic central banks use the direct instruments of regulatory and discretionary powers, while indirect involvement is associated with a deliberate effect on money market conditions (Choudhry & Mirakhor 1997). In accordance with this, Saudi Arabia should use market-oriented equity instruments, as well as combine direct and indirect instruments, to develop its own country-specific tools. Further, the KSA uses a minimum reserve policy with the help of a cash reserve ratio and statutory liquidity ratio, repos, foreign exchange swaps and placement of public funds (Al-Jasser & Banafe 1999). Although the Islamic framework may seem to limit the abilities of financial institutions, there remains an array of methods to influence the financial situation.

The main obstacle for monetary policy is its effective development in the context of an interest-free economy (Askari, Iqbal & Mirakhor 2014a). This problem pertains to the need to employ instruments different from the ones typical of conventional economies. In an Islamic economy, both fiscal and monetary policies use risk-sharing instruments to guarantee different entities are protected.

## 3.9 Key Practical Considerations for this Study

The research questions set for the current study are to evaluate the short-term and long-term effects of fiscal policy, monetary policy and merchandise trade on the Saudi economy. The dependent variables of the study include GDP, oil GDP and non-oil GDP. These variables test the effectivity of fiscal and monetary policies based on changes to GDP. As for independent variables, the list includes money supply, interest rates, CBC on the private sector and inflation as those that affect monetary policy, whereas government expenditure and government revenues are associated with fiscal policy.

Although GDP is currently rising (General Authority for Statistics 2018), the situation may change in view of diversification. Investigating variables is crucial to understand if

the Saudi economy is booming under the influence of the employed fiscal and monetary policies. The decomposition of total GDP into oil-based and non-oil-based components is a useful step to improve the understanding of the relationship between the different sectors and the GDP of KSA (Samargandi, Fidrmuc & Ghosh 2014).

## 3.10 Summary of the Gaps in the Literature

The existing knowledge provides extensive information about monetary and fiscal policies. Although multiple studies have focused on the functioning of economies in the Islamic finance framework, most recent investigations have not included Saudi Arabia. The KSA's current course towards diversification implies that the country is in a transitional period, which calls for additional studies to understand how the changes may affect GDP and policy-making processes. There is a lack of academic knowledge on the ways to coordinate monetary and fiscal policies, despite scholarly consensus on the importance of coordination (Arestis 2015; Dosi, Fagiolo, Napoletano, Roventini & Treibich 2015); in fact, there are no studies focusing on coordination efforts. The current study addresses this gap by offering insights into the relationship between monetary and fiscal policies under the principles of Islamic economic framework. Gaps in knowledge also include a lack of information on monetary and fiscal policies from an instrumental perspective in Saudi Arabia. Although general information includes the 'basics' regarding the tools that the KSA uses for management of fiscal and monetary issues, no up-to-date empirical findings are available. While Al-Jasser and Banafe (1999) identified the cash reserve ratio, statutory liquidity ratio, repos, foreign exchange swaps and placement of public funds as the monetary tools used by the KSA, these findings are outdated.

### 3.10.1 Rationale for this Study

The rationale for this study rests on the importance of providing Saudi policy-makers with relevant information about monetary and fiscal policies applicable to the strategy of diversification (Albassam 2015). Attempts to shift from a commodity-based economy to a knowledge-based economy with diversified sectors may change the position of Saudi Arabia in the global market and, consequently, the sources of governmental revenues and avenues of governmental expenditures. Steadily increasing GDP may cease improvement because of diversification (General Authority for Statistics 2018). The uncertainties that exist in the economic functioning of the country should be mitigated with the help of

relevant research that focuses on the effectivity of monetary and fiscal policies and tools for the KSA.

## 3.11 Summary

With the instability and dynamics of the modern economic environment, nations frequently face the necessity to adjust monetary and fiscal policies to manage their economies. The literature review of theoretical and empirical literature regarding the most important aspects and tools of monetary and fiscal policies demonstrated that Islamic countries, including Saudi Arabia, in addition to the conventional economic challenges of an exogenous nature, face additional obstacles that stem from the traditional Islamic framework (Tahir 2013). Impediments to normal functioning of the banking system in Islamic countries take the form of numerous economic prohibitions, including the prohibition on interest rates and the risk of uncertainty, and the obligation to implement only non-interest banking operations. Under these conditions, Saudi policy-makers, guided by the principles of Islamic finance, need not only to minimise the conflict between monetary and fiscal policies but also formulate 'fresh' decisions to ensure the maximum effectiveness of their economy and wellbeing of their nation. The new findings on fiscal policy, monetary policy and their impact on the Saudi economy will address existent gaps and provide a foundation for further research.

The next chapter develops the model to answer the research question, providing a conceptual framework, review of research methods, justification of the ARDL model, and the selected tests. Chapter 4 also overviews data collection, sources and variable measurements for the data obtained from SAMA and GASTAT.

# Chapter 4: Conceptual Framework and Methods Employed

## 4.1 Introduction

The purpose of this chapter is to develop a model that would efficiently answer the research question. To achieve this, the chapter starts by focusing on the conceptual framework that provides a foundation for the overview of the research questions and hypotheses. The chapter is organised as follows. Section 4.2 sets the empirical background for the variables and the methods used, Section 4.3 outlines the conceptual framework and Section 4.4 summarises the research hypotheses. In Section 4.5, a review of the research methods used in previous studies is presented. This review offered an opportunity to select the most suitable approach, specifically an ARDL model, which provides for unbiased estimates of long-term relationships among variables. Section 4.6 reviews the research method for the present study and Section 4.7 presents the data collection procedure and the sources. Section 4.8 details variable measurements and the final Section 4.9 summarises the chapter.

## 4.2 Empirical Background of the Variables and Methods Used

The effect of fiscal and monetary policies on the economy has generated many empirical studies in both developed and developing countries. Typically, the results have shown that monetary policy is more effective in developed countries while fiscal policy is more effective on economic activity in developing countries. This section justifies the choice of the determinant variables and provides a review of those variables used in this study.

### 4.2.1 Empirical Research in Developed Countries

Although studies have employed different variables and methods to research the impact of monetary policy and fiscal policy on GDP, one common pattern seems to be that, in the case of developed countries, monetary policy has a more significant impact than fiscal policy, especially in the long term. Table 4.2 outlines the key findings of the studies conducted on developed countries using such methods as ordinary least square (OLS), the St Louis equation and the VAR model. Specifically, a seminal study in the US conducted by Andersen and Jordan (1968) for the period 1952 to 1968 employed the OLS method. This result was reinforced by a more recent US study by Senbet (2011), who

employed a St Louis equation and a Vector Autoregression (VAR), noting that monetary policy affected real outputs more strongly than fiscal policy in the US in the period from 1959 to 2010.

Conversely, Waud's (1974) US study concluded that both fiscal and monetary influences on economic activity are significant and important. Waud (1974) analysed such variables as GDP, federal revenues and expenditures and money supply for the period of the OLS model. Darrat (1986) also studied the US in the period from 1955 to 1982 using a St Louis equation and the OLS method and concluded that neither government expenditures nor changes in money supply could significantly affect real outputs. In a more recent study, Belliveau (2011) used the OLS method and the St Louis equation and concluded that both monetary and fiscal policy are feasible options for policy-makers to stabilise outputs, as the analysis of the findings for the period spanning 1956 to 2007 in the US confirmed.

Batten and Hafer (1983) and Chowdhury (1988) investigated the efficiency of monetary policy in the developed European, North American and Asian countries from the 1960s to the 1980s and demonstrated the importance of money growth over the fiscal actions of governments in affecting GDP growth in developed countries. Moreover, Batten and Haffer (1983) specifically focused on the period from 1960 to 1980, using OLS methods and the St Louis equation to point out that this result was robust across both 'fixed' and 'flexible' exchange rate regimes. The connection between exchange rate flexibility and the efficiency of monetary policy in its influence on GDP growth demonstrates the importance of researching the exchange rate within the context of discussion on monetary policy, even in developed countries. Although, in Europe, as Chowdhury (1988) concluded after applying the St Louis approach for the analysis of six European nations for the study period between 1966 and 1984, the influence of monetary policy varies from country to country. Policy had a stronger and more predictable impact on GDP in Denmark, Norway and Sweden, while for Belgium and the Netherlands fiscal policy had a greater influence. The difference in results can be largely attributed to variations in institutional structural factors in each country. Below, is a table that briefly provides an overview of the empirical research on monetary and fiscal policy influences in developed countries.

**Table 4.1: Summary of Empirical Studies on the Effectiveness of Fiscal and Monetary Policy in Developed Countries**

| Researcher(s) | Data | Country(ies) | Dependent Variables | Independent Variables | Method/s | Findings |
|---|---|---|---|---|---|---|
| **Andersen and Jordan (1968)** | 1952–1968 | US | Nominal GDP | Money supply, high-employment expenditures | OLS, St Louis equation | The influence of monetary actions on economic activity is more certain than that of fiscal actions. Monetary influence is stronger and operates more quickly in relation to fiscal influence. |
| **Waud (1974)** | 1953–1968 | US | GNP | federal revenues and expenditure, money supply | OLS | Fiscal influences and monetary influences on economic activity represented by GNP are both significant and appear equally important. |
| **Batten and Hafer (1983)** | 1960–1980 | US, Canada, UK, Germany, France, Japan | GNP | narrow money, government expenditures, merchandise exports | OLS, St Louis equation | Monetary growth has a significant and lasting effect on nominal GNP growth in all six countries. Fiscal actions are significant only in the UK and France. |
| **Darrat (1986)** | 1955–1982 | US | Real GNP | money supply, government expenditures, government receipts | OLS, St Louis equation | Neither government expenditures nor money supply have significant lasting impacts on real outputs. |
| **Chowdhury (1988)** | 1966–1984 | Austria, Belgium, Denmark, UK, the Netherlands, | GNP | Money supply, real government expenditure, total exports | OLS | Monetary policy has a stronger effect on GNP in Denmark, Norway and Sweden. In the case of Belgium and the Netherlands, fiscal policy appears to have a greater influence on GNP. |

| Researcher(s) | Data | Country(ies) | Dependent Variables | Independent Variables | Method/s | Findings |
|---|---|---|---|---|---|---|
| | | Norway, Sweden | | | | |
| **Senbet (2011)** | 1959–2010 | US | Growth rate of nominal GDP | Federal funds rate, growth rate of non-borrowed reserves, government current expenditure | VAR Model | Monetary policy affects the real output more strongly than fiscal policy. |
| **Belliveau (2011)** | 1956–2007 | US | Nominal GDP | Money supply, government surplus | OLS, St Louis equation | Both monetary and fiscal policy are viable options for policy-makers seeking to stabilise outputs. |

**Note:** GNP = Gross National Product

### 4.2.2 Empirical Research in Developing Countries

In the case of developing countries, as summarised in Table 4.2, the consensus of empirical research generally favours fiscal policy over monetary policy in terms of the effectiveness of short-term interventions. However, it also indicates that monetary policy is generally a more effective means to improve economic outcomes in the long term (Hasan et al. 2016; Jayaraman 2012). As Kulkarni and Saxena (2003) stated, the economies of developing countries are more prone to economic crises and, hence, are more reactive to fiscal policy tools, which have more immediate effects in the short term.

Tuncer and Akinci (2018) investigated the effectiveness of fiscal and monetary policies on GDP in Turkey for the period from 2006 to 2016 using an ARDL approach. They found monetary policy to be more effective. Hasan et al. (2016) explored its relative effectiveness in Bangladesh for the period from 1974 to 2015 using the vector error correction model (VECM) method, with nominal GDP, money supply and reserve money, along with government expenditure and revenues, concluding that monetary policy had a greater long-term positive impact on economic growth than fiscal policy. Similar findings were reported by Havi and Enu (2014) using the OLS method in the study period from 1980 to 2012 and by Richard, Muriu and Maturu (2018) using the VAR method for the period from 1996 to 2014. Havi and Enu (2014) and Richard, Muriu and Maturu (2018) employed broad money supply and reserve money as proxies for monetary policy and used total government revenue and total government expenditure as proxies for fiscal policy. Similar to Hasan et al. (2016), Ali, Irum and Ali (2008) confirmed that monetary policy is a more powerful tool than fiscal policy for enhancing economic growth as measured by GDP growth in Pakistan, India, Sri Lanka and Bangladesh, as evidenced by the data collected for the period from 1990 to 2007. Ali, Irum and Ali (2008) used fiscal deficit and broad money as proxies for the policies and utilised an ARDL model for the estimation.

Ajayi and Aluko (2016) also found that monetary policy had a greater growth-stimulating effect on the Nigerian economy, as measured by GDP, using an OLS model for the period from 1986 to 2014. Saibu and Apanisile (2013) also supported the result that monetary policy is more effective on Nigerian GDP using an ARDL model for the period spanning 1960 to 2011. Conversely, Okorie, Sylvester and Simon-Peter (2017) found that fiscal policy had a greater impact on Nigeria's GDP using an ARDL model, although monetary

policy was a faster influence in the study period from 1981 to 2012. This latter finding contradicts the majority of studies and is reflective of the specific nature of the Nigerian economy that differs from those of other developing countries in Africa and Asia.

Bokreta and Benanaya (2016) undertook a study of Algeria for the period between 1970 and 2014 using the VECM approach with GDP per capita, government expenditure, net taxes, exchange rates and inflation. They concluded that fiscal policy has a greater impact on economic growth than monetary policy. Saqib and Aggarwal (2016), who used Johanson and Juselius's (1990) cointegration procedure, concluded that fiscal policy could be more effective than monetary for enhancing the economic growth of GDP in Pakistan in the period from 1984 to 2014. Jawaid, Qadri and Ali (2011) found that monetary policy is more effective than fiscal policy on Pakistan's GDP, using data from the period from 1981 to 2009 and applying cointegration and error-correlation models. However, in later years, Mahmood and Sial (2018) ran an ARDL model on Pakistan for the period from 1973 to 2014 and found that fiscal policy was more effective in stabilising domestic price levels.

As a tool for stimulating an economy, especially in the short term, fiscal policy was proven to be more effective in the South Pacific region. Jayaraman (2001) studied the four South Pacific nations of Fiji, Samoa, Tonga and Vanuatu for the period from 1980 to 1995, employing an OLS method; the study confirmed that fiscal policy was more effective than monetary policy in all four countries for promoting economic growth. In their more recent study, Jayaraman (2012) employed an ARDL model and demonstrated that fiscal policy had a stronger effect on Vanuatu's real GDP in the short term, but that monetary policy had stronger long-term effects in the study period from 1983 to 2010.

Considering Iran, Khosravi and Karimi (2010) used an ARDL model and demonstrated that fiscal policy was more effective on Iranian GDP for the years spanning 1960 to 2006. In addition, Moayedi (2013) used OLS, the St Louis equation and VECM and found that fiscal policy and exports exerted a lasting and significant effect on the Iranian economy for the period from 1990 to 2008. In contrast, in India, monetary policy implementation appeared to have a positive impact on growth in government expenditure, prices and output, as demonstrated by data analysis for the period between 1963 and 1993, as analysed with a VAR model (Ansari 1996).

In the developing countries of Europe, fiscal policy seems to be more effective than monetary policy, even in the long term, as concluded in the study by Topcu, Kuloglu, and Lobont (2015) on Romania for the period from 2004 to 2011, using OLS. Malawi (2009) employed an OLS method and the St Louis equation to show that fiscal policy had a stronger effect on economic activities, as measured by GDP growth rate, than monetary policies in Jordan and Tunisia for the period spanning 1972 to 2004. Olaloye and Ikhide (1995) employed the same methods and confirmed that fiscal policy exerted more influence on the GDP of Nigeria than monetary policy for the period from 1986 to 1991.

From the analysis of the discussed studies, it is evident that fiscal policy is more effective in countries where the complexity of the monetary system is circumscribed by challenging economic conditions and general economic crises. For a majority of Asian and African countries, fiscal policy is the shortest and most effective way to the stabilisation of an economy in critical conditions. The overview of these studies provides an understanding of the relevance of this research for Saudi Arabia. Below is a summary table that reviews the major studies on the effectiveness of fiscal and monetary policy in developing countries.

**Table 4.2: Summary of Empirical Studies on the Effectiveness of Fiscal and Monetary Policy in Developing Countries**

| Researcher(s) | Data | Country(ies) | Dependent Variables | Independent Variables | Method/s | Findings |
|---|---|---|---|---|---|---|
| **Darrat (1984)** | 1950–1981 | Brazil, Chile, Mexico, Peru, Venezuela | Nominal GNP | money supply, government spending, exports | OLS, St Louis equation | Fiscal policy has significant influence on GNP growth in all countries, while the effects of monetary policy are not significant. |
| **Olaloye and Ikhide (1995)** | 1986–1991 | Nigeria | GDP | money supply, government expenditure, net exports | OLS, St Louis equation | Fiscal policy exerts more influence on the economy than monetary policy. |
| **Ansari (1996)** | 1963–1993 | India | GDP | money supply, government expenditure, GDP deflator | VAR Model | Monetary policy accommodates growth in government expenditure, prices and outputs. |
| **Jayaraman (2001)** | 1980–1995 | Fiji, Samoa, Tonga, Vanuatu | Change in real GDP | real government expenditure, real money supply | OLS | Fiscal policies are effective in all of the four countries for promoting economic growth. In Samoa, both fiscal and monetary policies have no influence on growth. In Fiji, Tonga and Vanuatu, monetary policy has a positive effect on growth. In short, fiscal policies are found to be less effective. |
| **Ali, Irum and Ali (2008)** | 1990–2007 | Pakistan, | GDP growth rate | fiscal deficit, broad money | ARDL | Monetary policy is a more powerful tool than fiscal policy for enhancing economic growth. |

| Researcher(s) | Data | Country(ies) | Dependent Variables | Independent Variables | Method/s | Findings |
|---|---|---|---|---|---|---|
| | | India, Sri Lanka and Bangladesh | | | | |
| **Malawi (2009)** | 1972–2004 | Jordan, Tunisia | RGDP | money supply, government spending | OLS, St Louis equation | Fiscal policy has a stronger effect than monetary policy on economic activity; fiscal policy can be utilised as a stabilisation policy in both countries. |
| **Khosravi and Karimi (2010)** | 1960–2006 | Iran | GDP | consumer price index, money stock, government expenditure, exchange rate | ARDL | The results indicate that government expenditure (as fiscal policy) has a very significant impact on GDP growth. Meanwhile, the inflation and exchange rate (as monetary policy) variables have a negative influence on GDP. |
| **Jawaid, Qadri & Ali 2011 (2011)** | 1981–2009 | Pakistan | GDP | money supply, government expenditure, trade openness | cointegration and error correction model | Monetary policy is more effective than fiscal policy in Pakistan. |
| **Jayaraman (2012)** | 1983–2010 | Vanuatu | RGDP | real government expenditure, real money supply, real exchange rate index | ARDL | Fiscal policy is more important than monetary policy in stimulating economic growth, especially in the short term. In the long term, it is clear that innovations in monetary aggregate had a more significant effect on output growth in the study period. |

| Researcher(s) | Data | Country(ies) | Dependent Variables | Independent Variables | Method/s | Findings |
|---|---|---|---|---|---|---|
| **Moayedi (2013)** | 1990–2008 | Iran | nominal GNP | money supply, deposit rate, exchange rate, government expenditure, merchandise exports | OLS, St Louis equation ,VECM | Fiscal policy and exports exert a lasting and significant effect on the Iranian economy. |
| **Saibu and Apanisile (2013)** | 1960–2011 | Nigeria | GDP | government expenditure, revenue; interest rate, money supply, oil price, exchange rate, openness to world | ARDL | Monetary policy is more effective than fiscal policy but a coordination of both fiscal and monetary policy would produce better results. |
| **Havi and Enu (2014)** | 1980–2012 | Ghana | RGDP | labour force, gross fixed capital formation, money supply, general government expenditure | OLS | Although fiscal policy affects growth positively, monetary policy has a more powerful effect on growth. |
| **Topcu (2012)** | 2004–2011 | Romania | RGDP | money supply, government expenditure | OLS | Fiscal policy is more effective than monetary policy in both the short and the relatively long term. |
| **Bokreta and Benanaya (2016)** | 1970–2014 | Algeria | GDP per capita | government expenditure, net taxes, exchange rate, inflation | VECM | Fiscal policy is more effective than monetary policy when it comes to promoting economic growth. |

| Researcher(s) | Data | Country(ies) | Dependent Variables | Independent Variables | Method/s | Findings |
|---|---|---|---|---|---|---|
| **Hasan et al. (2016)** | 1974–2015 | Bangladesh | NGDP | money supply, reserve money, government revenue, government expenditure | VECM | Monetary policy has a greater long-term positive impact on economic growth than fiscal policy. |
| **Saqib and Aggarwal (2017)** | 1984–2014 | Pakistan | GDP | money supply, fiscal balance | cointegration test | Fiscal policy can be more effective for enhancing economic growth. However, the combination of both policies is highly recommended. |
| **Ajayi and Aluko (2016)** | 1986–2014 | Nigeria | GDP | money supply, government expenditure, export | OLS, Modified St Louis equation | Monetary policy has a greater growth-stimulating effect on the economy than fiscal policy. |
| **Okorie, Sylvester and Simon-Peter (2017)** | 1981–2012 | Nigeria | GDP | money supply, government expenditure | ARDL | Monetary policy has a faster effect on income than fiscal policy but fiscal policy has a greater impact. Based on speed, monetary policy is relatively effective but, based on magnitude, fiscal policy is more successful. |
| **Richard, Muriu and Maturu (2018)** | 1996–2014 | Rwanda | NGDP | government spending, net tax revenues, money stock, interbank rate | VAR | Monetary policy is more effective than fiscal policy in explaining the changes in nominal output in Rwanda. In addition, monetary policy reveals better outputs when the VAR model contains domestic exogenous variables than when they are excluded from the model. |

| Researcher(s) | Data | Country(ies) | Dependent Variables | Independent Variables | Method/s | Findings |
|---|---|---|---|---|---|---|
| **Tuncer and Akinci (2018)** | 2006–2016 | Turkey | GDP | public expenditure, money supply | ARDL | Monetary policy is determined to be more efficient. |
| **Mahmood and Sial (2018)** | 1973–2014 | Pakistan | Inflation Rate | currency in circulation, government development expenditure, budget deficit, indirect taxes | ARDL | Fiscal policy plays an important role in the steadiness of domestic price levels in Pakistan. |

## 4.3 Conceptual Framework

The background and the literature review chapters set the foundation for the development of an effective conceptual framework for this study, which is presented in Figure 4.1. The conceptual framework acknowledges fiscal policy, monetary policy and merchandise trade as significant determinants of GDP.

Fiscal policy influences government expenditures and government revenues. Monetary policy influences money supply, interest rates, commercial banks' claims on the private sector and inflation. It is therefore operationalised by these four variables. Merchandise trade influences exports and imports and is operationalised by the variables of merchandise exports and merchandise imports. Each of these operationalised variables are hypothesised to directly influence total GDP, oil GDP and non-oil GDP.[6] Based on these theorised associations, the model provides for the development of hypotheses that facilitate a discussion of the effects of fiscal and monetary policies on total GDP, oil GDP and non-oil GDP.

Monetary policy determines the supply and the cost of money within an economy with the main objective of achieving price stability. Expansionary monetary policy includes the lowering of interest rates, direct increases in money supply and policies directed at increasing aggregate demand. The relationship between expansionary monetary policy and GDP is usually positive. An increase in money supply directly influences consumer spending, which increases the nominal output. Further, a decrease in money supply leads to a decrease in consumer spending and investment, which usually results in a decrease in gross domestic production (Hameed 2011). Interest rate and GDP have a negative relationship where an increase in average interest rates promotes long-term saving. Therefore, consumers have less money to spend, causing a decrease in domestic production because they choose to save money under high interest rates instead of spending (Floger 2019). A lower reserve requirement allows banks to offer loans to customers. In this case, consumers have more money in hand, which leads to more spending on goods and services. This will enable the economy to increase its gross domestic production (Chappelow 2019). According to Barnes (2017), inflation leads to an increase in money supply, which result in the elevation of the nominal GDP.

[6] All operationalised variables used in this study are located in Table 4.1, Section 4.8

Fiscal policy, which can be expansionary or contractionary, has a direct impact on the GDP of an economy as a result of government spending and tax policies (Kenton 2019). However, the aggregate demand will increase, resulting in economic growth. Further, under an expansionary fiscal policy, government expenditure exceeds government income, whereas contractionary fiscal policies result in increased income and decreased government expenditure. The balance of payment is determined by the value of imports and exports within a particular economy.

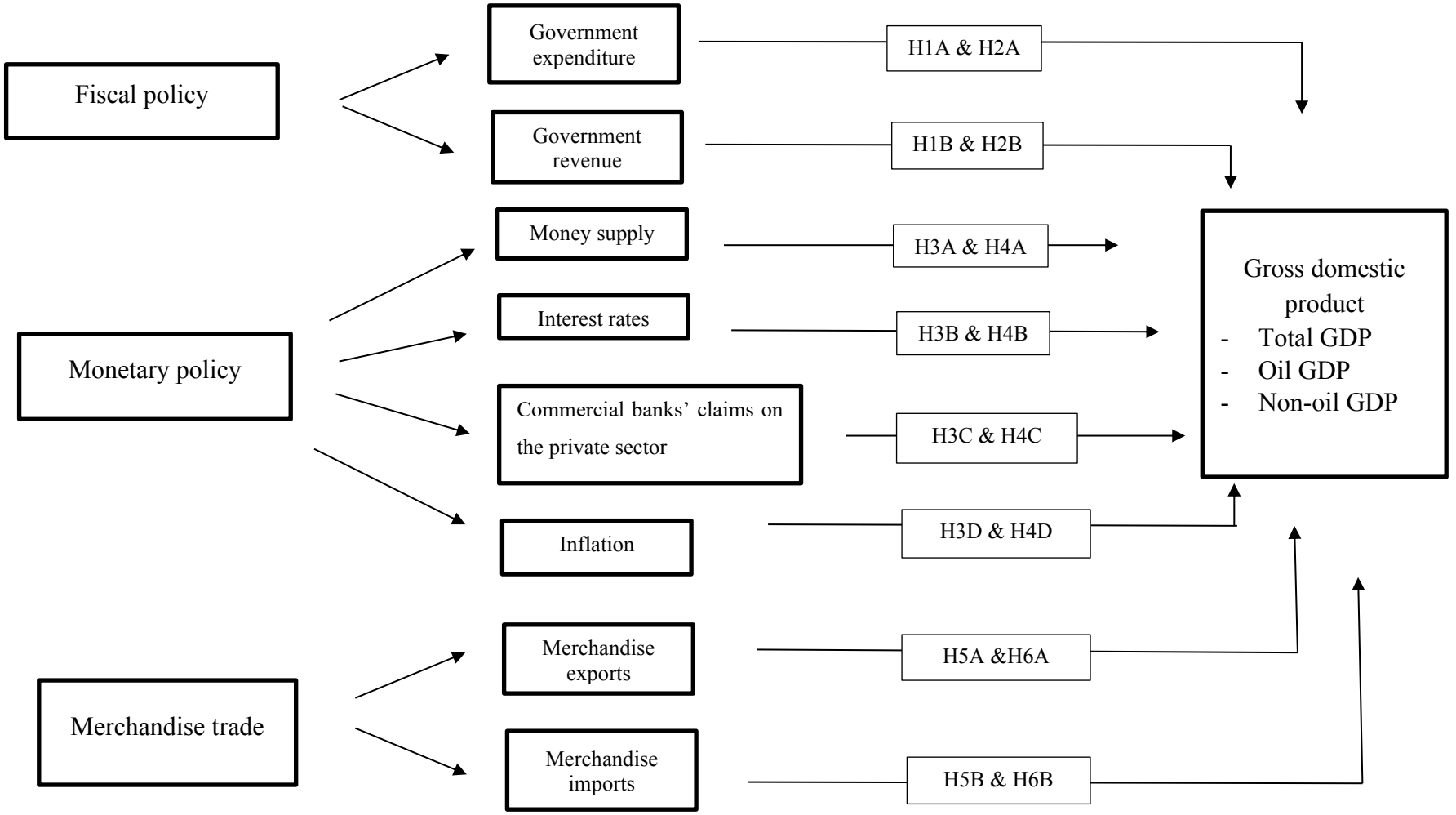



**Figure 4.1: Conceptual Framework for this Study**

## 4.4 Research Hypotheses

The conceptual framework presented above provides guidance to the researcher in determining the testable hypotheses for this study as consistent with the study's objectives. The following testable hypotheses were drawn from the research questions, are considered appropriate for this study and are subject to empirical investigation. The following section presents the hypotheses as relevant to the identified research questions:

**Research Question 1**: What is the long-term effect of fiscal policy on the Saudi economy, measured by GDP, oil GDP and non-oil GDP?

To address Research Question 1, the following hypotheses are tested:

**Hypothesis 1:** There is a long-term relationship between fiscal policy and GDP.

- **H1Ao**: There is a long-term relationship between government expenditure and GDP.
- **H1Aa**: There is no long-term relationship between government expenditure and GDP.
- **H1Bo**: There is a long-term relationship between government revenue and GDP.
- **H1Ba**: There is no long-term relationship between government revenue and GDP.

**Research Question 2**: What is the short-term effect of fiscal policy on the Saudi economy, measured by GDP, oil GDP and non-oil GDP?

To address Research Question 2, the following hypotheses are tested:

**Hypothesis 2:** There is a short-term relationship between fiscal policy and GDP.

- **H2Ao**: There is a short-term relationship between government expenditure and GDP.
- **H2Aa**: There is no short-term relationship between government expenditure and GDP.
- **H2Bo**: There is a short-term relationship between government revenue and GDP.
- **H2Ba**: There is no short-term relationship between government revenue and GDP.

**Research Question 3:** What is the long-term effect of monetary policy on the Saudi economy, measured by GDP, oil GDP and non-oil GDP?

To address Research Question 3, the following hypotheses are tested:

**Hypothesis 3:** There is a long-term relationship between monetary policy and GDP.

- **H3Ao**: There is a long-term relationship between money supply and GDP.
- **H3Aa**: There is no long-term relationship between money supply and GDP.
- **H3Bo**: There is a long-term relationship between interest rates and GDP.
- **H3Ba**: There is no long-term relationship between interest rates and GDP.
- **H3Co**: There is a long-term relationship between commercial banks' claims on the private sector and GDP.
- **H3Ca**: There is no long-term relationship between commercial banks' claims on the private sector and GDP.
- **H3Do**: There is a long-term relationship between inflation and GDP.
- **H3Da**: There is no long-term relationship between inflation and GDP.

**Research Question 4:** What is the short-term effect of monetary policy on the Saudi economy, measured by GDP, oil GDP and non-oil GDP?

To address Research Question 4, the following hypotheses are tested:

**Hypothesis 4:** There is a short-term relationship between monetary policy and GDP.

- **H4Ao**: There is a short-term relationship between money supply and GDP.
- **H4Aa**: There is no short-term relationship between money supply and GDP.
- **H4Bo**: There is a short-term relationship between interest rates and GDP.
- **H4Ba**: There is no short-term relationship between interest rates and GDP.
- **H4Co**: There is a short-term relationship between commercial banks' claims on the private sector and GDP.
- **H4Ca**: There is no short-term relationship between commercial banks' claims on the private sector and GDP.
- **H4Do**: There is a short-term relationship between inflation and GDP.
- **H4Da**: There is no short-term relationship between inflation and GDP.

**Research Question 5**: What is the long-term effect of merchandise trade on the Saudi economy, measured by GDP, oil GDP and non-oil GDP?

To address Research Question 5, the following hypotheses are addressed:

**Hypothesis 5**: There is a long-term relationship between the merchandise trade and GDP.

- **H5Ao**: There is a long-term relationship between merchandise exports and GDP.
- **H5Aa**: There is no long-term relationship between merchandise exports and GDP.
- **H5Bo**: There is a long-term relationship between merchandise imports and GDP.
- **H5Ba**: There is no long-term relationship between merchandise imports and GDP.

**Research Question 6**: What is the short-term effect of merchandise trade on the Saudi economy, measured by GDP, oil GDP and non-oil GDP?

To address Research Question 6, the following hypotheses are addressed:

**Hypothesis 6**: There is a short-term relationship between the merchandise trade and GDP.

- **H6Ao**: There is a short-term relationship between merchandise exports and GDP.
- **H6Aa**: There is no short-term relationship between merchandise exports and GDP.
- **H6Bo**: There is a short-term relationship between merchandise imports and GDP.
- **H6Ba**: There is no short-term relationship between merchandise imports and GDP.

## 4.5 Research Methods Review

The following section presents a brief outline of the commonly used methods and justifies the choice of the most appropriate method to test the hypotheses of the present study. Typically, the main research methods employed for the analysis of macroeconomic situations examined in the present research are undertaken by OLS, VAR, VECM or ARDL. A more detailed discussion on the uses of these approaches are undertaken, along with the justification for the use of ARDL for this thesis, occurs in subsections 4.5.1, 4.5.2, 4.5.3 and 4.5.4.

Figure 4.2 presents a flow chart used as a guide for methodology given the properties of the time series data set. This thesis presents a discussion of the methods that are commonly used for time series estimation, followed by a detailed discussion of the specific model employed by this study to estimate the parameters.

Certain methods are commonly used in this area, including OLS, VAR, VECM and ARDL. For estimation techniques used in time series analysis, the key concern is the stationarity of the data. Unit root tests provide a solid proof of stationarity for any given series. Unit root test results are necessary because commonly used methods for stationary time series are incompatible for use with non-stationary series.

If all variables in the time series are relatively stationary, the methodology tends to be simple. In this situation, OLS and vector autoregressive (VAR) models provide unbiased estimates. However, when variables are non-stationary, OLS and VAR models may not be suitable for estimating the relationships. When all variables are non-stationary and all in the same order, a VECM model is preferred. However, if variables produce mixed results when stationary and non-stationary, this will cause difficulty. When all variables have mixed results and, none of which are in their second deference, an ARDL model can be used. Figure 4.2 illustrates a general methodological framework for time series analysis based on the data stationarity of the time series (Shresth & Bhatta 2018).

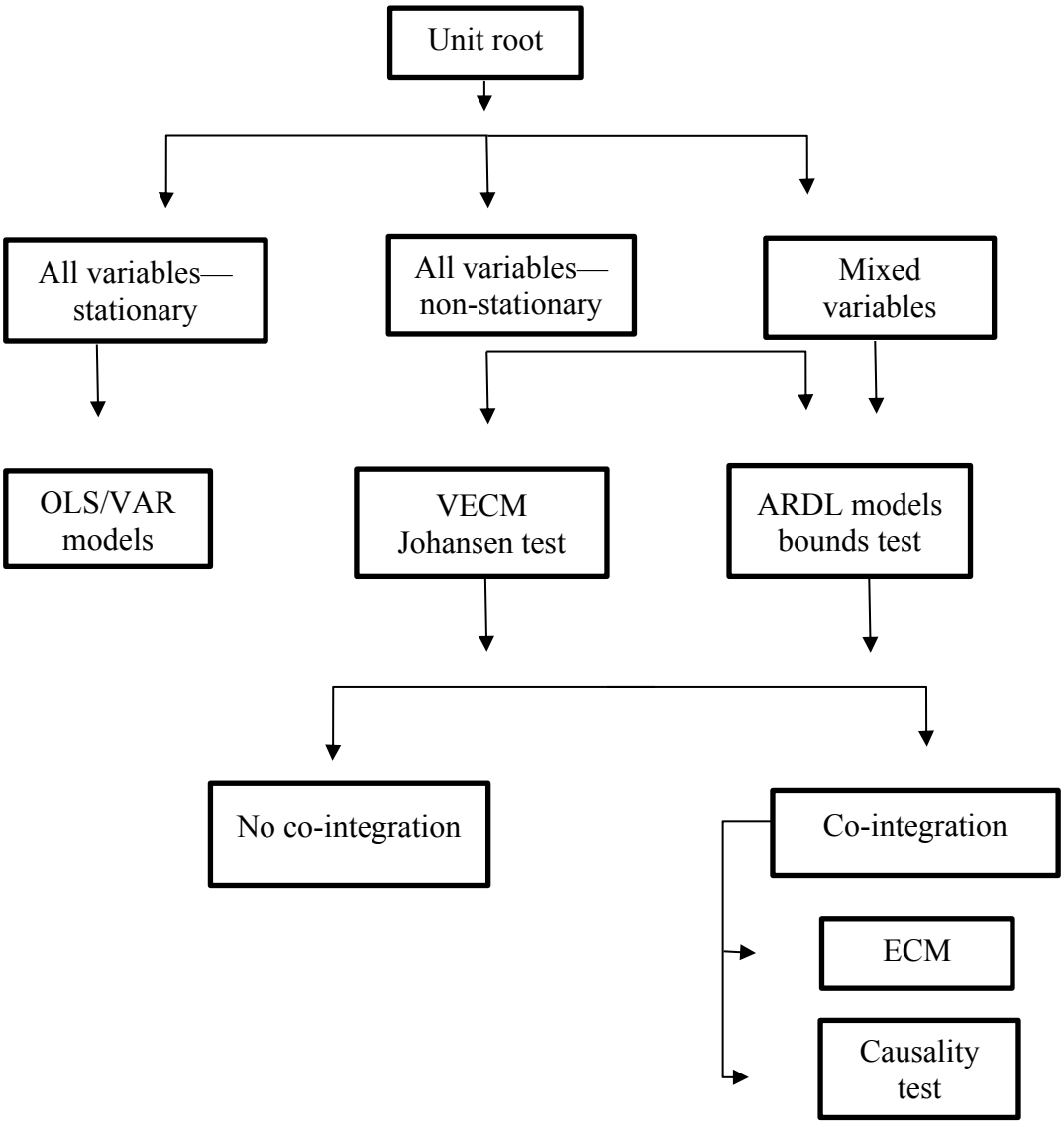



**Figure 4.2: Method Selection for Time Series Data (Shresth & Bhatta 2018)**

### 4.5.1 St Louis Equation (Ordinary Least Squares)

A seminal approach to analysing macroeconomic issues is via the St Louis equation, which has been the preferred approach to assess monetary and fiscal policy interactions by economists for a long time. The St Louis equation proposed by Federal Reserve Bank of St. Louis economists Leonall C. Andersen and Jerry J. Jordan (A–J) in 1968 was an expanded version of the equation originally introduced by Milton Friedman and David Meiselman in 1963. However, as Bias (2014) pointed out in his chronological survey, Friedman and Meiselman started the debate over whether a single-equation regression model can answer the most profound questions in macroeconomics. The result of their work was a simple, reduced form of OLS regression equation comparing the effectiveness

of monetary and fiscal policy (Friedman & Meiselman 1963). This equation was used to compare the theories of Keynesians with monetarist frameworks. Critics such as Bias (2014) argued that this model was designed to prove that monetarism was superseding Keynesianism as an effective macroeconomic theory.

Further investigations allowed researchers to modify the equation to meet new economic requirements. While Andersen and Jordan (1968) supported the original single-equation approach suggested by Freidman and Meiselman, they also suggested expanding the equation to address criticism about the original equation. The expanded Andersen and Jordan equation is presented below.

$$\Delta Y_t = a + \sum_{i=0}^{4} m_i \Delta M_{t-i} + \sum_{i=0}^{4} e_i \Delta E_{t-i} + \sum_{i=0}^{4} z_i \Delta Z_{t-i} \qquad 4.1$$

In this expanded version of the equation, all variables are in first difference form, as indicated by Δ; $a$ is a constant; $Y$ is nominal domestic spending; $M$ represents monetary policy defined either by monetary stock or monetary base; $E$ is high-employment expenditure,[7] receipts or surplus; and $Z$ is a variable that captures the effect of all other variables, such as international trade, weather, preferences, technology, infrastructure, war and resources. Andersen and Jordan (1968) used an Almon lag technique with fourth-degree polynomials and a four-period lag for combining different measures of fiscal and monetary policy to determine whether changes in these variables would have a significant impact on the nominal spending in an economy. With a dataset from January 1953 to April 1968, Andersen and Jordan confirmed Friedman and Meiselman's finding that monetary policy had a noticeable impact no matter what measure was used for spending, while fiscal policy had no significant effects. Despite the attempts to improve the functioning of the equation, it garnered much criticism, which prevents the current thesis from using it. In particular, the St Louis equation was criticised by Stein (1980) because not all variables were endogenous and other regressors were not included. Stein (1980) also criticised the equation because it constrained the Almon lag procedure. Modigliani and Ando (1976, as cited in Batten and Thornton 1986), provided evidence to challenge the validity of the A–J results, indicating that the St Louis equation produced poor estimates of the true multipliers and overstated the size of the monetary influence.

[7] A high-employment expenditure means a constant level of economic activity. Whether high employment is defined as 2%, 4% or 6% is irrelevant in this context. The estimate of the budget at a high-employment government expenditure level provides a contribution to its stream of the economy.

### 4.5.2 Vector Autoregression (VAR)

The VAR model was proposed by Sims (1980) and is a widely used econometric method. Sims's (1980) approach sought to overcome the ad hoc restrictions that were required to identify and classify exogenous and endogenous variables. The VAR models assume that all variables are endogenous. For example, the VAR method typically models the three macro-series of money supply, interest rate and output along with an autoregressive function of their lagged values. The VAR model might even include some exogenous variables, such as trends or seasonal fluctuations, but the core idea is that the model does not have to classify variables as endogenous or exogenous. Importantly, as Baltagi (2007) observed, imposing restrictions on VAR models to reduce the number of estimated parameters is not viable because it reintroduces the ad hoc restrictions that this method was originally supposed to remedy.

Sims (1980) argued that, despite the relative absence of structure in a VAR, it could be effectively used to investigate policy-related questions that are typically asked at central banks, such as the one investigated in the current research. The VAR model is defined below.

$$AX_t = A(L)X_{t-1} + BZt + u_t \qquad 4.2$$

Here, A represents a 6*6 structural coefficient square matrix, A(L) is a polynomial of order p in the lag operation and Z is a deterministic term with an associated coefficients matrix B. The vector of structural shocks is given by $u_t$, representing the contemporaneous response of the variables to disturbances or innovations. On the basis of the unrestricted VAR model above, the ECM can be expressed as:

$$\Delta X_t = \alpha + \sum_{i=1}^{n} \beta_i \ \Delta X_{t-i} + \gamma_i \delta_{t-1} + DZ_i + U_t \qquad 4.3$$

Here, Xt and $U_t$ is a 6*1 vector of serially uncorrelated shocks, γ is a 6*6 matrix of error correction coefficients, $\delta_{t-1} = AX_{t-1}$ are the error correction terms and $\beta_i (i = 1,2,3 \ldots \ldots n)$ indicates the short run coefficients.

Because of the absence of relative structure in this model, as claimed by Sims (1980), and the fact that all variables need to be stationary to be used in this model, the current

research considered alternative approaches to estimate the impacts. One candidate was the VECM, which is described below.

### 4.5.3 Vector Error Correction Model (VECM)

The VAR model is a general framework used universally to describe the dynamics of the interrelationship between stationary variables. However, when the time series are not stationary, the VAR model should be modified by applying the VECM, which is a modification of the VAR model for variables that are stationary in their differences, involving a re-parameterisation of the VAR model on different levels (Kilian & Lutkepohl 2017). The VECM approach suggests that there may by several linearly independent cointegrating vectors. Thus, linear combinations of these vectors are also cointegrating as a result of the stationarity of the linear combinations of stationary variables. The modified version of the VAR equation is given below.

$$\Delta y_t = \Pi_1 y_{t-1} + \Gamma \Delta y_{t-1} + \cdots + \Gamma_{p-1} \Delta y_{t-p+1} + u_t, \qquad 4.4$$

Here, $\Pi = -(\mathrm{I}_K - A_1 - \cdots - A_p)$ represents the dynamics of the model in the short term and $\Gamma_i = -(\mathrm{A}_{i+1} + \cdots + A_p)$,, for $i = 1, \ldots, p-1$ is the long term relationship among the variables included in the vector, $y_t$ is the identity vector. Among the regressors in the equation, the only non-stationary variable is $y_{t-1}$.

The key advantages of the VECM approach are that pretesting is not necessary, all variables are treated as endogenous, multiple cointegration relationships are allowed and it is possible to perform tests on the long-term parameters. In cases when variables have different levels of stationarity or where the time series is relatively small ($n \leq 30$) or finite, an ARDL model could provide more accurate results (Nkoro & Uko 2016).

### 4.5.4 Autoregressive Distributed Lag (ARDL) Model

The ARDL model is another important approach to estimating macroeconomic models allowing for the analysis of relationships among multiple variables, with many advantages. First, it allows for the simultaneous testing of the long- and short-term relationships between the variables in a time series model (Asumadu-Sarkodie & Owusu 2016). Second, it is very efficient and consistent in determining properties for cointegration relationships in small and finite sample sizes (Ghatak & Siddiki 2001).

Third, the ARDL is applicable irrespective of whether the regressors in the model are purely I (0), purely I (1) or mutually cointegrated. Fourth, the bounds testing procedure does not require the pretesting of variables to be included in the model for unit roots, unlike other techniques, such as the Johansen (1988) approach. Fifth, despite the possible presence of endogeneity, the ARDL model provides unbiased coefficients for explanatory variables. Sixth, the ARDL model corrects the omitted lagged variable bias (Inder 1993). Jalil, Ma and Naveed (2008) and Ang (2010) argued that the ARDL framework includes sufficient numbers of lags to capture the data generating process in general to the requirements of the specific modelling approach outlined by Hendry (1995). Finally, the error correction model (ECM) can be derived via ARDL through a simple linear transformation (Banerjee, Dolado & Mestre 1998). ECM integrates short-term adjustments with long-term equilibrium without losing long-term information. Based on the advantages of the ARDL and considering the size of the dataset in the context of the Saudi economy, including the integrated order of the regressors, the ARDL technique has been chosen to estimate the models that have been constructed to test the hypotheses of the current thesis. A detailed description of this model is provided below.

Although methods such as OLS, VAR and VECM have the potential to guide the analysis, the ARDL approach is the most effective option due to the advantages this test offers. The ARDL test is distinguished from the majority of other methods in some aspects, since it resorts to a single reduced-form model, while its bound test is suitable for the analysis regardless of series levels and forms. The proposed method also holds merit because it facilitates the exploration of long-term and short-term parameters simultaneously which reflects the research objectives of the present research.

## 4.6 Research Method for the Present Study

Based on the information above, ARDL appears to be the most important model to address this study's research questions on the effects of monetary and fiscal policy on GDP in Saudi Arabia. Considering the small sample fitting for the model and that all variables are non-stationary, the ARDL model is suitable for generating the findings about long- and short-term relationships and the effects of variables. This estimation technique provides an unbiased method with which to generate new statistics and solid

data that can be used to evaluate the effectivity of multiple relationships among variables. Asumadu-Sarkodie and Owusu (2016) stressed that the desirability of this model rests on its unbiased long-term estimation, despite endogenous variables acting as regressors. The subsection below provides a more detailed specification of the ARDL model and the pre-estimation tests employed in this thesis, such as tests of stationarity and tests of cointegration.

In economic scenario analysis, the ARDL model provides a more intensive approach to the cointegration technique of Pesaran, Shin, and Smith (2001), where change in one economic variable affects other economic variables over time (Naidu, Pandaram & Chand 2019). The ARDL model has a re-parameterisation in the error correction process, which is equal to the cointegration of non-stationary variables (Hassler & Wolters 2006). Several authors, such as Pesaran and Shin (1996), Laurenceson and Chai (2003), Pesaran and Shin (1998) and Jalil, Ma and Naveed (2008) suggested that there seems to be a number of advantages to ARDL modelling. It can be used to estimate long- and short-term dynamics, even when the variables in question may include a mixture of stationary and non-stationary time series. The bounds test does not require the pretesting of the series to determine their order of integration, since the test can be conducted regardless of whether they are purely I (1), purely 1 (0) or mutually or fractionally integrated. As observed by Laurenceson and Chai (2003), Shrestha and Chowdhury (2007), Jalil, Ma and Naveed (2008) and Mukhopadhyay and Pradhan (2010), the ARDL modelling incorporates a sufficient number of lags to capture the data generating process to the requirements of a specific modelling framework. However, in this analysis, the bound test approach as well as the Johansen cointegration test was applied to examine whether the variables had long-term associations. Thereafter, a VAR lag order selection criterion was performed to determine the number of lags for the equations.

### 4.6.1 Model Specification

Because of the nature of the Saudi economy, it is crucial to employ appropriate equations that help with the information generated about the variables and hypotheses. Total GDP, oil GDP and non-oil GDP were chosen as the relevant dependent variables and three models were estimated, one for each dependent variable. The three estimated models are given below:

$$Total_{GDP} = f(MS, I, CBC, INF, GE, GR, ME, MI) \quad 4.5$$

$$Oil_{GDP} = f(MS, I, CBC, INF, GE, GR, ME, MI) \quad 4.6$$

$$Non-oil_{GDP} = f(MS, I, CBC, INF, GE, GR, ME, MI) \quad 4.7$$

Here:

- Total GDP = total real gross domestic product
- Oil GDP = real oil gross domestic product
- Non-oil GDP = real non-oil gross domestic product
- MS = real money supply (M2)
- I = interest rates
- CBC = real commercial bank claims on the private sector
- INF = changes in consumer price index (CPI)
- GE = real government expenditure
- GR = real government revenue
- ME = real merchandise exports
- MI = real merchandise imports.

In the current study, the ARDL model was incorporated to evaluate the relationship between GDP and the variables representing monetary policy, fiscal policy and merchandise trade. The estimators used were money supply, interest rates, commercial banks' claims on the private sector, inflation, merchandise exports, merchandise imports, government expenditure and government revenue. Total GDP can be calculated using the below formulae:

$$GDP_{Total,OIL,Non-OIL} = f(MS, I, CBC, INF, GE, GR, ME, MI) \quad 4.8$$

$$GDP_t = \alpha_0 + \alpha_1 MS_t + \alpha_2 I_t + \alpha_3 CBC_t + \alpha_4 INF_t + \alpha_5 GE_t + \alpha_6 GR_t + \alpha_7 ME_t + \alpha_8 MI_t + \varepsilon_t \quad 4.9$$

As discussed in Chapter 3, these variables are commonly used to evaluate the effectiveness of fiscal and monetary policies.

### 4.6.2 The ARDL Model as an Estimation Technique

This study employs an ARDL approach advanced by Pesaran and Pesaran (1997) and refined a few years later by Pesaran, Shin and Smith (2001) to estimate the effects of fiscal and monetary policies, along with openness to the world, on Saudi total GDP, oil GDP and non-oil GDP using annual data for the period from 1980 to 2017. The ARDL model takes into account such dynamic behaviour and uses the lagged values of both the dependent and the independent variables to account for long-term implications. Hence, the ARDL approach is the ideal modelling method to examine the relationship between the policies and GDP. Additionally, an ECM could be estimated, if the variables were found to be cointegrated, to obtain the short-term dynamics of the relationship between the variables.

### 4.6.3 Test of Stationarity

In the time series literature, various unit root tests exist. However, in the present study, Augmented Dicker Fuller (1981), Phillip-Perron (1988) and Ng and Perron (2001) tests were used to test the stationarity of the variables used in the estimation. If the variables were found to be integrated of order one or non-stationary, cointegration was recognised as the appropriate tool to analyse the relationship between the variables. However, if the variables were found to be stationary, a VAR in levels was estimated.

In this study, time series data were used to analyse GDP. Since time series data generally show trending behaviour, non-stationary data may pose a problem. Therefore, to obtain valid results, it is important to remove the trending behaviour of data. Hence, it is a pre-requisite to test time series properties and to identify whether the variables are stationary at various levels, first difference or second difference (Priyankara 2018). Different unit root tests are used to select the most appropriate econometric method for the data analysis, such as the augmented Dicky-Fuller unit root test (Dickey & Fuller 1979), the Phillips–Perron test (Phillips & Perron 1988) and the Kwiatkowski–Phillips–Schmidt–Shin test (KPSS) (Kwiatkowski, Phillips & Shin 1992), which are reviewed below.

The augmented Dickey–Fuller (ADF) test validates the null hypothesis that a unit root is present in a time series sample. The alternative hypothesis differs based on the version of the test used. The test results adjust for the impact on the distribution of the test static. However, the test should be either stationarity or trend stationarity. The Phillips–Perron

test is a unit root test used in time series analysis to test the null hypothesis where the time series is integrated of order one. This test also builds on the Dickey–Fuller test of null hypothesis where delta is the first difference operator. Finally, the KPSS test can be used in the analysis to determine whether a time series is stationary around a linear trend or is non-stationary because of a unit root. A stationary time series occurs when statistical properties, such as the mean and variance, are constant over time. The null hypothesis for the test is that the data are stationary and the alternate hypothesis for the test is that the data are not stationary.

As discussed earlier, the ARDL model requirement is that the variables under consideration are not integrated at an order higher than one, Chandran and Tang (2013) argues that the critical values tabulated in Pesaran, Shin and Smith (2001) will not be valid if the ARDL equation is included the I (2) variables. Therefore, the test is important for the accurate use of the ARDL model.

### 4.6.4 Lag Determination

Choosing an appropriate lag structure is important for specifying the best model for testing the hypotheses of the study. Anselin, Le Gallo and Jayet (2008) argue that 'economic theory rarely gives us information about the lag length, so this must be determined empirically. Several methods are available to gain information about the appropriate lag length, though they do not always give the same answer'. In their argument, Anselin, Le Gallo and Jayet (2008) stated that there is no 'right way' to identify the length of a lag and the researcher is usually forced to make a judgment after looking at the evidence from several methods.

Although several methods to obtain the optimal lag can be used, such as the final prediction error (FPE) and the Hannan–Quinn information criterion (HQ), the two most common methods are the Schwarz–Bayesian criterion (SIC) (Schwarz 1978) and the Akaike information criterion (AIC) (Akaike 1974). According to Pesaran and Shin (1998), the SIC provides slightly better estimates than the AIC in small samples in the ARDL framework. The AIC also tends to overestimate the number of lags to be included, which is not favourable for small samples as, by increasing the lag, the number of observations decreases. Information criteria are designed to measure the amount of information about the dependent variable contained in a set of regressors.

The AIC and the SIC are usually calculated in log form by the formulae:

$$AIC = In\left(\frac{\sum_{t=1}^{t}\hat{u}_t^2}{T}\right) + \frac{2K}{T} \quad 4.10$$

$$SIC = In\left(\frac{\sum_{t=1}^{t}\hat{u}_t^2}{T}\right) + \frac{K\ In\ T}{T} \quad 4.11$$

Here:

- $T$ is sample length
- $K$ is the total number of estimated coefficients
- $\hat{u}_t$ are the residuals.

The 'main ingredient' in both information criteria is the sum of the squared residuals, which needs to be as small as possible. When using the information criteria to choose the lag length, caution is required to ensure that all candidate models chosen are estimated over the exact same sample period. This requires particular caution in lag models because there will usually be more observations available for models with shorter lags and higher degrees of freedom, which, in turn, will affect the level of significance of the estimates.

### 4.6.5 ARDL Model

This section explains the ARDL model and its relative tests. When analysing possible relationships between two or more variables, the researcher often postulates specifications according to, for example, Equation 4.12, where $Y$ is the dependent variable, $X$ is a vector of independent variables and $f$ is some function:

$$Y = f(X) \quad 4.12$$

The ARDL model procedure introduced by Pesaran, Shin, and Smith (2001) tries to capture the relationship in $f(X)$, where the dependent variable is the function of its own past lagged values and the current and past values of other explanatory variables. In this section, the ARDL model will be clarified by describing the simplest version of ARDL—that is, a one variable ARDL ($q$, $p$) model—and, in the next section, the model will be applied to the variables of choice in this research.

Following the work by Pesaran and Shin (1998) and Pesaran, Shin, and Smith (2001), the ARDL (*q, p*) model of Equation 4.12 can be specified by Equation 4.13 where $y_t$ is the dependent variable and $x_t$ is the independent variable and $q$ and $p$ are the respective lags.

$$\Delta_{yt} = \beta_0 + \sum_{i=1}^{q} \delta_i \, \Delta_{yt-i} + \sum_{j=0}^{p} \varphi_j \, \Delta_{xt-j} + \gamma_1 y_{t-1} + \gamma_2 x_{t-1} + e_t \qquad 4.13$$

The coefficient $\beta_0$is a constant term and $e_t$ is the white noise error. The coefficients δi and φj for all j correspond to the short-term relationship, while $\gamma_j$ , $j$ = 1, 2 corresponds to the long-term relationship.

### 4.6.6 Test of Cointegration

Cointegration tests are considered one of the main improvements in modelling economic time series (Harris, McCabe & Leybourne 2002; Cook & Vougas 2007). The concept of cointegration was first developed by Engle and Granger (1987) and then modified by Stock and Watson (1988), Johansen (1988), Johansen and Juselius (1990) and later by Pesaran, Shin and Smith (2001). The concept of cointegration allows us to describe the existence of an equilibrium or stationary relationship among two or more time series, each of which is individually non-stationary. Banerjee, Dolado and Mestre (1998). A series is integrated if it accumulates past effects because its future path depends on previous influences and is not related to a mean to which it must return.

Various studies have employed Johansen's cointegrating technique to determine the long-term relationships between various variables of interest. In fact, this remains the technique of choice by those who argue that it is the most accurate method to apply to I(1) variables. Recently, an emerging body of work led by Pesaran and Shin (1996), Pesaran and Pesaran (1997) and Pesaran Shin, and Smith (2001) has introduced an alternative and new version of the cointegration techniques, known as the ARDL bounds test. Although it is argued that the ARDL has a number of advantages over the conventional Johansen cointegration techniques, both the Johansen cointegration test and the ARDL bounds test were conducted here to determine the number of cointegrating relations that existed among the variables and to ensure the robustness of both sets of results.

*4.6.6.1 F-Bounds Test for Co-integration*

The ARDL approach to cointegration testing requires the estimation of an error correction version of the ARDL model. The ARDL approach is based on two stages. The first is the bounds testing, as developed by Pesaran, Shin and Smith (2001), which specifies whether the variables are cointegrated or not. Bounds testing is founded in the assumption that there is no autocorrelation among the error terms. As argued by Jayaraman, Choong and Kumar (2011), given the limited availability of observations, the bounds test is the perfect method for determining long-term cointegration. Pesaran, Shin and Smith (2001) provided upper and lower critical value bounds in respect to 1%, 2.5%, 5%, and 10% levels of significance. If the computed F-statistics are greater than a value of I (1), the null hypothesis of no cointegration among the variables can be rejected; therefore, long-term cointegration among variables exists. However, if the F-statistic is smaller than I (0), the null hypothesis of no long-term relationship cannot be rejected; therefore, the model demonstrates a lack of long-term cointegration among variables. However, if the F-statistics lie between I (0) and I (1), the results are deemed inconclusive (Kyophilavong et al. 2014).

If the bounds test confirms the existence of a cointegrating relationship between the variables, it is possible to enter the second stage of the analysis, calculate the error correction term (ECT) and ultimately derive the long-term results.

Using the results from Equation 4.13, it is possible to determine whether a long-term relationship exists among the variables. To establish this, we use the null hypothesis for lower and upper bounds, as set out by Pesaran, Shin and Smith (2001) to reject or to fail to reject the null hypothesis or to be inclusive.

When the test provides inconclusive results, a possible remedy may be to examine the ECT, following work by Banerjee, Dolado and Mestre (1998) and Kremers, Ericsson and Dolado (1992). Pahlavani, Wilson and Worthington (2005) and Bahmani-Oskooee and Nasir (2004) used a negative and significant ECM term in a similar framework to motivate cointegration and long-term relationships in inconclusive cases. An equivalent test that can be performed to assess the cointegration of the variables is the t-test, which has a similar approach to the one described above—that is, the usage of a similar null

hypothesis and lower and upper bounds—and is presented by Pesaran, Shin and Smith (2001). The t-test can be used as a complementary test if the F-test is inconclusive.

*4.6.6.2 Johansen's Test for Co-integration*

In addition to the ARDL bounds testing approach for cointegration, the Johansen (1988) cointegration test was utilised to determine a linear combination of the variables and the order of cointegration. Lag lengths for Johansen's procedure were chosen using Schwarz's Bayesian (SIC) information criterion processes. Johansen (1991) defined two different test statistics for cointegration under his method: the trace test and the maximum eigenvalue test. The trace test is a joint test that validates the null hypothesis of no cointegration ($H_0: r = 0$) against the alternative hypothesis of cointegration ($H_1: r > 0$). The maximum eigenvalue test conducts tests on each eigenvalue separately. It tests the null hypothesis that the number of cointegrating vectors is equal to $r$ against the alternative of $r + 1$ cointegrating vectors (Brooks 2008).

$$\lambda_{trace}(\mathrm{r}) = -\mathrm{T} \sum_{i=r+1}^{g} In\ \left(1 - \widehat{\lambda_i}\right) \qquad 4.14$$

$$\lambda_{max}(\mathrm{r}, \mathrm{r} + 1) = -\mathrm{T}\ In\left(1 - \widehat{\lambda_i}\right) \qquad 4.15$$

Here:

- $r$= number of cointegrating vectors under the null hypothesis
- $\widehat{\lambda_i}$ = the estimated eigenvalue from the matrix

'Johansen and Juselius (1990) proposed that the trace test may lack power relative to the maximal eigenvalue test. However, the trace test is more robust to the non-normality of errors' (Cheung & Lai 1993). Therefore, the result of the eigenvalue statistic is more apt than that of the trace statistic for facilitating the choice of the order of integration.

### 4.6.7 Test of the ECM for the Bounds Testing

Short-term dynamics will be available from the error correction specification of the ARDL model. In the time series analysis, it is suggested that short-term dynamics should be added to the long-term relationship. This would only be possible with an ECM

specification for the existing models. The ECT is defined as the speed of adjustment at which the divergence, in the short term, as the result of the shocks, returns to long-term equilibrium. For the ECT to have meaning and to represent a convergence to long-term trends following the shocks, its results must first be significant; second, they must have a negative sign and, finally, they should be less than one. The negative sign points to the stationarity of the system (Muller 2004). The results are required to be less than one as the variables are interpreted in percentage form. A value greater than one would otherwise mean a speed of adjustment of over 100%, which would be statistically unrealistic. Once the ECT and the short-term dynamics of the model are determined, the long-term correlations will be observed.

Therefore, the second step in the ARDL approach is to construe the ECM term. If the F-bounds test produces satisfactory results, it is possible to determine the long-term equilibrium relationship without spurious regression, as the linear combination of the non-stationary variables will be stationary in a simple OLS framework:

$$y_t = \beta_0 + \beta_{1t} xt + \varepsilon_t \qquad 4.16$$

To capture the convergence of the model towards equilibrium, an ECT is defined by $ECM_{t-1} = y_{t-1} - \hat{\beta}_0 - \hat{\beta}_1 x_{t-1}$, where β̂s are the estimators from Equation 4.8. Note that $ECM_{t-1}$ is the residuals from Equation 4.16. Further, if the model is moving towards equilibrium in the long term, the difference between the independent and dependent variables ($ECM_{t-1}$) cannot increase, as that would impose divergence. Hence the difference must decrease. As $xt$ , $yt$ , $\beta j$ are all given from the regression in Equation 4.16, $ECM_{t-1}$ becomes a new data series. In the third and final step, the short-term dynamics are estimated using Equation 4.8 by replacing the lagged variables $yt$ , $xt$ with the ECT $ECM_{t-1}$. The equation can be specified as follows:

$$\Delta_{yt} = \beta_0 + \sum_{i=1}^{q} \delta_i \, \Delta_{yt-i} + \sum_{j=0}^{p} \varphi_j \, \Delta_{xt-j} + \lambda ECM_t - 1 + \varepsilon_t \qquad 4.17$$

The ECM coefficient $\lambda$ must be statistically significant and negative for the model to converge in equilibrium. Further, a significant ECM coefficient confirms the existence of a stable, long-term relationship and cointegration between the independent and dependent variables. The coefficient also determines the speed of adjustment to equilibrium; for instance, when there are annual data and $\lambda = -0.5$, then $y$ will, after a shock in x, return

to equilibrium in the long term at a rate of 50% per year. The ECM term is very useful for many practitioners, including policy-makers and central banks who can analyse how fast their policies affect the economy (Larsson & Haq 2016).

### 4.6.8 Post-estimation Diagnostic Tests

The validation of the finding is dependent on both the strengths and weaknesses of the model. A linear regression model is susceptible to a number of possible errors, apart from the inclusion of irrelevant variables or the omission of relevant ones, such as normality, serial correlation and heteroskedasticity, which can produce inefficient estimators. Accordingly, the Jarque–Bera test of normality, the Breusch–Godfrey serial correlation Lagrange multiplier and the Breusch-Pagan–Godfrey test for heteroskedasticity were conducted.

#### *4.6.8.1 Normality Test*

The Jarque–Bera (JB) test of normality is an asymptotic or large-sample test and it is based on the OLS residuals. This test first computes the skewness and kurtosis measures of the OLS residuals and uses the following test statistic:

$$JB = n\,[\text{skewness}2/6 + (\text{kurtosis} - 3)2/24]$$

Since the normal distribution of the value of skewness is zero and the value of the kurtosis is 3, (kurtosis − 3) represents excess kurtosis. Under the null hypothesis that the residuals are normally distributed, Jarque and Bera (1987) showed that asymptotically (i.e., in large samples), the JB statistic follows the chi-square distribution with 2 df. If the p-value of the computed chi-square statistic in an application is sufficiently low, one can reject the hypothesis that the residuals are normally distributed. However, if the p-value is reasonably high, one does not reject the normality assumption (Gujarati 1995).

#### *4.6.8.2 Serial Correlation*

The Breusch–Godfrey serial correlation Lagrange multiplier test (Godfrey 1978) checks for serial correlation when the different lags of the residuals are correlated. Serial correlation does not affect the unbiasedness of the regression estimators but rather influences their efficiency (Brooks 2019). It may, for example, affect the standard errors of the regression, invalidating the significance tests—that is, there is a possibility that

wrong inferences could be made if the independent variables are determinants of the variations in the dependent variable (Haq & Larson 2016).

*4.6.8.3 Heteroskedasticity Test*

The Breusch-Pagan–Godfrey test (Breusch-Pagan 1979; Godfrey 1978) is a test of the null hypothesis of no heteroskedasticity against heteroskedasticity. It tests whether all residuals have a constant variance. In the regular OLS estimation as well as for the ARDL model, it is assumed that the residuals have constant variance (homoscedasticity). If the model does not have constant variance (heteroskedasticity) in the residuals, the estimated coefficients will not have the minimum variance of unbiased estimators.

### 4.6.9 Stability Test

Since the ARDL model is quite sensitive to structural breaks, this study employed a time series that was sensitive to worldwide events. Hence, the stability of the coefficients needed to be analysed. To assess the stability of the long- and short-term coefficients, the cumulative sum (CUSUM) and the cumulative sum of squares (CUSUMSQ) tests proposed by Brown, Durbin and Evans (1975) can be used. If there is instability in the coefficients one may increase the sample size or introduce dummy variables (Naiya & Manap 2013; Juselius 2006; Fuinhas & Marques 2012).

*4.6.9.1 CUSUM and CUSUMSQ Tests*

CUSUM and CUSUMSQ tests were applied to check for the stability of the models. The stability of the regression coefficients was evaluated using stability tests, which can show whether or not a regression equation remains stable over time (Pahlavani, Wilson & Worthington 2005). Stability tests are appropriate for time series data, especially when there is uncertainty about when structural change might have taken place. If the plot of the results remains within the 5% critical boundaries, the null hypothesis—that is, the confirmation of the ECM stability—cannot be rejected. On the contrary, in circumstances where the plot surpasses the boundaries, the model is unstable. Thus, the CUSUM and CUSUMSQ tests were applied.

*4.6.9.2 Granger Causality Test*

The existence of a long-term relationship does not reveal the direction of causality. Therefore, when analysing the causal direction between GDP and policies, economists have developed a number of techniques for ascertaining the causal relationships between time series. Some of the most popular methods are based on the concept of Granger causality, that is, the idea that a variable $X_t$ causes another variable $Y_t$ if, by incorporating the past history of $X_t$, one can improve the prediction of $Y$ to be more accurate than a prediction based solely on the history of $Y_t$ alone. The notion of Granger causality is based on a criterion of incremental forecasting value. By testing for Granger causality, it is possible to refute claims of econometric exogeneity. Therefore, tests for Granger causality are valuable tools in the empirical analysis of economic variables. Tests for Granger causality are useful in that they offer qualitative characterisations of the relationships under study. Tests for mutual Granger causality or feedback are also important because, if $X$ Granger causes $Y$ and $Y$ Granger causes $X$, inconsistent parameter estimates will be obtained when fitting one-way distributed lag models (Schwert 1978). The Granger causality test usually analyses two variables together, testing their interactions.

Granger test of causality equation:

$$y_t = \alpha_0 + \sum_{i=1}^{T} \alpha_{1i}\, y_{t-1} + \sum_{j=1}^{T} \alpha_{2j}\, x_{t-1} + \varepsilon_t \qquad 4.18$$

Here:

- $0 \leq i, j \leq T$
- $\sum_{j=1}^{T} \alpha_{2j}\, x_{t-1} = 0$
- the null hypothesis = $H_0$.

If the hypothesis $H_0$ is rejected where $\alpha_{21} = \alpha_{22} = \ldots = \alpha_{2T} = 0$, than it can be implied that, according to Granger causality, $x_t$ causes variable $y_t$. The statement implying that $x$, according to Granger, does not cause y is gained if the current value of x better explains the current value $y$—and the past values of $x$ and $y$—than the past values of $y$ alone. The Granger causality test explains which variable is dependent and which is independent in the equation.

### 4.6.10 Robustness Check

To check the robustness of the estimates, this analysis employed the fully modified OLS estimator (FMOLS) developed by Phillips and Hansen (1990), the canonical correlation regression estimator (CCR) by Park (1992) and the dynamic OLS estimator (DOLS) developed by Stock and Watson (1993). This enabled the testing of the sensitivity of the long-term parameters gained from the ARDL model to strengthen the study's results. In similar situations, scholars have considered using FMOLS, CCR and DOLS as a robustness checks for the ARDL model (Priyankara 2018; Chandran & Tang 2013; Aliyev & Mikayilov 2016; Narayan 2005; Shahzad et al. 2014; Tursoy & Faisal 2018; Ahmed, Muzib & Roy 2013) to reaffirm the results obtained from it and make it more reliable. Therefore, this study performed the following three tests to check for robustness and to ensure the results obtained through the study confirmed the ADRL model.

*4.6.10.1 Fully Modified Ordinary Least Square (FMOLS) Estimator*

The FMOLS uses a semi-parametric approach to estimate the long-term parameters (Fereidouni, Al-Mulali & Mohammed 2014). The FMOLS technique allows studies to overcome the problems of endogeneity, serial correlation, omitted variable bias, measurement errors and heterogeneity in long-term parameters (Fereidouni, Al-Mulali & Mohammed 2014). This technique has the ability to estimate a single, cointegrating relationship, which is indicated by the presence of a combination of I (1) variables (Bashier & Siam 2014). According to Amarawickrama and Hunt (2007), the FMOLS method successfully corrects the inference problems in traditional cointegration techniques and, as a result, t-statistics for the long-term estimates are valid.

According to Adom et al. (2015), the FMOLS estimator can be calculated through the below equation. They state that the method is asymptotically unbiased and rich with fully efficient mixture-normal asymptotic distribution, which allows for the conducting of a standard Wald test using asymptotic chi-square statistical inference.

$$\hat{O}_{FME} = \left(\sum_{T-1}^{T} Z_t \, Z_t'\right)^{-1}\left(\sum_{T-1}^{T} Z_t \, Y_t' - T\left[{}^{y+}_{O}12'\right]\right) \qquad 4.19$$

Here, $Y_t' = y_t - \hat{\lambda_{\text{ox}}} \, \hat{\lambda_{\text{xx}}^{-1}} \, \Delta \, \chi_t$ is the correction term for endogeneity and $\hat{\lambda_{\text{ox}}} \, \hat{\lambda_{\text{xx}}^{-1}}$ are the kernel estimates of the long-term covariance; $\hat{j_{=}} \, \hat{\Delta_{\text{ox}}} - \hat{\Delta_{\text{ox}}} \, \hat{\Delta^{-1}} \, \Delta_{xx}$ is the correction

term for serial correlation and $\hat{\Delta}_{ox}$ and $\hat{\Delta}_{xx}$ are the kernel estimates of the one-sided, long-term covariances

*4.6.10.2 Canonical Correlation Regression (CCR) Estimator*

This method can likewise be used to test the cointegrating vectors in the ARDL model, which provides similar applications to those in FMOLS. However, the CCR considers data transformations only, whereas FMOLS focuses on the transformation of both data and parameters (Adom et al. 2015; Park 1992). The CCR estimator can be obtained through the below equation, which is a single regression, but can also apply to multivariate regression without modification or the loss of efficiency (Park 1992).

$$\hat{O}_{CCR} = (\sum_{t-1}^{T} Z_t^* \, Z_t^{*1})^{-1} \sum_{t-1}^{T} Z_t^* \, Y_t^* \qquad 4.20$$

Here, $Y_t^* = (X_t^{*1}, D_t), X_t^* = X_t - \left(\sum \hat{}^{-1} \, \hat{\wedge_2}\right)\hat{v_t}$ and $Y_t^* \, - \hat{\sum}^{-1} \, \hat{\wedge_2} \, \hat{\beta} \, [\, \eta \, \hat{}_{22}^{-1} \omega \hat{}_{21} \,]' \hat{v_t}$ denotes the transformed data; $\hat{\beta}$ is an estimate of the cointegrating equation coefficients; $\hat{\wedge_2}$ is the second column of $\hat{\wedge}$ and $\hat{\sum}$ denotes the estimated contemporaneous covariance matrix of the residual.

*4.6.10.3 Dynamic Ordinary Least Squares (DOLS) Estimator*

This method estimates the long-term relationship via a parametric approach. Variables under this model are integrated in a different order but are still cointegrated (Masih & Masih 1996). Further, the model simultaneously incorporates bias and small sample bias by including leads and lags (Kurozumi & Hayakawa 2009) to obtain unbiased and asymptotically efficient estimators using least-squares estimates. In addition, the parameters adjust for possible autocorrelation and residual non-normality (Herzer, Nowak-Lehmann & Siliverstovs 2006). The equation below can be used to calculate the DOLS estimator:

$$y_t = a + bX_t + \sum_{i=-k}^{i=k} \emptyset_i \; \Delta X_{t+i+\epsilon_t} \qquad 4.21$$

Here, $b$ is the long-run elasticity and $\emptyset_i$ are the coefficients of leads and lags in the differences of I (1) regressors.

## 4.7 Data Collection and Sources

Annual data on total GDP, oil GDP and non-oil GDP, real government expenditure (GE), real government revenues (GR), real money supply (M2), interest rates deposit (I), real commercial banks' claims on the private sector (CBC), inflation (annual changes in CPI 2007 = 100) (INF), real merchandise exports (ME) and real merchandise imports (MI) for the period spanning 1980 to 2017 were used for the estimation. The data were obtained from the SAMA and the GASTAT. All variables are presented in logarithmic form, excluding the interest rate, to smooth the variability in the series and to facilitate the interpretation of results. The units of measure for all variables are Saudi riyals, which have been transformed to real terms using the 2007 CPI.

## 4.8 Variable Measurements

This subsection focuses on the measurements of variables, namely all dependent and independent variables. Table 4.3, at the end of this section, provides an overview of the variables, sources and measurements.

### 4.8.1 Real Total, Oil and Non-Oil GDP

GDP is an inflation-adjusted indicator that reflects the value of all goods and services at the constant prices that an economy produces in a particular period (Brezina 2011). Gordon (2014) suggested a new method of estimating real GDP growth; the traditional growth accounting method uses an estimate of future total factor productivity growth and adds an estimate of future capital deepening. Gordon's method skips the step requiring a 'guestimate' of the health of future investment spending.

### 4.8.2 Real Government Expenditure (GE)

GE is a variable that includes all government consumption, transfer payments and investment. The financing of these expenditures occurs through government borrowing or taxes. Any changes in GE form an important component of fiscal policy, which is used to stabilise the macroeconomic business cycle. Real GE is classified into two types: government final consumption expenditure to directly satisfy the personal or collective needs of a population and government investment in the form of the acquisition of goods and services intended to create future benefits. Danladi et al. (2015) argued in their article

about the effects of this variable on the Nigerian economy that the structure and the size of real GE determine the growth patterns of an economy.

### 4.8.3 Real Money Supply (MS)

Money supply is a variable that indicates the entire stock of currency and other liquid instruments that circulate in a country's economy at a given time (Labonte & Makinen 2006). Money supply is also referred to as real broad money supply because it includes not only cash and checking deposits, but also saving deposits, money market securities, mutual funds and other time deposits. From the policy-makers' point of view, money supply is important because, through its analysis, they are able to develop monetary policies by controlling interest rates and increasing or decreasing the amount of money in the economy. Evidence from studies such as that by Owoye and Onafowora (2007) indicates that real money supply may have an impact on real GDP, for example, when a central bank is not strongly committed to its annual money growth targets, this affects both the GDP and the inflation rate in an adverse manner.

Often, the definition of monetary policy focuses on the liabilities of the central bank as a main regulator of the money stock growth. This focus on the money stock is important because in an economy with fiat money it provides a certain nominal anchor for the system. In their article, Toida and Gavin (1983) investigated the issue of picking an intermediate target for monetary policy, where each of the major monetary aggregates rejects each measure of the monetary base, although no monetary base measure rejects any given measure of the money supply. From this study, it is evident that narrow measures of money supply are most closely related to economic activity. Further, the study used a component of money supply as a proxy for monetary policy actions, which was defined as consisting of notes and coins in circulation, plus demand deposits, saving deposits and fewer-than-30-days deposits.

### 4.8.4 Real Merchandise Exports (ME)

Real MEs were used as a proxy to external sector performance. Real export was incorporated in the model on the grounds that if missing exogenous variables are closely correlated with the variables representing monetary and fiscal actions, their omission may lead to a serious statistical problem (Taylor, Cuthbertson and Hall 1992). One can a priori expect that fiscal and monetary actions will affect the foreign trade sector leading to a

high degree of correlation between the two. As a result, it was imperative to include a variable representing these external influences when analysing the comparative effectiveness of monetary and fiscal actions on economic growth in Saudi Arabia.

### 4.8.5 Real Merchandise Imports (MI)

Since this study focuses on real MEs, the model also requires information about imports, as they likewise depend on the variable of openness to the world. The MI variable shows the performance of the external sector from the perspective of goods and services coming into the country. It may also have an effect on the way policy-makers develop monetary and fiscal instruments.

### 4.8.6 Real Government Revenues (GR)

The concept of real GR explains the amount of money received by a government from one source, such as taxation, non-tax revenues and capital receipts (Narayan & Narayan 2006). Real GRs are used to benefit the country for purposes such as roads, homes, schools and the development of the country in general. Real GRs are one component of the general balance of the country, with government spending being another. The relationship between these two components in balance has a crucial influence on a country's ability to spend money and boost its economy. As Narayan and Narayan (2006) indicate in their article, if government revenue causes government spending and, eventually, causes budget deficits, then the latter could be eliminated by enacting policies aimed at the stimulation of GRs.

### 4.8.7 Interest Rate (I)

Among other monetary policy instruments, interest rates are used most frequently by central banks. SAMA, the Saudi central bank, is solely responsible for monetary policy development and implementation. A change in interest rate levels, via the application of a 12-month rate, is one way to influence the course of economic development through money supply. SAMA has diverse monetary tools to achieve intermediate and long-term goals, but there are limitations on interest rate adjustments. SAMA closely monitors dollar interest rates with a small premium. The popularity of interest rates as a tool is rooted in their simplicity and universality. Woodford (2011) explains that interest rates are set by the central bank to influence other monetary variables in the economy, such as

consumer prices and credit expansion. Since the interest rate is the price at which private agents—mostly private banks—obtain money from the central bank, private banks then offer their financial products at interest rates based on those established by monetary policy decisions. To this, Hamilton and Wu (2012) added that 'the key instrument of monetary policy is the interest rate on overnight loans between banks' (p. 3). Other common interest rates include the discount rate and the rate at which different maturities are repurchased. By operating interest rates, policy-makers perform contractive and expansive monetary policy, depending on their current aims.

Interest rates, as the most widely used macro-variable, are inseparably linked with monetary policy. In fact, evidence demonstrates that the term structure of interest rates plays a crucial role in monetary policy decisions. For example, Kung (2015) concluded that interest rates are pivotal in reconciling empirical growth and inflation forecasts with the slope of the yield curve and highlighted the importance of the growth channel in explaining the term structure of interest rates. Policy-makers use interest rates as a lever to stimulate economic activity; a rise in interest rates is commonly used to curb inflation or currency depreciation, while a decrease in interest rates seeks to boost economic activity, foster credit expansion and enable currency depreciation. All these monetary policy efforts are aimed to stimulate economic activity and develop competitiveness; in combination with fiscal policy instruments, they facilitate a government's ability to control its expenditures and revenues.

### 4.8.8 Real Commercial Banks' Claims on the Private Sector (CBC)

Commercial banks' claims on the private sector are also a significant variable in this study. The use of such claims can help with the design and implementation of monetary policies because banks can use the evaluation of clients to decide which individuals can obtain loans (Suhartono, Mongid & Notodihardjo 2010). Moreover, the influence of commercial banks on the private sector has become significant and increased by 1.4%, or SAR 19.9 billion, from the second quarter of 2017 to the same quarter of 2018 (Research and International Affairs Deputyship 2018). These developments suggest that paying attention to bank claims should be a feature of the model.

### 4.8.9 Inflation (INF)

The CPI is a macroeconomic indicator used to measure changes in the cost of living and in the value of money. According to McTaggart, Findlay and Parkin (2012), the CPI measures the change in the price of the market basket—that is, how many goods and services can be purchased by households. This indicator can also be used to determine the inflation rate in a particular economy by defining changes in the price of the basket of goods and services typically purchased by households. An extensive body of research has been carried out to address the ways in which different countries adjust their inflation rates using specific monetary policy regimes.

Table 4.3 overleaf provides an overview of the variables, sources and measurements.

**Table 4.3: An Overview of the Variables, Sources and Measurements**

| | | Variable Name | Source | Measurement |
|---|---|---|---|---|
| **1** | Saudi Arabian GDP | Real total GDP | GASTAT | Value of the real GDP for all institutional sectors (oil/non-oil/private/government) |
| | | Real oil GDP | GASTAT | Value of the real GDP in the oil sector |
| | | Real non-oil GDP | GASTAT | Value of the real GDP in the non-oil sector (including both the private and the government sectors) |
| **2** | Fiscal policy | Real government expenditure | SAMA | Total amount of real government current expenditures (including compensation of employees and expenditure on national defence and security) |
| | | Real government revenue | SAMA | Total amount of real government revenue (including taxes, custom duties, revenue from state-owned enterprises and capital revenues) |
| **3** | Monetary policy | Real money supply | SAMA | The entire stock of currency and other liquid instruments circulating in a country's economy as of a particular time (including cash, coins and balances held in checking and savings accounts as well as other near-money substitutes) |
| | | Interest rate | SAMA | Interest rate on Saudi real deposits for 12 months |
| | | Real Commercial banks' claims on the private sector | SAMA | Financial resources provided to the private sector by other depository corporations (except for central banks, including loans, purchases of no-equity securities and trade credits and other accounts receivable that establish a claim for repayment) |
| | | Inflation | SAMA | The annual changes in the CPI |

| | | Variable Name | Source | Measurement |
|---|---|---|---|---|
| **4** | Merchandise trade | Real merchandise exports | GASTAT | Total real number of commodities produced or manufactured locally or modified by an industrial process that are intended for export |
| | | Real merchandise imports | GASTAT | Total real number of commodities and goods imported to the country |

## 4.9 Summary

This chapter has provided an overview of the conceptual framework used in this study and the methods facilitating this research effort. The chapter then explained the hypotheses and theoretical framework used in the study and delivered a review of research methods in prior studies, followed by a discussion of the implemented model, the data and the sources. These subsections included a discussion of the estimation technique, encompassing tests of stationarity, cointegration and stability based on the ARDL model, which is considered the most suitable for the testing of long-/short-term relationships. The major economic variables used in the study were then discussed.

The next chapter offers a discussion of the results of the data analysis. The chapter opens with the descriptive statistics followed by the unit root tests, a determination of the lag order and the empirical ARDL approach summary. In addition, Chapter 5 outlines the residual diagnostic tests, summarises the Granger causality test results and offers an overview of the estimation results along with the robustness checks. The final sections of the Chapter 5 are devoted to a discussion of the results for merchandise trade, fiscal policy and monetary policy.

# Chapter 5: Results and Discussion

## 5.1 Introduction

The main aim of this research is to investigate the effectiveness of monetary and fiscal policy on Saudi GDP. This chapter reports and discusses the results of the data analysis. Section 5.2 provides the descriptive statistics, while Section 5.3 describes the appropriate pre-estimation tests that were used to ensure that the results were not spurious: ADF tests, a Phillips–Perron test and Kwiatkowski–Phillips–Schmidt–Shin tests were conducted to test stationarity within the time series. Section 5.4 outlines the determination of the lag order, for which the Schwarz–Bayesian information criterion was employed. Section 5.5 summarises the empirical ARDL approach, including the ARDL bounds tests for long-term relationships, the empirical results based on the ARDL technique, the results of the estimated ARDL models, the results of the long-term relationships and the short-term ECMs. Section 5.6 offers insight into the residual diagnostic tests, such as the normality test, the serial correlation test, the heteroskedasticity test and the stability diagnostic tests using the corresponding CUSUM and CUSUMSQ. Section 5.7 details the Granger causality test to assess the relationship between the independent and dependent variables, while Section 5.8 provides an overview of the estimation results. Section 5.9 discusses the robustness checks: the range of methods employed for this include the FMOLS method, CCR and the DOLS method. Section 5.10 contains the discussion of the results for fiscal policy, merchandise trade and monetary policy. Section 5.11 concludes with a summary of the chapter.

## 5.2 Descriptive Statistics

A description of the variables in the study is presented in Table 5.1 with the main descriptive statistics for the study period 1980 to 2017. The null hypothesis of the test is that the variables are normally distributed. As can be seen in all the cases, the null hypothesis is not rejected, and it should be concluded that the examined data are normally distributed. In addition, the historical developments are illustrated in Figure 5.1. As can be seen, GDP underwent an upward trend over the examined

period, with a sharp decline during the GFC. However, an economic slowdown was not observed when non-oil GDP was considered.

**Table 5.1: Descriptive Statistics of the Variables in the Study**

Sample: 1980–2017 (n = 37)

| | TOTAL GDP | OIL GDP | NON-OIL GDP | I | MS | GE | GR | CBC | INF | MI | ME |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Mean | 13.65005 | 12.65511 | 13.13883 | 5.403238 | 12.70037 | 12.66655 | 12.58492 | 12.27314 | 0.011081 | 12.08358 | 12.69907 |
| Median | 13.41025 | 12.52771 | 12.95297 | 5.284161 | 12.45647 | 12.50578 | 12.42118 | 12.05627 | 0.010000 | 11.78658 | 12.56814 |
| Maximum | 14.62867 | 13.93308 | 14.10338 | 14.15583 | 13.98896 | 13.65672 | 13.85251 | 13.84711 | 0.060000 | 13.12455 | 13.98952 |
| Minimum | 12.81714 | 11.32840 | 12.45547 | 0.969175 | 11.60940 | 11.96558 | 11.37979 | 10.81611 | −0.030000 | 11.30210 | 11.35571 |
| Std. Dev. | 0.608547 | 0.768108 | 0.550084 | 3.439004 | 0.801865 | 0.512330 | 0.718520 | 1.038911 | 0.023545 | 0.609985 | 0.801373 |
| Skewness | 0.336421 | 0.098620 | 0.527864 | 0.514704 | 0.391874 | 0.554367 | 0.298965 | 0.229691 | 0.179572 | 0.543918 | 0.149528 |
| Kurtosis | 1.618062 | 1.943749 | 1.817149 | 2.600163 | 1.667200 | 1.956840 | 1.882672 | 1.555659 | 2.168325 | 1.718823 | 1.762809 |

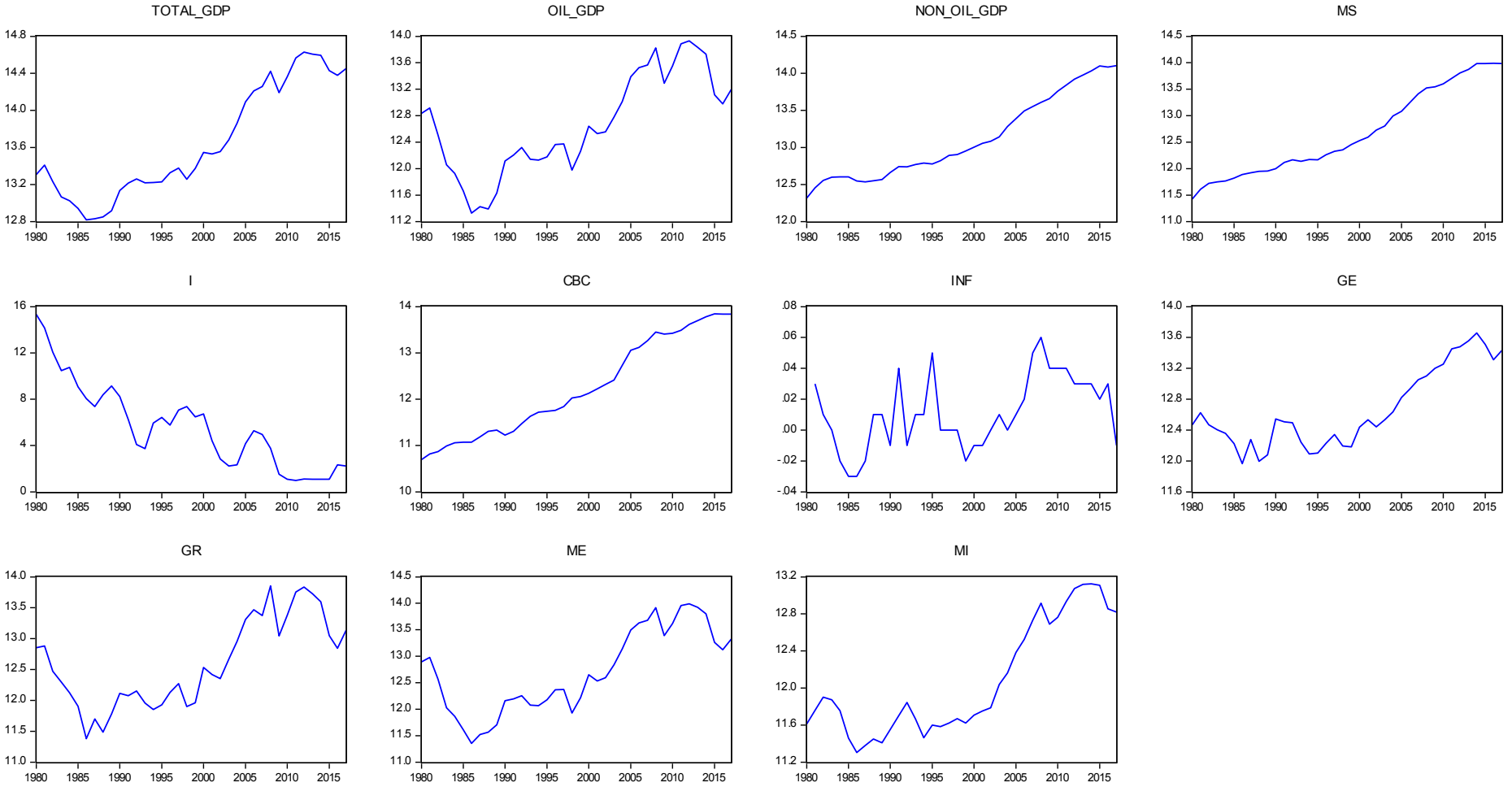
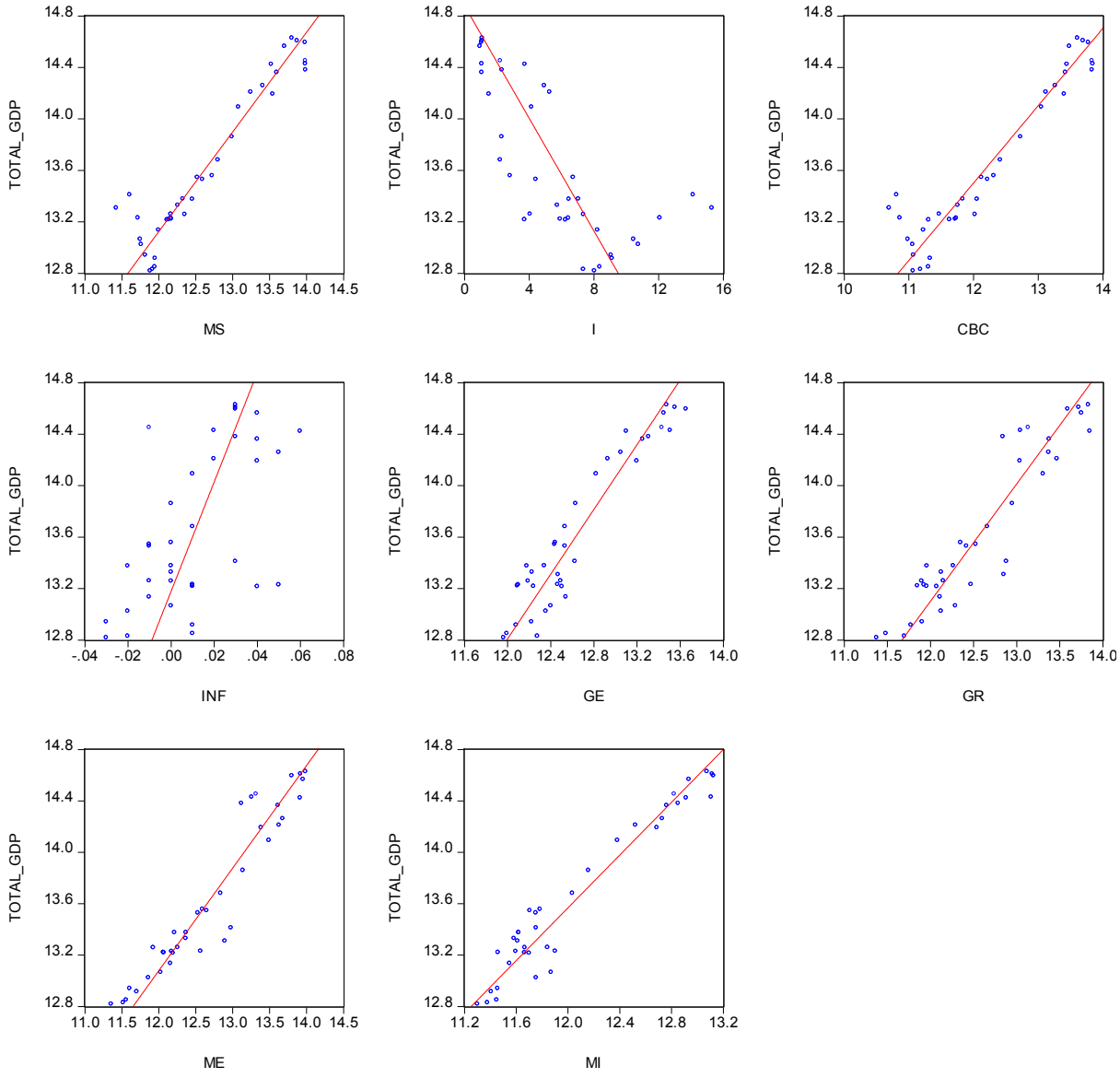


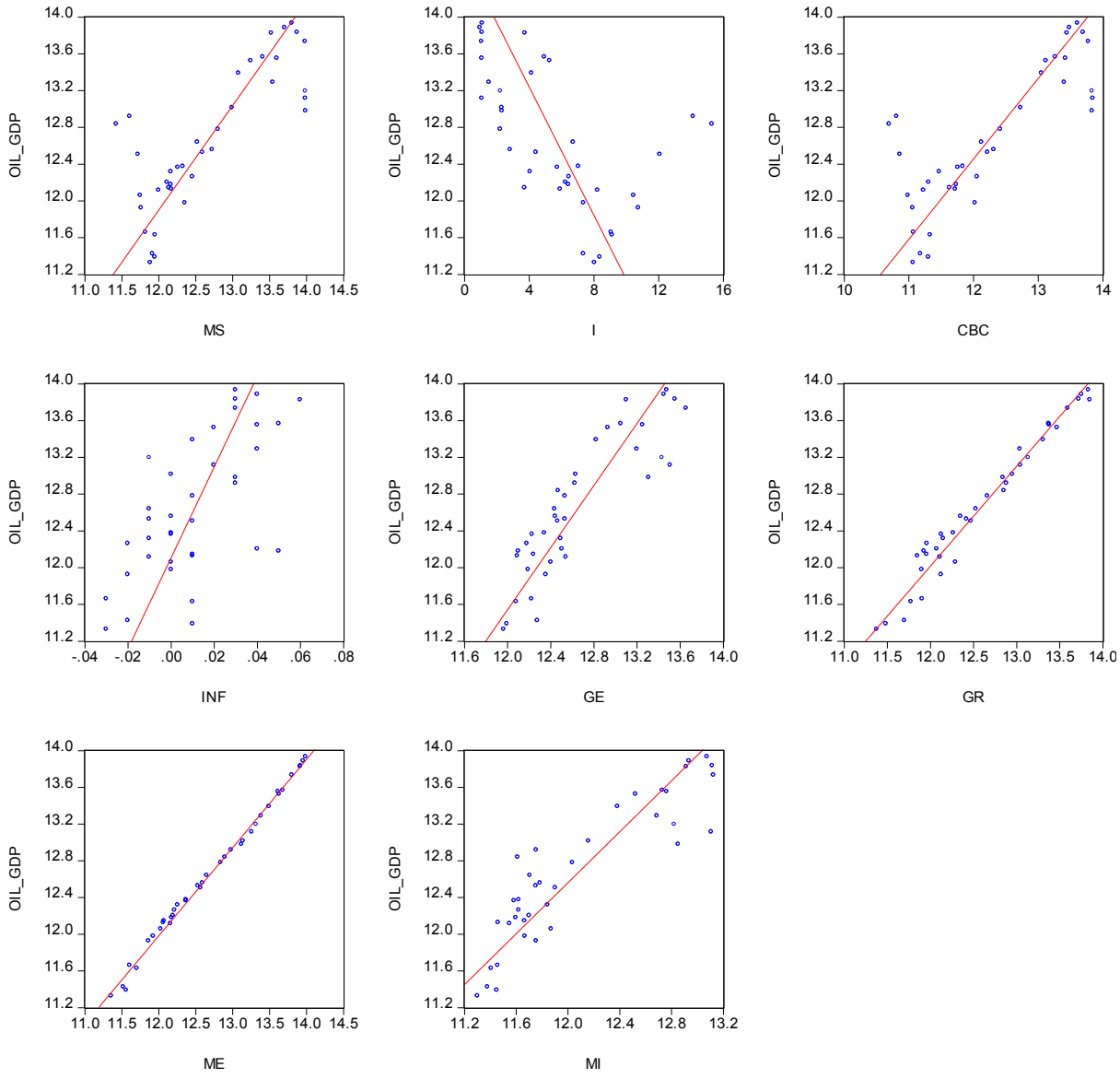

**Figure 5.1: Historical Trends of the Variable**

Figures 5.2 to 5.4 show the scatter plots, along with the regression lines of the independent variables against GDP, non-oil GDP and oil GDP. As can be seen, in all cases, GDP is significantly correlated with all the included independent variables. With the exception of interest rates, all of the relationships are positive.



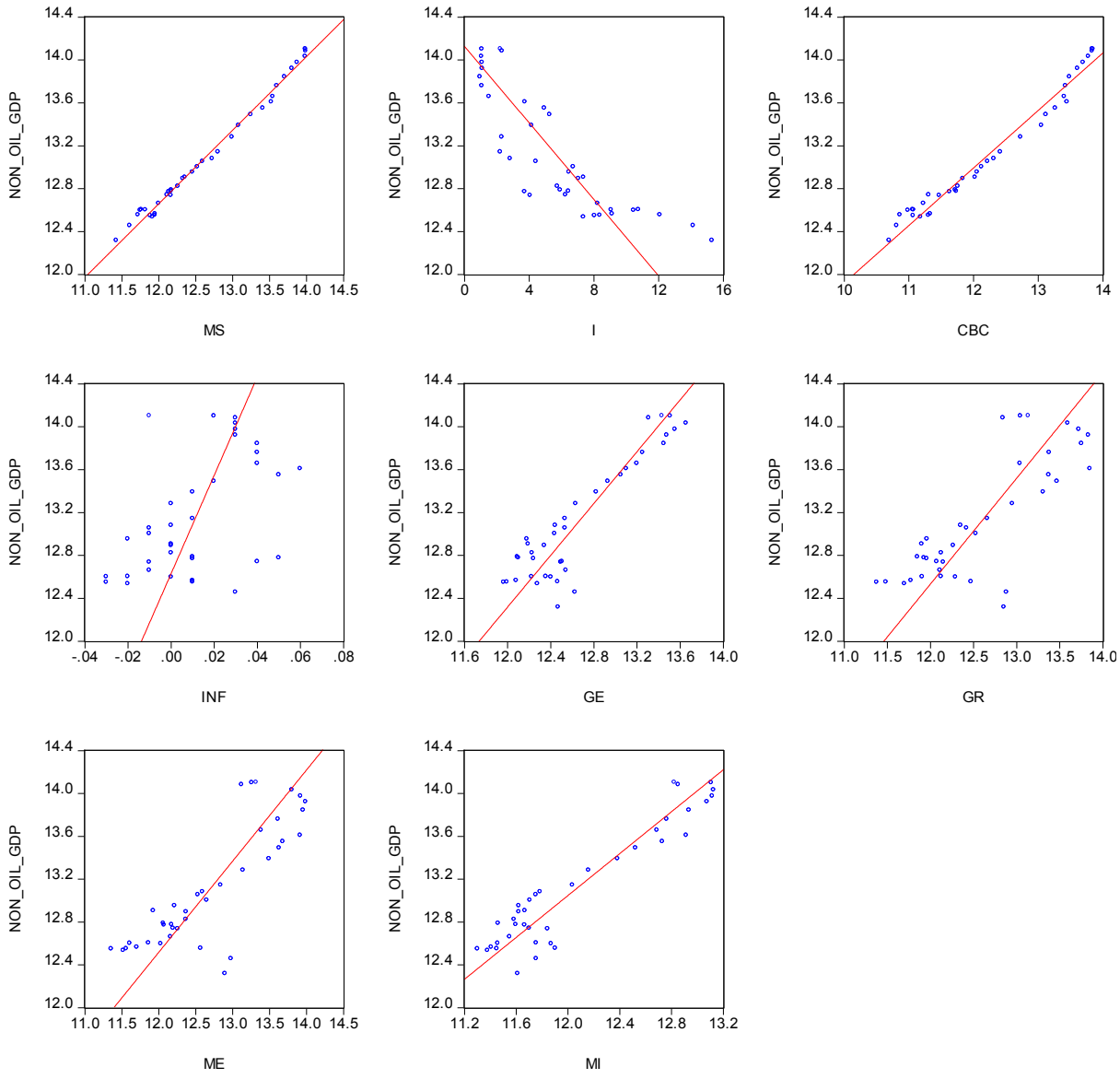

**Note:** All independent variables except interest rates are in log form on the horizontal axis while the dependent variable is on the vertical axis.

**Figure 5.2: Variable Relationships Against GDP**




**Note:** All independent variables except interest rates are in log form on the horizontal axis while the dependent variable is on the vertical axis.

**Figure 5.3: Variable Relationships Against Oil GDP**




**Note:** All independent variables except interest rates are in log form on the horizontal axis while the dependent variable is on the vertical axis.

**Figure 5.4: Variable Relationships Against Non-Oil GDP**

## 5.3 Unit Root Tests

In order to conduct the ARDL approach, unit root tests were undertaken to ensure that none of the variables are integrated to the order of two, that is, I (2). In the case of I (2) variables, ARDL procedures will be erroneous. If a variable is found to be I (2), then the F-statistics

value, as produced by Pesaran, Shin and Smith (2001) and Narayan (2005), can no longer be valid.

Therefore, to ensure that all the variables satisfy the underlying assumption of the ARDL methodology before proceeding to the estimation stage, the empirical analysis begins with the tests of stationarity by employing ADF tests, a Phillips–Perron test and Kwiatkowski–Phillips–Schmidt–Shin tests to check for stationarity. The general testing procedure for the test is as follows:

$$\Delta y_t = \alpha + \beta t + \gamma y_{t-1} + \delta_1 \Delta y_{t-1} + \cdots + \delta_{p-1} \Delta y_{t-p+1} + \varepsilon_t \qquad 5.1$$

Here, $\alpha$ and $\beta$ are correspondingly drift and trend terms and $\varepsilon_t$ is the error term.

Under the null hypothesis, $\gamma = 0$ against the alternative hypothesis of $\gamma < 0$. The ADF test adds lags of $\Delta$ y_t to the regression to capture serial correlation. The Phillips–Perron test estimates the regression model without the lags but adjusts the test statistics for serial correlation. The test results are summarised in Tables 5.2 to 5.4. The null hypotheses in the ADF and the PP tests are that the data have a unit root, whereas in the KPSS test under the null hypothesis, the time series data are stationary. The conclusion of the tests is that all the variables follow I (1) process, meaning that they are stationary only in the first differences, with a non-conclusive result for the interest rate. The current thesis will follow the view of Cerrato, Kim and MacDonald (2013), who suggested that, although interest rates in some countries are not stationary, they can be considered I (1) processes.

These results concur with the findings of Nelson and Plosser (1982) that most macroeconomic variables are non-stationary at the variable level, although the first differences are stationary. This implies that the variables are integrated at order I (1), which satisfies the underlying assumptions of the ARDL model, enabling the estimation of long-term relationships.

**Table 5.2: ADF Test Results**

| | ADF Test | | | | |
|---|---|---|---|---|---|
| | Levels | | First Difference | | |
| **Variables** | **Drift** | **Drift and Trend** | **Drift** | **Drift and Trend** | **Order of Integration** |
| log(Total GDP) | 0.0688 | −2.5302 | −4.5684*** | −4.7324*** | I(1) |
| log(Oil GDP) | −0.9554 | −2.5902 | −4.6512*** | −4.6725*** | I(1) |
| log(Non-Oil GDP) | 0.8019 | −2.3225 | −3.5811** | −3.8908** | I(1) |
| log(I) | −2.5078 | −4.3768*** | −4.6081*** | −4.6543*** | I(1) |
| log(ms) | 0.4222 | −1.9569 | −4.0727*** | −4.1343** | I(1) |
| log(ge) | −0.3974 | −2.1310 | −6.0025*** | −6.2067*** | I(1) |
| log(gr) | −1.2215 | −2.7109 | −6.1823*** | −6.2028*** | I(1) |
| inflation | −1.9635 | −3.6463 | −8.4180*** | −8.2474*** | I(1) |
| log(cbc) | −0.1793 | −2.2842 | −4.0486*** | −3.9912** | I(1) |
| log(mi) | −0.3427 | −1.6213 | −4.1544*** | −4.1653*** | I(1) |
| log(me) | −0.8787 | −2.6609 | −4.5714*** | −4.6168*** | I(1) |

**Note:** The ADF test was performed using Schwarz information criterion and the automatic lag selection set as from nine lags.
*, ** and *** indicate significance at 1%, 5% and 10% levels respectively. The null hypothesis is the existence of a unit root.

**Table 5.3: Phillips–Perron Test Results**

| | Phillips–Perron Test | | | | |
|---|---|---|---|---|---|
| | Levels | | First Difference | | |
| **Variables** | **Drift** | **Drift and Trend** | **Drift** | **Drift and Trend** | **Order of Integration** |
| log(Total GDP) | −0.1634 | −2.5378 | −4.5876*** | −4.7632*** | I(1) |
| log(Oil GDP) | −1.1742 | −2.6411 | −4.6347*** | −4.6679*** | I(1) |
| log(Non-Oil GDP) | 0.5955 | −1.2200 | −3.6583*** | −3.8972** | I(1) |
| I | −3.0072** | −2.7389 | −3.7351*** | −3.8123** | I(0) |
| log(ms) | 0.0337 | −1.3559 | −4.1025*** | −4.1131*** | I(1) |
| log(ge) | −0.3914 | −2.1182 | −6.0026*** | −6.2311*** | I(1) |
| log(gr) | −1.2055 | −2.7109 | −6.1823*** | −6.2022*** | I(1) |
| inflation | −3.0460** | −3.6753** | −8.4293*** | −8.2591*** | I(1) |
| log(cbc) | −0.0222 | −1.5692 | −3.9309*** | −3.8603** | I(1) |
| log(mi) | −0.5042 | −1.6213 | −4.1769*** | −4.1286** | I(1) |
| log(me) | −1.0970 | −2.6958 | −4.5470*** | −4.6068*** | I(1) |

**Note:** The PP tests were performed with Bartlett Kernel and Newey–West Bandwidth.
*, ** and *** indicate significance at 1%, 5% and 10% levels respectively. The null hypothesis is the existence of a unit root.

**Table 5.4: Kwiatkowski–Phillips–Schmidt–Shin Test Results**

| | Kwiatkowski–Phillips–Schmidt–Shin Test | | | | |
|---|---|---|---|---|---|
| | Levels | | First Difference | | |
| **Variables** | **Drift** | **Drift and Trend** | **Drift** | **Drift and Trend** | **Order of Integration** |
| log(Total GDP) | 0.6428** | 0.1594** | 0.2256* | 0.1362 | I(1) |
| log(Oil GDP) | 0.5322** | 0.1177 | 0.1788 | 0.1356* | I(1) |
| log(Non-Oil GDP) | 0.7133** | 0.1816** | 0.2030 | 0.0926 | I(1) |
| I | 0.7014** | 0.1174** | 0.2856 | 0.1278* | I(1) |
| log(ms) | 0.7219** | 0.1651** | 0.1542 | 0.1266* | I(1) |
| log(ge) | 0.5661** | 0.1957** | 0.1957 | 0.0794 | I(1) |
| log(gr) | 0.4981* | 0.1415* | 0.1845 | 0.1107 | I(1) |
| Inflation | 0.3651* | 0.0649 | 0.1017 | 0.1017 | I(1) |
| log(cbc) | 0.7279** | 0.1545** | 0.1666 | 0.1491** | I(1) |
| log(mi) | 0.5939** | 0.1791** | 0.1544 | 0.1379* | I(1) |
| log(me) | 0.5377** | 0.1261* | 0.1968 | 0.1414* | I(1) |

**Note:** PP and KPSS tests were performed with Bartlett Kernel and Newey–West Bandwidth.
*, ** and *** indicate significance at 1%, 5% and 10% levels respectively. Under the KPSS, the null data are stationary.

## 5.4 Determination of the Lag Order

The ARDL model allows each variable to have its own optimal lag length structure. There are several approaches to guide the determination of the appropriate number of lags to be included in the model. Pesaran and Sheen (1998) recommended a maximum lag of two for the annual data, whereas Sharp (2010) argues that the choice of lag length can be justified on a theoretical basis and should be left to the analyst in the case of cointegrated variables.

The order of the distributed lag on the dependent variable and the regressors can be selected using either the AIC or the Schwarz Information Criterion (SIC). However, based on Monte Carlo simulation results, Pesaran and Smith (1998) found that SIC is preferable to AIC, as it is a parsimonious model that selects the smallest possible lag length, while AIC selects the maximum relevant lag length (Muruko 2013). Selection of the lag order for the independent variables in this study was based on the SIC lag selection method. A VAR lag order selection criterion was applied for the three equations and for each of the dependent variables used in the analysis. These two different methods were used to ensure the robustness of the results. It is important to proceed with a low lag number (such as one), as a higher lag order in ARDL decreases the degrees of freedom, which, in turn, restricts the precision of the results. Given the small sample size and the results of the tests, this thesis used a lag length of one for the dependent variables and of two for the independent variables. The results are summarised in Tables 5.5 and 5.6.

**Table 5.5: Lag Selection Criteria**

| | Lag | LogL | LR | FPE | AIC | SC | HQ |
|---|---|---|---|---|---|---|---|
| Total GDP | 0 | −33.12131 | NA | 0.389756 | 1.895628 | 1.939615 | 1.910981 |
| | 1 | 26.05683 | 111.7809* | 0.015387 | −1.336491 | −1.248517* | −1.305786* |
| | 2 | 27.16636 | 2.034145 | 0.015298* | −1.342576* | −1.210616 | −1.296518 |
| Oil GDP | 0 | −41.52408 | NA | 0.621628 | 2.362449 | 2.406435 | 2.377801 |
| | 1 | −3.46972 | 71.88045* | 0.079350 | 0.303873 | 0.391847* | 0.334578* |
| | 2 | −2.309058 | 2.127882 | 0.078666* | 0.294948* | 0.426908 | 0.341005 |
| Non-oil GDP | 0 | −28.75406 | NA | 0.305789 | 1.653003 | 1.696990 | 1.668356 |
| | 1 | 64.79355 | 176.7010 | 0.001789 | −3.48853 | −3.400557 | −3.457825 |
| | 2 | 70.15288 | 9.825448* | 0.001404* | −3.730716* | −3.598756* | −3.684658* |
| Money supply | 0 | −42.15514 | NA | 0.643808 | 2.397508 | 2.441495 | 2.412860 |
| | 1 | 56.11736 | 185.6258 | 0.002896 | −3.00652 | −2.918547 | −2.975815 |
| | 2 | 59.06914 | 5.411596* | 0.002599* | −3.114952* | −2.982992* | −3.068894* |
| Interest rate | 0 | −91.86770 | NA | 10.19048 | 5.159316 | 5.203303 | 5.174669 |
| | 1 | −52.95242 | 73.50662 | 1.240048 | 3.052912 | 3.140886 | 3.083618 |
| | 2 | −50.47253 | 4.546465* | 1.142486* | 2.970696* | 3.102656* | 3.016754* |
| Commercial banks' claims on the private sector | 0 | −51.41576 | NA | 1.076941 | 2.911987 | 2.955974 | 2.927339 |
| | 1 | 38.13040 | 169.1428 | 0.007868 | −2.007245 | −1.919271 | −1.97654 |
| | 2 | 40.25836 | 3.901257* | 0.007392* | −2.069909* | −1.937949* | −2.023851* |
| Inflation | 0 | 81.37990 | NA | 0.000593 | −4.593137 | −4.548699 | −4.577797 |
| | 1 | 88.94754 | 14.27041* | 0.000407 | −4.968431 | −4.879554* | −4.937751* |
| | 2 | 90.00956 | 1.941966 | 0.000406* | −4.971975* | −4.838659 | −4.925954 |

| | Lag | LogL | LR | FPE | AIC | SC | HQ |
|---|---|---|---|---|---|---|---|
| Merchandise exports | 0 | −43.04701 | NA | 0.676511 | 2.447056 | 2.491043 | 2.462409 |
| | 1 | −3.498088 | 74.70353* | 0.079475 | 0.305449 | 0.393423* | 0.336154 |
| | 2 | −2.184119 | 2.408942 | 0.078122* | 0.288007* | 0.419967 | 0.334064* |
| Merchandise imports | 0 | −33.13808 | NA | 0.390119 | 1.896560 | 1.940547 | 1.911913 |
| | 1 | 19.88096 | 100.1471 | 0.021685 | −0.993387 | −0.905413 | −0.962682 |
| | 2 | 22.23153 | 4.309383* | 0.020123* | −1.068419* | −0.936459* | −1.022361* |
| Government expenditure | 0 | −27.00232 | NA | 0.277432 | 1.555684 | 1.599671 | 1.571037 |
| | 1 | 14.44711 | 78.29337* | 0.029326* | −0.691506* | −0.603533* | −0.660801* |
| | 2 | 14.44924 | 0.003910 | 0.031006 | −0.636069 | −0.504109 | −0.590012 |
| Government revenue | 0 | −39.09279 | NA | 0.543087 | 2.227377 | 2.271364 | 2.242730 |
| | 1 | −8.116547 | 58.51069* | 0.102722* | 0.562030* | 0.650004* | 0.592735* |
| | 2 | −8.102843 | 0.025123 | 0.108537 | 0.616825 | 0.748785 | 0.662882 |

**Note:** * indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at a 5% level); FPE: final prediction error; AIC: Akaike information criterion; SC: Schwarz information criterion; HQ: Hannan–Quinn information criterion.

**Table 5.6: VAR Lag Order Selection Criteria for the Equations**

| | Lag | LogL | LR | FPE | AIC | SC | HQ |
|---|---|---|---|---|---|---|---|
| Equation 1 (total GDP) | 0 | 186.8089 | NA | 3.13e−16 | −10.16051 | −9.760564 | −10.02245 |
| | 1 | 447.0310 | 371.7458* | 1.29e−20 | −20.40177 | −16.40231* | −19.02116 |
| | 2 | 559.0815 | 102.4462 | 6.13e−21* | −22.17609* | −14.57710 | −19.55292* |
| Equation 2 (oil GDP) | 0 | 171.5721 | NA | 7.47e−16 | −9.289834 | −8.889888 | −9.151773 |
| | 1 | 427.9148 | 366.2039* | 3.85e−20 | −19.30942 | −15.30995* | −17.92880 |
| | 2 | 540.1003 | 102.5696 | 1.81e−20* | −21.09145* | −13.49246 | −18.46828* |
| Equation 3 (non-oil GDP) | 0 | 181.2693 | NA | 4.29e−16 | −9.843959 | −9.444013 | −9.705898 |
| | 1 | 440.7002 | 370.6156 | 1.86e−20 | −20.04001 | −16.04055* | −18.65940 |
| | 2 | 566.0387 | 114.5951* | 4.12e−21* | −22.57364* | −14.97465 | −19.95047* |

**Note:** * indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at a 5% level); FPE: final prediction error; AIC: Akaike information criterion; SC: Schwarz information criterion; HQ: Hannan–Quinn information criterion.

## 5.5 Empirical Autoregressive Distributed Lag (ARDL) Approach

This research employs the ARDL bounds test approach proposed by Pesaran, Shin and Smith (2001) to estimate long- and short-term effects. The main advantage of this technique over the other cointegration methods is that it is robust enough to cope with the stochastic behaviour of the variables. The choice of this method is justified in the previous chapter (Pesaran, Shin & Smith 2001; Bahmani-Oskooee & Hegerty 2007).

### 5.5.1 ARDL Bounds Test for Long-term Relationships

This section summarises the estimated long-term ECMs and the results of the ARDL long-term bounds tests. In the first step of the ARDL analysis, the presence of long-term relationships was tested using the equations. Unless the series were cointegrated, there was no equilibrium between the variables and inference was futile. The ARDL bounds test for cointegration by Pesaran, Shin and Smith (2001) and Pesaran and Pesaran (1997) was performed. Since the sample consisted of 37 observations, the F-statistic of Narayan's (2005) critical values was also performed, as recommended for bounds testing in a small sample.

The summary of the ARDL long-term form and the bounds test are presented in Table 5.7. Results from the F-statistic in all three models show a higher upper-bound critical value that surpasses both that of Pesaran, Shin and Smith (2001) and Narayan (2005) at a 10% level, implying a lack of cointegration among the variables.

Hence, in all the three models, the null hypothesis of no cointegration is rejected, meaning that the examined variables are cointegrated, which supports the conclusion that the variables share long-term relationships and adjust to short-term shocks. This means any change in the current equilibrium level of the economy is a temporary phenomenon and a return to the long-term path will occur in the future. The discussion on this finding is presented in Section 5.10.

**Table 5.7: ARDL Bounds Test Results for Cointegration**

| | F-statistic | F-critical (10%) Pesaran et al. (2001) | F-critical (10%) Narayan (2005) | t-statistic | t-critical | Cointegration |
|---|---|---|---|---|---|---|
| Total GDP | 12.4 | 2.85 | −1 | −5.2 | −4.4 | Yes/Yes |
| Oil GDP | 5.7 | 2.85 | −1 | −4.5 | −4.4 | Yes/Yes |
| Non-Oil GDP | 7.6 | 2.85 | −1 | −5.95 | −4.4 | Yes/Yes |

### 5.5.2 Empirical Results Based on ARDL Technique

The applied approach is an ARDL model in error correction form, where the variables share both long-term and short-term relationships, are cointegrated and adjust to deviations from the long-term equilibrium. The general functional form of the models can be presented as follows:

$$\Delta Y_t = \sum_{i=1}^{k} \beta_i \Delta X_{it} + ec\left(Y_{t-1} - \sum_{i=1}^{k} \alpha_i X_{it-1}\right) + \varepsilon_t \qquad 5.1$$

Here, $y_t$is the dependent variable; total, oil and non-oil GDP, $\beta_i$and $\alpha_i$ are corresponding slope terms; $ec$ is the error correction coefficient; and $\varepsilon_t$ is the error term. Three different models were estimated with three different GDP variables: total GDP, non-oil GDP and oil GDP. For the total GDP the appropriate lag chosen was (1,0,0,0,2,1,1,1,0); for the oil GDP it was (1,0,0,0,2,1,2,2,0) and for the non-oil GDP it was (1,2,0,0,2,1,0,0,2). The test results are given in Figures 5.5 to 5.7.

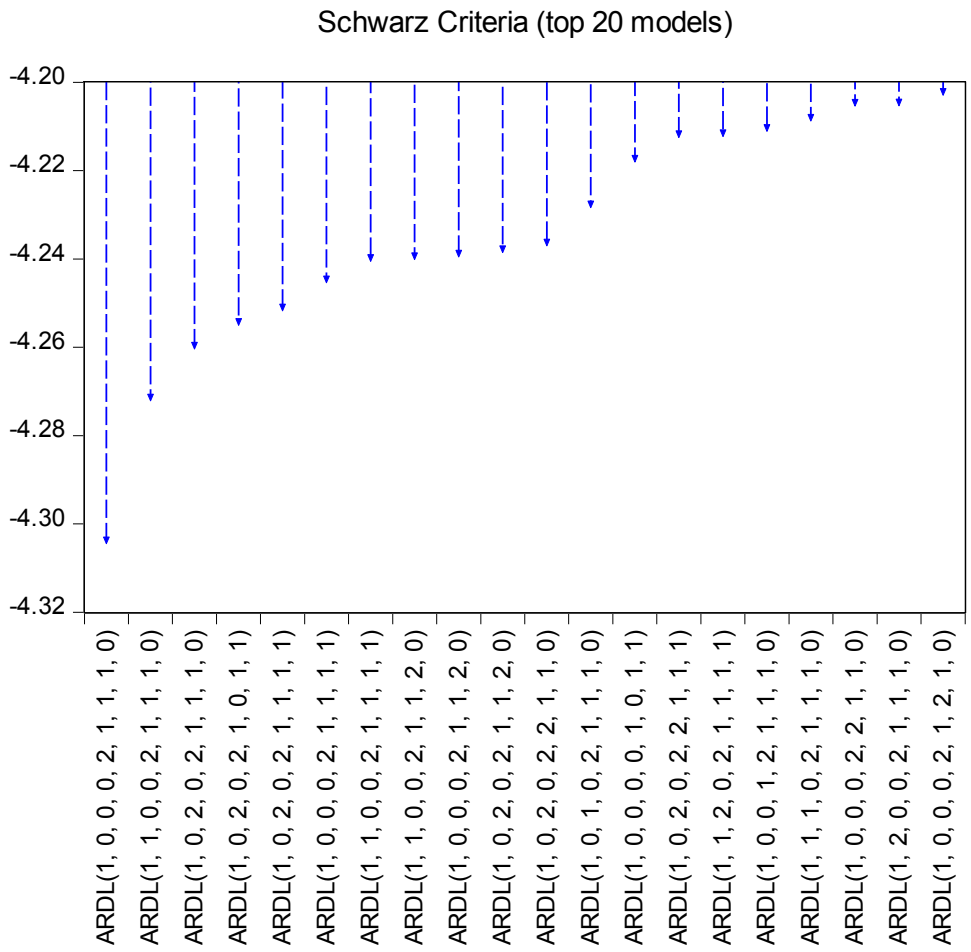



**Figure 5.5: Schwarz Criteria for Choosing Best ARDL Model (Total GDP)**

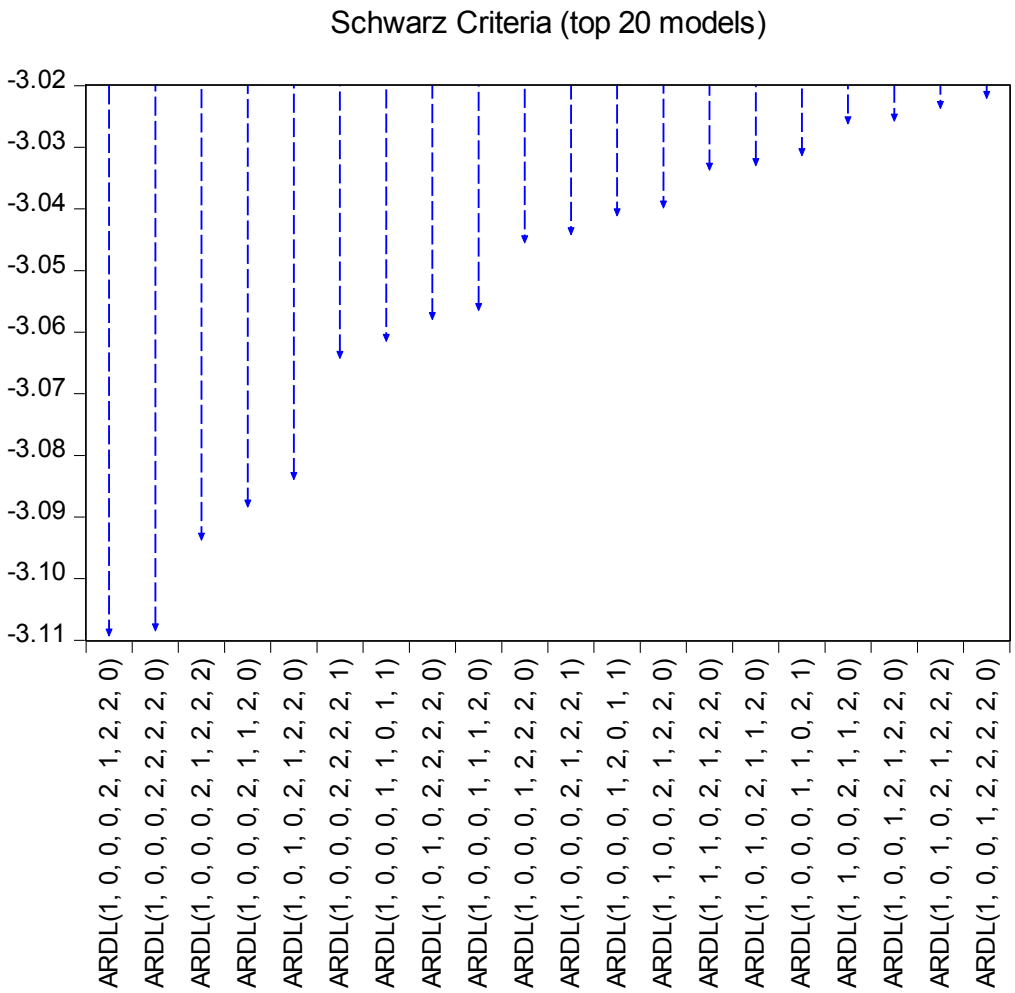



**Figure 5.6: Schwarz Criteria for Choosing Best ARDL Model (Oil GDP)**

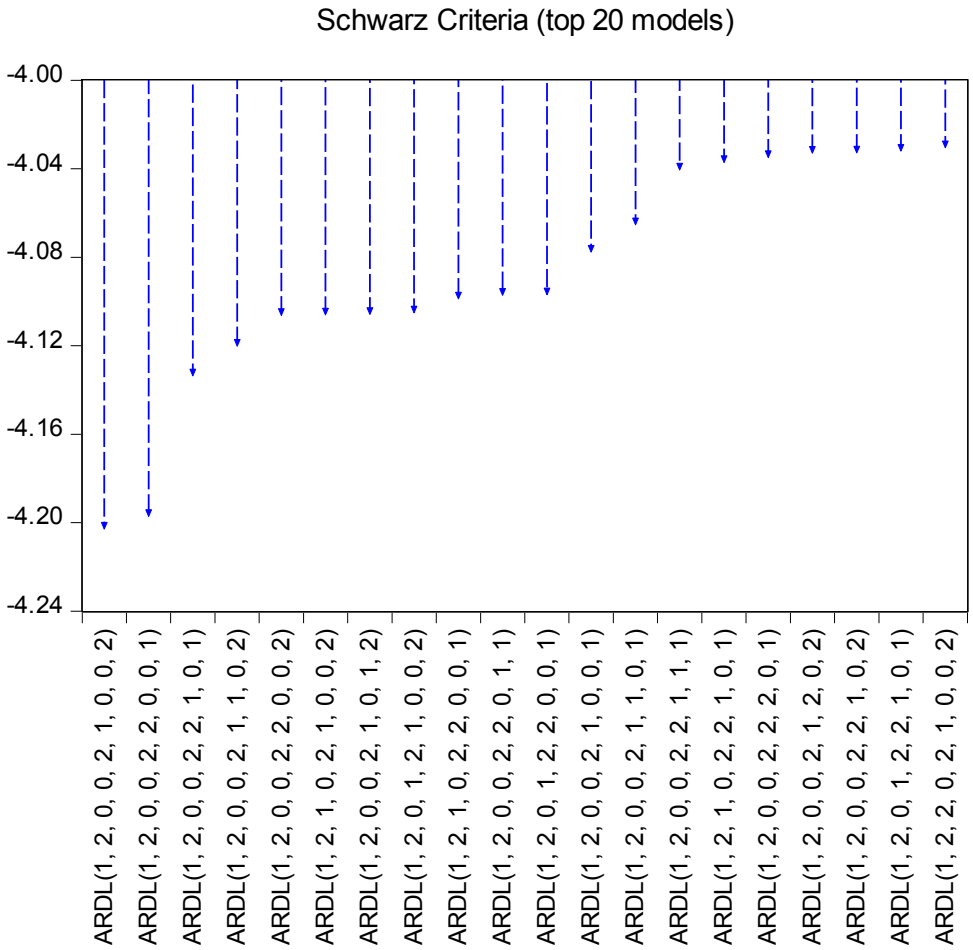



**Figure 5.7: Schwarz Criteria for Choosing Best ARDL Model (Non-Oil GDP)**

### 5.5.3 Results of the Estimated ARDL Models

The summaries of the level equations, which illustrate long-term relationships between the variables, are presented in Table 5.8. All the model results show that, in the long-term, there were significant lag effects, about 56.6%, 65.9% and 45.4% respectively. Over the long term, a 1% increase in money supply decreased oil GDP by about 0.39% and produced a long-term impact multiplier—about 0.23%—and a long-term total effect of 0.14% on non-oil GDP. Meanwhile, there was also a significant, positive long-term effect from changes to interest rates, which affected only the overall GDP. Overall, expansionary monetary policy contributed to economic growth in the non-oil sector alone. An increase in GE had a significant positive impact on total GDP and oil GDP and a significant negative impact on non-oil GDP in the second lag. A 1% increase in GEs over the long term increased total GDP by about 0.23% and oil GDP by about 0.28% and decreased non-oil GDP by about 0.11%. At the same time, an increase in government

expenditure by 1% decreased non-oil GDP by about 0.03% over the long term. The general conclusion is that fiscal policy is an effective policy for economic advancement, particularly in the oil sector. Commercial bank claims on the private sector (CBC) only had a significant, long-term positive effect on total GDP and oil GDP. A 1% increase in CBC increased total GDP and oil GDP by about 0.15% and 0.3% respectively. In the long term, inflation is a positive factor for total and oil GDP growth, as a 1% inflation contributed to 0.63% of the total GDP growth and 1.17% of the oil GDP growth. However, its impact on the non-oil GDP was negative—0.96%. Overall, in the long term, an increase in MI negatively affected the total GDP and oil GDP, as a 1% increase contributed to corresponding decreases of 0.12% and 0.17%. However, the long-term impact on non-oil GDP was positive at 0.18%.

**Table 5.8: ARDL Long-term Relationships**

| | **Total GDP** | | **Oil GDP** | | **Non-Oil GDP** | |
|---|---|---|---|---|---|---|
| Lag | 0.5661*** | (0.09) | 0.6586*** | (0.13) | 0.4538*** | (0.1) |
| MS | −0.0309 | (0.09) | −0.3858** | (0.14) | 0.2341** | (0.11) |
| MS(−1) | | | | | −0.5143*** | (0.16) |
| MS(−2) | | | | | 0.4219*** | (0.11) |
| I | 0.0062** | (< .001) | 0.0055 | (0.01) | 0.0029 | (< .001) |
| I(−1) | | | 0.0118* | (0.01) | | |
| CBC | 0.1531** | (0.05) | 0.3005*** | (0.1) | 0.0868 | (0.07) |
| INF | −0.4182* | (0.22) | 0.1439 | (0.38) | −0.9671*** | (0.27) |
| INF(−1) | 0.4586* | (0.24) | 1.1715*** | (0.4) | −0.8175*** | (0.26) |
| INF(−2) | 0.6345*** | (0.21) | 0.8314** | (0.37) | 0.6324** | (0.24) |
| ME | 0.3715*** | (0.05) | 1.0351*** | (0.08) | 0.0439 | (0.05) |
| ME(−1) | −0.2533*** | (0.04) | −0.6719*** | (0.14) | 0.1442** | (0.05) |
| MI | −0.0582 | (0.06) | −0.3451*** | (0.1) | 0.1755*** | (0.06) |
| MI(−1) | −0.1153** | (0.04) | −0.1696* | (0.09) | | |
| MI(−2) | | | −0.1212* | (0.06) | | |
| GE | −0.012 | (0.04) | 0.1331* | (0.07) | 0.0541 | (0.05) |
| GE(−1) | 0.2424*** | (0.05) | 0.2813*** | (0.08) | −0.0739 | (0.05) |
| GE(−2) | | | 0.2374*** | (0.06) | −0.1081** | (0.04) |
| GR | 0.0753 | (0.05) | 0.0759 | (0.08) | −0.0299** | (0.01) |
| C | 1.1449*** | (0.38) | −0.7118 | (0.44) | 1.8257*** | (0.38) |
| R-squared | 0.999539 | | 0.999366 | | 0.999456 | |

| | Total GDP | Oil GDP | Non-Oil GDP |
|---|---|---|---|
| Adjusted R-squared | 0.999216 | 0.998733 | 0.998973 |

**Note:** Standard errors are in the parentheses.
*p < 0.1, **p < 0.05, ***p < 0.01.

### 5.5.4 Results of the Long-term Relationship

The summary of level equations, which illustrates long-term relationships between the variables, is presented in Table 5.9. The results show that within monetary policy variables, money supply has a negative significant effect on oil GDP in the long term. For interest rates, there is a positive and significant effect in the long term on total GDP and oil GDP. Commercial banks claims have a positive and significant effect on total GDP and oil GDP, while inflation has a significant and positive effect on total GDP and oil GDP and a negative and significant effect on non-oil GDP.

With respect to fiscal policy variables, GE has a positive and significant effect on total GDP and oil GDP, but an insignificant effect on non-oil GDP. By contrast, GRs have a significant negative effect on non-oil GDP. Further discussion is presented in Section 5.10.1.

The merchandise trade variables show that ME had a positive and significant effect on all models, while MI had a significant negative impact for total GDP and oil GDP but a significant positive effect on non-oil GDP. The results of these long-term relationships will be discussed in Section 5.10.

**Table 5.9: ARDL Long-term Bounds Tests**

| **Levels Equation** | | | |
|---|---|---|---|
| | **Total GDP** | **Oil GDP** | **Non-Oil GDP** |
| MS | −0.0712 (0.21) | −1.13 (0.55)* | 0.2593 (0.21) |
| I | 0.0144 (0.01)** | 0.0505 (0.03)* | 0.0053 (0.01) |
| CBC | 0.3528 (0.14)** | 0.8802 (0.44)* | 0.159 (0.14) |
| INF | 1.5556 (0.86)* | 6.2878 (3.26)* | −2.1097 (0.82)** |
| ME | 0.2723 (0.11)** | 1.0636 (0.24)*** | 0.3444 (0.13)** |
| MI | −0.4 (0.18)** | −1.8622 (0.81)** | 0.3213 (0.1)*** |
| GE | 0.531 (0.18)*** | 1.9093 (0.84)** | 0.0991 (0.1) |
| GR | 0.1736 (0.12) | 0.2223 (0.26) | −0.388 (0.12)*** |
| C | 2.6387 (0.51) | −2.0847 (1.69) | 3.3427 (0.49)*** |

**Note:** Standard errors are in the parentheses.
*p < 0.1, **p < 0.05, ***p < 0.01. c = constant

The short-term dynamic parameters will be obtained by estimating the following ECMs associated with the long-term estimates:

$$EC_t = TOTAL_t^{GDP} - 0.0712 * MS_t + 0.0144 * I_t + 0.3528 * CBC_t + 1.5556 * INF_t + 0.2723 * ME_t - 0.4000 * MI_t + 0.5310 * GE_t + 0.1736 * GR_t + 2.6387$$

$$EC_t = OIL_t^{GDP} - 1.1300 * MS_t + 0.0505 * I_t + 0.8802 * CBC_t + 6.2878 * INF_t + 1.0636 * ME_t - 1.8622 * MI_t + 1.9093 * GE\_t + 0.2223 * GR_t - 2.0847$$

$$EC_t = Non - OIL_t^{GDP} + 0.2593 * MS_t + 0.0053 * I_t + 0.1590 * CBC_t - 2.1097 * INF_t + 0.3444 * ME_t + 0.3213 * MI_t + 0.0991 * GE_t - 0.3880 * GR_t + 3.3427$$

### 5.5.5 Short-term Error Correction Models

This section presents the results of the ARDL, the ECM and the ARDL bounds tests. The general specification of an ECM model can be presented as:

$$\Delta y_t = \gamma + B(L)\Delta x_t + \alpha (y_{t-1} - \beta_0 - \beta_1 x_{t-1}) + \varepsilon_t \quad 5.2$$

Here:

- $\Delta y_t$ is the first difference of the dependent variable
- $\Delta x_t$ is the vector of the first differences of the independent variables
- $B(L)$ is the lag operator and shows the number of lags of the explanatory variables
- $\alpha$ is the error correction coefficients and measures the response of the dependent variable to the deviation of long-term equilibrium, which is given in the parentheses
- $\varepsilon_t$ is the error term.

The results of the ECM short-term effects are given in Table 5.10. As shown in the table, the correction factor is significant and negative in the range (−1, 0) for all the estimated models. This indicates that the variables share a common equilibrium and any deviation from the long-term trend is adjusted in the upcoming periods.

Particularly, the adjustment rate was approximately 43.4% in the total GDP model, 34.1% in the oil GDP model and 54.6% in the non-oil GDP model. In the short-term, increases in money supply initially had a significant positive effect on non-oil GDP. However, in the next period, this effect was offset by a negative effect that was almost two times greater. For government expenditures, significant short-term effects were observed only for oil GDP. An increase in government expenditures initially improved the oil GDP, but in the next period its impact was negative. For GRs, there was an initially significant decrease for non-oil GDP, but during the next periods it positively contributed to growth.

The short-term effects of inflation were mostly negative. The results indicate that, in the short term, inflation reduced economic activity for total GDP, oil GDP and non-oil GDP. The short-term effects of exports were positive for total GDP, oil GDP and non-oil GDP, while MI had a negative impact on total GDP and oil GDP in the first lag and a positive effect on oil GDP in the second lag. These results will be discussed further in Section 5.10.

**Table 5.10: ARDL Error Correction Short-term Effects**

| | Total GDP | | Oil GDP | | Non-Oil GDP | |
|---|---|---|---|---|---|---|
| D(I) | | | 0.0055 | (0.00) | | |
| D (MS) | | | | | 0.2341*** | (0.06) |
| DMS(−1) | | | | | −0.4219*** | (0.08) |
| D (INF) | −0.4182** | (0.15) | 0.1439 | (0.25) | −0.9671*** | (0.14) |
| DINF(−1) | −0.6345*** | (0.14) | −0.8314*** | (0.24) | −0.6324*** | (0.13) |
| D (ME) | 0.3715*** | (0.01) | 1.0351*** | (0.02) | 0.0439* | (0.02) |
| D (MI) | −0.0582* | (0.03) | −0.3451*** | (0.06) | | |
| D (MI(−1) | | | 0.1212*** | (0.03) | | |
| D (GE) | −0.012 | (0.02) | 0.1331*** | (0.04) | | |
| DGE(−1) | | | −0.2374*** | (0.04) | | |
| D (GR) | | | | | −0.0739*** | (0.02) |
| D (GR(−1) | | | | | 0.0299*** | (0.01) |
| CointEq(−1)* | −0.4339*** | (0.03) | −0.3414*** | (0.04) | −0.5462*** | (0.05) |
| R-squared | 0.9866 | | 0.9945 | | 0.9075 | |
| Adjusted R-squared | 0.9843 | | 0.9928 | | 0.8836 | |

**Note:** Standard errors are in the parentheses.
*p < 0.1, **p < 0.05, ***p < 0.01.
D is the first deference of the variables.

## 5.6 Residual Diagnostic Tests

Diagnostic tests for serial correlation, normality, functional form, heteroskedasticity and the structural stability of the models were used to inform whether the models were valid. To complement this study, it was also important to investigate whether the long- and short-term relationships found remained stable throughout the entire period of the study. For this purpose, it was necessary to test for parameter stability. The tests for stability used are based on the CUSUM and the CUSUMSQ tests proposed by Brown, Durbin and Evans (1975). Unlike the chow test, that requires breakpoints to be specified, the CUSUM tests can be used even if the structural breakpoint is unknown.

### 5.6.1 Normality Test

After estimating the models, the next step was to implement post-estimation model diagnostics. The normality of the error terms was checked by employing histograms and the Jarque–Bera test for normality (see Table 5.11 below). The null hypothesis of the test

is that the distribution of the error term is normal. As can be seen from the results, the null hypothesis could not be rejected in all models, confirming that the error terms in all the models were normally distributed.

**Table 5.11: Normality Test Results**

| | Total GDP | Oil GDP | Non-Oil GDP |
|---|---|---|---|
| Jarque-Bera | 2.70 | 0.86 | 0.63 |
| Probability | 0.26 | 0.65 | 0.73 |

### 5.6.2 Serial Correlation

The existence of serial correlation in the model residuals was tested through the Breusch–Godfrey Serial Correlation Lagrange multiplier test, the results of which are presented in Table 5.12. The null hypothesis of the test is no autocorrelation. The results indicate that the error terms were not serially correlated.

**Table 5.12: Breusch–Godfrey Serial Correlation Lagrange Multiplier Test**

| | GDP | Oil GDP | Non-Oil GDP |
|---|---|---|---|
| F-statistic | 0.093 | 1.686 | 1.430 |
| Obs*R-squared | 0.170 | 6.423 | 5.307 |
| Prob. F | 0.764 | 0.219 | 0.268 |
| Prob. Chi-Square | 0.680 | 0.060 | 0.070 |
| Serial Correlation | No | No | No |

### 5.6.3 Heteroskedasticity Test

This section presents the results of the Breusch-Pagan–Godfrey tests for heteroskedasticity. The null hypothesis of the test suggests that the variance of the error term is constant and there were no heteroskedasticity issues in the models. The test results given in Table 5.13 confirm the absence of heteroskedasticity.

**Table 5.13: Heteroskedasticity Test: Breusch-Pagan–Godfrey**

| | GDP | Oil GDP | Non-Oil GDP |
|---|---|---|---|
| F-statistic | 0.854 | 0.386 | 1.728 |
| Obs*R-squared | 13.096 | 9.747 | 21.198 |
| Scaled explained SS | 4.309 | 1.838 | 5.430 |
| Prob. F | 0.612 | 0.971 | 0.132 |
| Prob. Chi-Square | 0.519 | 0.914 | 0.171 |
| Prob. Chi-Square, SS | 0.993 | 1.000 | 0.993 |
| Heteroskedasticity | No | No | No |

### 5.6.4 Stability Diagnostic Tests

As justified in Chapter 4, the CUSUM and the CUSUMSQ are employed to ascertain the constancy of the long-term multipliers by testing the above ECM for the stability of its parameters.

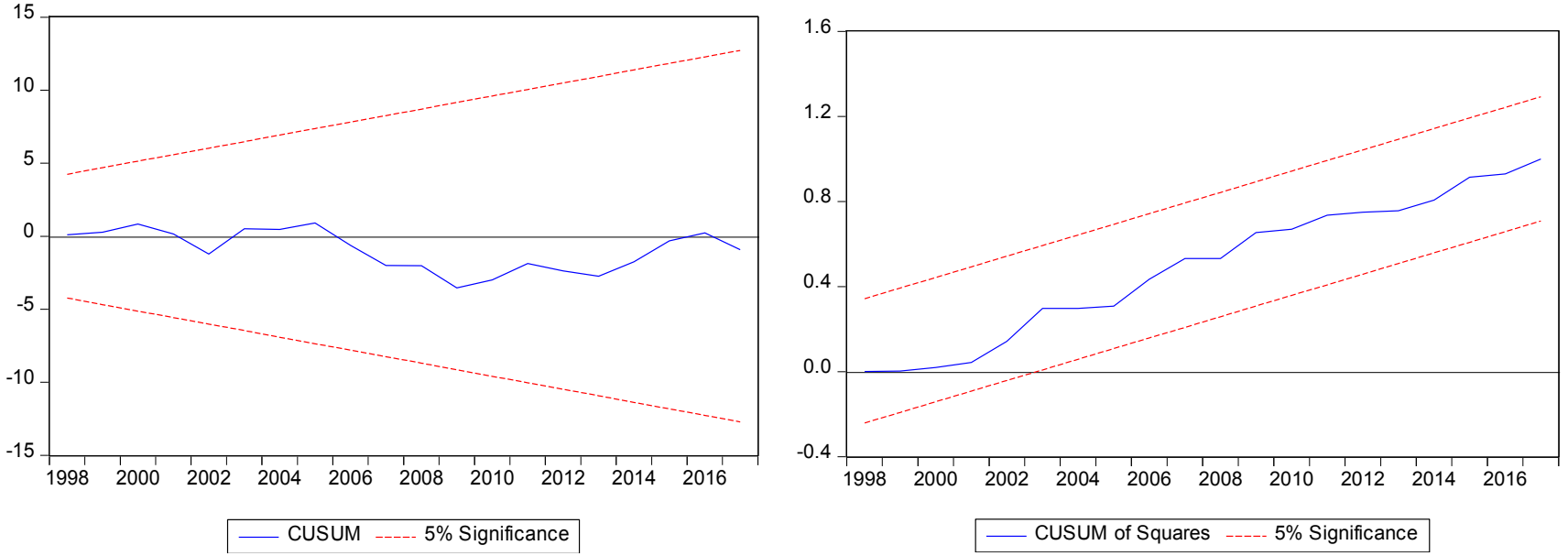
*5.6.4.1 CUSUM Test*

The CUSUM, which is based on the residuals from the recursive estimates, tests for model stability. Under the null hypothesis, there is stability in the estimated model parameters. The null hypothesis is rejected at the 5% significance level if the estimated CUSUM statistics for each period fall below the 2.5 percentile or above the 97.5 percentile of the CUSUM distribution. The results of the tests are presented in Figures 5.8 to 5.10 and confirm stability.

*5.6.4.2 CUSUM of Square Test*

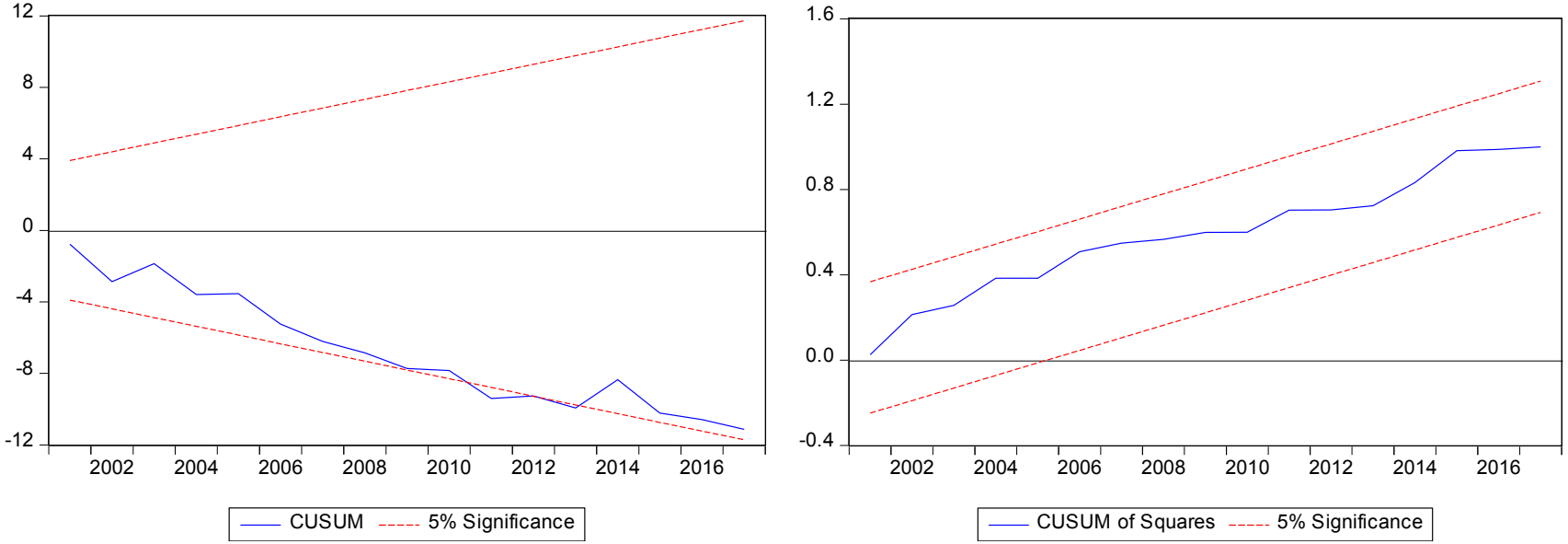
The CUSUMSQ test, which is based on the residuals from the recursive estimates, was also employed. Under the null hypothesis, models observe the stability of estimated variances. Similar, to the CUSUM test, the null hypothesis is rejected at the 5% significance level if the estimated CUSUM statistics for each period fall below the 2.5 percentile or above the 97.5 percentile of the CUSUM distribution. The results of the tests are presented in Figures 5.8 to 5.10. As can be seen from the results for all the models, the null hypothesis could not be rejected and it may be concluded that the models exhibit stability in variances. For oil GDP, the data were affected by various external shocks,

such as world economic crises and oil price fluctuation—points raised by Narayan and Smyth (2005).



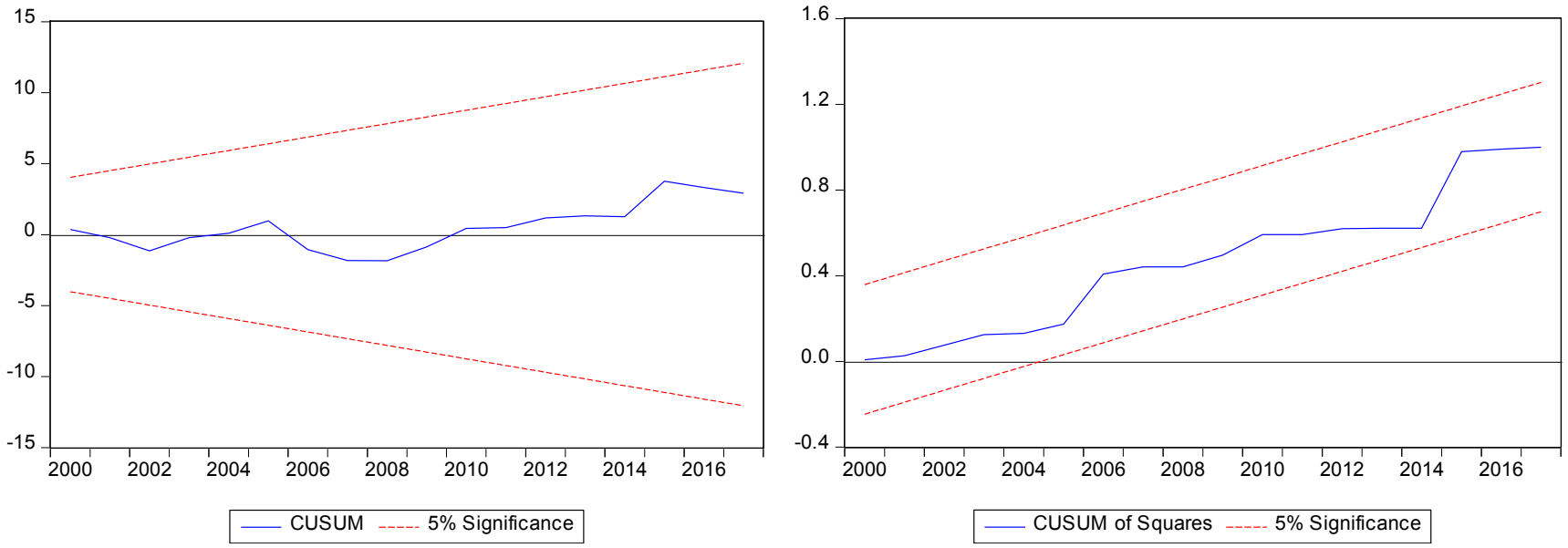

**Note:** The red broken line shows the critical bounds at the 5% significance level, whereas the blue line between the two broken lines represents the measurements of the recursive residuals of the cumulative sum and the cumulative sum of the square. The recursive residuals are on the vertical axis, while the horizontal axis represents the years.

**Figure 5.8: CUSUM and CUSUMSQ Tests for Total GDP**




**Note:** The red broken line shows the critical bounds at the 5% significance level, whereas the blue line between the two broken lines represents the measurements of the recursive residuals of the cumulative sum and the cumulative sum of the square. The recursive residuals are on the vertical axis, while the horizontal axis represents the years.

**Figure 5.9: CUSUM and CUSUMSQ Tests for Oil GDP**




**Note:** The red broken line shows the critical bounds at the 5% significance level, whereas the blue line between the two broken lines represents the measurements of the recursive residuals of the cumulative sum and the cumulative sum of the square. The recursive residuals are on the vertical axis, while the horizontal axis represents the years.

**Figure 5.10: CUSUM and CUSUMSQ Tests for Non-Oil GDP**

## 5.7 Granger Causality Test

To study the long-term causal relation between independent variables and GDP, this study employed the Granger causality test to determine the direction of the linkage and to confirm Granger feedback between the variables under study. Given that studies on fiscal and monetary policies have shown a positive effect on GDP, it is important to investigate the direction of causality—that is, whether causality runs from policy variables to GDP or vice versa. The direction of causality, if present, is very important to policy-makers as this ensures that policy targets and reforms put in place are correct and focus on the appropriate areas. To check for this relationship, Granger causality tests were run covering two different lag structures. A lag length of two in the Granger test corresponds to a reasonable time during which one variable can help predict another (Muruko 2013).

This section summarises the results of the Granger causality tests. For the three models two types of the test were employed: the first with two lags and the second with one lag. According to the results (presented in Tables 5.14–5.16), there was cross causality between MS and GDP, I and GDP and between GR, GE and GDP in both models. The results confirm that monetary policy and fiscal policy variables in the estimated models were endogenous.

**Table 5.14: Granger Causality Test (Total GDP)**

| Null Hypothesis | Lag 1 | | Lag 2 | | Conclusion |
|---|---|---|---|---|---|
| | F-Statistic | Prob. | F-Statistic | Prob. | |
| MS does not Granger cause TOTAL GDP | 3.73475 | 0.0617 | 6.42954 | 0.0046 | Bidirectional causality |
| TOTAL GDP does not Granger cause MS | 8.92390 | 0.0052 | 2.62314 | 0.0886 | |
| I does not Granger cause TOTAL GDP | 4.51023 | 0.041 | 5.09742 | 0.0122 | Bidirectional causality |
| TOTAL GDP does not Granger cause I | 3.28357 | 0.0788 | 4.36875 | 0.0213 | |
| CBC does not Granger cause TOTAL GDP | 7.15439 | 0.0114 | 8.73371 | 0.001 | Unidirectional causality |
| TOTAL GDP does not Granger cause CBC | 0.97351 | 0.3308 | 1.12408 | 0.3378 | |
| INF does not Granger Cause TOTAL GDP | 0.00372 | 0.9517 | 0.26711 | 0.7674 | Unidirectional causality |
| TOTAL GDP does not Granger cause INF | 5.39263 | 0.0265 | 2.68527 | 0.0846 | |
| ME does not Granger cause TOTAL GDP | 0.37737 | 0.5431 | 2.14320 | 0.1343 | Unidirectional causality |
| TOTAL GDP does not Granger cause ME | 1.70316 | 0.2006 | 3.02104 | 0.0633 | |
| MI does not Granger cause TOTAL GDP | 4.38525 | 0.0438 | 0.94076 | 0.4012 | Bidirectional causality |
| TOTAL GDP does not Granger cause IMP | 21.6475 | 0.0005 | 8.59823 | 0.0011 | |
| GE does not Granger cause TOTAL GDP | 5.44398 | 0.0257 | 2.17301 | 0.1309 | Bidirectional causality |
| TOTAL GDP does not Granger cause GE | 13.0083 | 0.001 | 7.05368 | 0.003 | |
| GR does not Granger cause TOTAL GDP | 3.52628 | 0.069 | 5.45223 | 0.0094 | Bidirectional causality |
| TOTAL GDP does not Granger cause GR | 6.17434 | 0.018 | 8.04712 | 0.0015 | |

**Table 5.15: Granger Causality Test (Oil GDP)**

| Null Hypothesis | Lag 1 | | Lag 2 | | Conclusion |
|---|---|---|---|---|---|
| | F-Statistic | Prob. | F-Statistic | Prob. | |
| MS does not Granger cause OIL_GDP | 3.36452 | 0.0754 | 4.56869 | 0.0182 | Unidirectional causality |
| OIL_GDP does not Granger cause MS | 11.4985 | 0.0018 | 2.46736 | 0.1013 | |
| I does not Granger cause OIL_GDP | 4.35172 | 0.0445 | 4.50159 | 0.0192 | Bidirectional causality |
| OIL_GDP does not Granger cause I | 3.59732 | 0.0664 | 3.79862 | 0.0335 | |
| CBC does not Granger cause OIL_GDP | 5.24583 | 0.0283 | 6.02877 | 0.0061 | Unidirectional causality |
| OIL_GDP does not Granger cause CBC | 2.41033 | 0.1298 | 1.20119 | 0.3145 | |
| INF does not Granger cause OIL_GDP | 0.75908 | 0.3899 | 0.90364 | 0.4158 | Unidirectional causality |
| OIL_GDP does not Granger cause INF | 6.93472 | 0.0128 | 2.85024 | 0.0736 | |
| ME does not Granger cause OIL_GDP | 2.45190 | 0.1266 | 1.24359 | 0.3023 | No causality |
| OIL_GDP does not Granger cause ME | 1.72985 | 0.1972 | 0.74775 | 0.4818 | |
| MI does not Granger cause OIL_GDP | 0.03925 | 0.8441 | 0.52125 | 0.5989 | Unidirectional causality |
| OIL_GDP does not Granger cause IMP | 14.5574 | 0.0005 | 5.04333 | 0.0127 | |
| GE does not Granger cause OIL_GDP | 0.80972 | 0.3745 | 0.49754 | 0.6128 | Unidirectional causality |
| OIL_GDP does not Granger cause GE | 4.90658 | 0.0336 | 4.76528 | 0.0157 | |
| GR does not Granger cause OIL_GDP | 5.09836 | 0.0305 | 3.45768 | 0.0441 | Unidirectional causality |
| OIL_GDP does not Granger cause GR | 9.38061 | 0.0043 | 8.08187 | 0.0015 | |

**Table 5.16: Granger Causality Test (Non-Oil GDP)**

| | Lag 1 | | Lag 2 | | |
|---|---|---|---|---|---|
| **Null Hypothesis** | **F-Statistic** | **Prob.** | **F-Statistic** | **Prob.** | **Conclusion** |
| MS does not Granger cause NON_OIL_GDP | 3.89470 | 0.0566 | 7.11490 | 0.0029 | Unidirectional causality |
| NON_OIL_GDP does not Granger cause MS | 0.33186 | 0.5684 | 2.26300 | 0.121 | |
| I does not Granger cause NON_OIL_GDP | 0.26599 | 0.6094 | 1.14898 | 0.3301 | Unidirectional causality |
| NON_OIL_GDP does not Granger cause I | 2.55530 | 0.1192 | 3.19661 | 0.0547 | |
| CBC does not Granger cause NON_OIL_GDP | 5.58561 | 0.024 | 6.04544 | 0.0061 | Unidirectional causality |
| NON_OIL_GDP does not Granger cause CBC | 0.28518 | 0.5968 | 1.77495 | 0.1863 | |
| INF does not Granger cause NON_OIL_GDP | 2.02831 | 0.1638 | 0.78081 | 0.4671 | Unidirectional causality |
| NON_OIL_GDP does not Granger cause INF | 3.29371 | 0.0786 | 2.43585 | 0.1046 | |
| ME does not Granger cause NON_OIL_GDP | 23.5006 | 0.00003 | 4.63040 | 0.0174 | Bidirectional causality |
| NON_OIL_GDP does not Granger cause ME | 2.13161 | 0.1535 | 3.97602 | 0.029 | |
| MI does not Granger cause NON_OIL_GDP | 1.73882 | 0.1961 | 2.54648 | 0.0946 | Bidirectional causality |
| NON_OIL_GDP does not Granger cause MI | 1.59415 | 0.2153 | 8.05739 | 0.0015 | |
| GE does not Granger cause NON_OIL_GDP | 2.11937 | 0.1546 | 5.08865 | 0.0123 | Bidirectional causality |
| NON_OIL_GDP does not Granger cause GE | 5.77672 | 0.0218 | 6.40257 | 0.0047 | |
| GR does not Granger cause NON_OIL_GDP | 13.7511 | 0.0007 | 2.10428 | 0.139 | Bidirectional causality |
| NON_OIL_GDP does not Granger cause GR | 3.59066 | 0.0666 | 4.38376 | 0.0211 | |

## 5.8 Robustness Check

Although the three equations passed all diagnostic and stability tests, a number of robustness checks were conducted to examine the sensitivity of the findings. In this section, the robustness of the analysis and the consistency of the results obtained from the ARDL bounds test is checked. Cointegration among the variables was checked by the test proposed by Johansen (1988) and Johansen and Juselius (1992). The stationarity test results indicated that all the level variables were non-stationary; however, in their first differenced form they were stationary, which is the pre-condition for the Johansen cointegration test. The Johansen (1988) cointegration test was utilised to determine a linear combination of the variables and the order of cointegration. This test is based on two different likelihood ratio tests: the 'trace' and the 'maximum eigenvalue' log likelihood statistics. Johansen (1988) indicated that the maximum eigenvalue test is capable of identifying more than one cointegrating relationship among the series. The analysis was extended to account for the robustness of long-term parameters by re-estimating the coefficients though FMOLS, CCR and DOLS.

### 5.8.1 Johansen Cointegration Test

The Johansen test for cointegration provides a sensitivity check on the ARDL results. It is used to determine the number of cointegrating relationships among the variables. If the variables are cointegrated, there exists a stationary linear combination, which is called the cointegrating equation. This equation represents the long-term equilibrium relationship between the variables. To determine the number of cointegrating equations, the trace and the maximum eigenvalue test statistics are examined and contrasted to the critical values at a 5% level of significance.

Tables 5.17–5.19 provide the likelihood ratio and trace statistics derived from the cointegration test. The test is based on the hypothesis that there are unrestricted intercepts and no trend. This test suggests that there are at least five cointegration equations among the variables under study when GDP is the dependent variable. The result is significant against the 5% critical value. According to this test, the variables share long-term relationships and are cointegrated with GDP in all cases.

Since the existence of cointegration vectors was approved by both the trace test and the maximum eigenvalue test, the appropriate approach for the given research objective and

data was an ECM. This result supports the ARDL bounds test for cointegration result, which indicates that the variables share a long-term relationship and adjust to short-term shocks.

**Table 5.17: Johansen Cointegration Test (Total GDP)**

| Unrestricted Cointegration Rank Test (Trace and Maximum Eigenvalue) | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Hypothesised No. of CE(s)** | **Eigenvalue** | **Trace Statistic** | **0.05 Critical Value** | **Prob.**** | **Max-Eigen Statistic** | **0.05 Critical Value** | **Prob.**** |
| None * | 0.898366 | 336.8549 | 197.3709 | 0.0000 | 80.02313 | 58.43354 | 0.0001 |
| At most 1 * | 0.853851 | 256.8318 | 159.5297 | 0.0000 | 67.30952 | 52.36261 | 0.0008 |
| At most 2 * | 0.809783 | 189.5222 | 125.6154 | 0.0000 | 58.08559 | 46.23142 | 0.0018 |
| At most 3 * | 0.743540 | 131.4367 | 95.75366 | 0.0000 | 47.62745 | 40.07757 | 0.0059 |
| At most 4 * | 0.702733 | 83.80921 | 69.81889 | 0.0026 | 42.45933 | 33.87687 | 0.0037 |
| At most 5 | 0.509487 | 41.34988 | 47.85613 | 0.1778 | 24.93066 | 27.58434 | 0.1054 |

**Note:** Trace test indicates 5 cointegrating eqn(s) at the 0.05 level.
Max-eigenvalue test indicates 5 cointegrating eqn(s) at the 0.05 level.
* denotes a rejection of the hypothesis at the 0.05 level.
**MacKinnon, Haug and Michelis (1999) p-values.

**Table 5.18: Johansen Cointegration Test (Oil GDP)**

| Unrestricted Cointegration Rank Test (Trace and Maximum Eigenvalue) | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Hypothesised No. of CE(s)** | **Eigenvalue** | **Trace Statistic** | **0.05 Critical Value** | **Prob.**** | **Max-Eigen Statistic** | **0.05 Critical Value** | **Prob.**** |
| None * | 0.893485 | 340.3740 | 197.3709 | 0.0000 | 78.38152 | 58.43354 | 0.0002 |
| At most 1 * | 0.877892 | 261.9925 | 159.5297 | 0.0000 | 73.59982 | 52.36261 | 0.0001 |
| At most 2 * | 0.825253 | 188.3927 | 125.6154 | 0.0000 | 61.05463 | 46.23142 | 0.0007 |
| At most 3 * | 0.763028 | 127.3380 | 95.75366 | 0.0001 | 50.39339 | 40.07757 | 0.0025 |
| At most 4 * | 0.594351 | 76.94465 | 69.81889 | 0.0121 | 31.57934 | 33.87687 | 0.0917 |
| At most 5 | 0.565446 | 45.36531 | 47.85613 | 0.0841 | 29.17021 | 27.58434 | 0.0310 |

**Note:** Trace test indicates 5 cointegrating eqn(s) at the 0.05 level.
Max-eigenvalue test indicates 4 cointegrating eqn(s) at the 0.05 level.
* denotes a rejection of the hypothesis at the 0.05 level.
**MacKinnon, Haug and Michelis (1999) p-values.

**Table 5.19: Johansen Cointegration Test (Non-Oil GDP)**

| Unrestricted Cointegration Rank Test (Trace and Maximum Eigenvalue) | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Hypothesised No. of CE(s)** | **Eigenvalue** | **Trace Statistic** | **0.05 Critical Value** | **Prob.**** | **Max-Eigen Statistic** | **0.05 Critical Value** | **Prob.**** |
| None * | 0.927647 | 359.3648 | 197.3709 | 0.0000 | 91.91702 | 58.43354 | 0.0000 |
| At most 1 * | 0.867131 | 267.4478 | 159.5297 | 0.0000 | 70.64363 | 52.36261 | 0.0003 |
| At most 2 * | 0.835801 | 196.8041 | 125.6154 | 0.0000 | 63.23366 | 46.23142 | 0.0004 |
| At most 3 * | 0.759446 | 133.5705 | 95.75366 | 0.0000 | 49.86838 | 40.07757 | 0.0029 |
| At most 4 * | 0.680463 | 83.70211 | 69.81889 | 0.0026 | 39.93084 | 33.87687 | 0.0084 |
| At most 5 | 0.516555 | 43.77126 | 47.85613 | 0.1149 | 25.43859 | 27.58434 | 0.0918 |

**Note:** Trace test indicates 5 cointegrating eqn(s) at the 0.05 level.
Max-eigenvalue test indicates 5 cointegrating eqn(s) at the 0.05 level.
* denotes a rejection of the hypothesis at the 0.05 level.
**MacKinnon, Haug and Michelis (1999) p-values.

### 5.8.2 Long-term Elasticities from DOLS, FMOLS and CCR

As a robustness check of the results, additional cointegration methods were employed to examine the long-term relationships of interest approaches—specifically, FMOLS, developed by Phillips and Hansen (1990); DOLS, developed by Stock and Watson (1993); and CCR, developed by Park (1992). It is believed that the use of more than one estimator is crucial if there is concern about the robustness of the results (Narayan 2005). FMOLS is consistent with small sample sizes and is a semi-parametric approach. DOLS is a parametric approach in estimation of a long-term relationship and is employed for models where the variables are integrated in a different order, but nonetheless cointegrated. Finally, the CCR method implements only data transformation. The estimation results are integrated into Tables 5.20–5.22. The long-term elasticities from these three models also provide very similar results to the ARDL results in terms of signs and magnitudes. Moreover, all methods confirm the existence of cointegrating relationships among the variables. In general, the results are very close across all modes, confirming the robustness of the estimated models.

**Table 5.20: Robustness Check (Total GDP)**

| | ARDL | | FMOLS | | DOLS | | CCR | |
|---|---|---|---|---|---|---|---|---|
| TOTAL_GDP(−1) | 0.5661*** | (0.09) | 0.5664*** | (0.04) | 0.5661*** | (0.07) | 0.5801*** | (0.06) |
| MS | −0.0309 | (0.09) | −0.0256 | (0.04) | −0.0309 | (0.07) | −0.0101 | (0.07) |
| I | 0.0062** | (0.00) | 0.0058*** | (0.00) | 0.0062*** | (0.00) | 0.0057** | (0.00) |
| CBC | 0.1531** | (0.05) | 0.1485*** | (0.02) | 0.1531*** | (0.04) | 0.131** | (0.05) |
| INF | −0.4182** | (0.22) | −0.4267*** | (0.1) | −0.4182** | (0.16) | −1.1032** | (0.47) |
| INF(−1) | 0.4586** | (0.24) | 0.4551*** | (0.1) | 0.4586** | (0.17) | 1.2885** | (0.69) |
| INF(−2) | 0.6345*** | (0.21) | 0.6243*** | (0.1) | 0.6345*** | (0.16) | 0.3972 | (0.37) |
| ME | 0.3715*** | (0.05) | 0.3723*** | (0.02) | 0.3715*** | (0.03) | 0.3836*** | (0.04) |
| ME(−1) | −0.2533*** | (0.04) | −0.2537*** | (0.02) | −0.2533*** | (0.03) | −0.2621*** | (0.03) |
| MI | −0.0582 | (0.06) | −0.0532** | (0.03) | −0.0582 | (0.04) | 0.0839 | (0.08) |
| MI(−1) | −0.1153** | (0.04) | −0.1176*** | (0.02) | −0.1153*** | (0.03) | −0.2262*** | (0.07) |
| GE | −0.012 | (0.04) | −0.0147 | (0.02) | −0.012 | (0.03) | −0.1293** | (0.07) |
| GE(−1) | 0.2424*** | (0.05) | 0.2413*** | (0.02) | 0.2424*** | (0.03) | 0.3258*** | (0.08) |
| GR | 0.0753 | (0.05) | 0.0739*** | (0.02) | 0.0753** | (0.03) | 0.0621 | (0.04) |
| C | 1.1449*** | (0.38) | 1.1596*** | (0.17) | 1.1449*** | (0.28) | 1.1415*** | (0.26) |
| R-squared | 0.9953 | | 0.9952 | | 0.9953 | | 0.9985 | |
| Adjusted R-squared | 0.9921 | | 0.9917 | | 0.9921 | | 0.9975 | |

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

**Table 5.21: Robustness Check (Oil GDP)**

| | ARDL | | FMOLS | | DOLS | | CCR | |
|---|---|---|---|---|---|---|---|---|
| OIL_GDP(−1) | 0.6586*** | (0.13) | 0.6487*** | (0.06) | 0.6586*** | (0.08) | 0.6558*** | (0.1) |
| MS | −0.3858** | (0.14) | −0.3848*** | (0.06) | −0.3858*** | (0.09) | −0.3384** | (0.12) |
| I | 0.0055 | (0.01) | 0.0057** | (0.00) | 0.0055 | (0.00) | 0.0075 | (0.01) |
| I(−1) | 0.0118** | (0.01) | 0.012*** | (0.00) | 0.0118*** | (0.00) | 0.0111** | (0.01) |
| CBC | 0.3005*** | (0.1) | 0.2983*** | (0.04) | 0.3005*** | (0.06) | 0.2668** | (0.09) |
| INF | 0.1439 | (0.38) | 0.1223 | (0.17) | 0.1439 | (0.25) | −0.2531 | (0.74) |
| INF(−1) | 1.1715*** | (0.4) | 1.1707*** | (0.17) | 1.1715*** | (0.25) | 1.6699 | (1.08) |
| INF(−2) | 0.8314** | (0.37) | 0.8499*** | (0.17) | 0.8314*** | (0.23) | 0.6856 | (0.62) |
| ME | 1.0351*** | (0.08) | 1.0394*** | (0.04) | 1.0351*** | (0.05) | 1.0903*** | (0.09) |
| ME(−1) | −0.6719*** | (0.14) | −0.661*** | (0.07) | −0.6719*** | (0.09) | −0.7075*** | (0.12) |
| MI | −0.3451*** | (0.1) | −0.3503*** | (0.04) | −0.3451*** | (0.06) | −0.3901*** | (0.13) |
| MI(−1) | −0.1696** | (0.09) | −0.1741*** | (0.04) | −0.1696*** | (0.06) | −0.1056 | (0.17) |
| MI(−2) | −0.1212** | (0.06) | −0.1234*** | (0.03) | −0.1212*** | (0.04) | −0.1590** | (0.09) |
| GE | 0.1331** | (0.07) | 0.13*** | (0.03) | 0.1331*** | (0.05) | 0.0916 | (0.1) |
| GE(−1) | 0.2813*** | (0.08) | 0.2825*** | (0.03) | 0.2813*** | (0.05) | 0.2480** | (0.13) |
| GE(−2) | 0.2374*** | (0.06) | 0.2471*** | (0.03) | 0.2374*** | (0.04) | 0.3065*** | (0.07) |
| GR | 0.0759 | (0.08) | 0.0767** | (0.03) | 0.0759 | (0.05) | 0.0785 | (0.08) |
| C | −0.7118 | (0.44) | −0.7321*** | (0.19) | −0.7118** | (0.28) | −0.8494** | (0.34) |
| R-squared | 0.9936 | | 0.9940 | | 0.9936 | | 0.9932 | |
| Adjusted R-squared | 0.9833 | | 0.9876 | | 0.9873 | | 0.9759 | |

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

**Table 5.22: Robustness Check (Non-Oil GDP)**

| | ARDL | | FMOLS | | DOLS | | CCR | |
|---|---|---|---|---|---|---|---|---|
| NON_OIL_GDP(−1) | 0.4538*** | (0.1) | 0.4582*** | (0.07) | 0.4538*** | (0.08) | 0.495*** | (0.12) |
| MS | 0.2341** | (0.11) | 0.2503*** | (0.07) | 0.2341*** | (0.08) | 0.0887 | (0.27) |
| MS(−1) | −0.5143*** | (0.16) | −0.513*** | (0.1) | −0.5143*** | (0.12) | −0.1102 | (0.52) |
| MS(−2) | 0.4219*** | (0.11) | 0.4152*** | (0.07) | 0.4219*** | (0.09) | 0.1998 | (0.26) |
| I | 0.0029 | (0) | 0.0029 | (0) | 0.0029 | (0) | 0.003 | (0) |
| CBC | 0.0868 | (0.07) | 0.0757 | (0.05) | 0.0868 | (0.05) | 0.0475 | (0.09) |
| INF | −0.9671*** | (0.27) | −1.0403*** | (0.19) | −0.9671*** | (0.21) | −1.7578** | (0.73) |
| INF(−1) | −0.8175*** | (0.26) | −0.8618*** | (0.17) | −0.8175*** | (0.19) | −0.1719 | (0.79) |
| INF(−2) | 0.6324** | (0.24) | 0.6119*** | (0.15) | 0.6324*** | (0.18) | 0.6958 | (0.55) |
| ME | 0.0439 | (0.05) | 0.044 | (0.03) | 0.0439 | (0.04) | 0.0486 | (0.11) |
| ME(−1) | 0.1442** | (0.05) | 0.1552*** | (0.04) | 0.1442*** | (0.04) | 0.1415** | (0.07) |
| MI | 0.1755*** | (0.06) | 0.1797*** | (0.04) | 0.1755*** | (0.04) | 0.1685** | (0.08) |
| GE | 0.0541 | (0.05) | 0.0499 | (0.03) | 0.0541 | (0.04) | 0.0292 | (0.07) |
| GR | −0.0739 | (0.05) | −0.0739** | (0.03) | −0.0739** | (0.04) | −0.0554 | (0.08) |
| GR(−1) | −0.1081** | (0.04) | −0.1157*** | (0.03) | −0.1081*** | (0.03) | −0.0666 | (0.08) |
| GR(−2) | −0.0299** | (0.01) | −0.0322*** | (0.01) | −0.0299** | (0.01) | −0.0834** | (0.04) |
| C | 1.8257*** | (0.38) | 1.7533*** | (0.23) | 1.8257*** | (0.28) | 1.5922*** | (0.45) |
| R-squared | 0.9945 | | 0.9942 | | 0.9945 | | 0.9942 | |
| Adjusted R-squared | 0.9897 | | 0.9885 | | 0.9897 | | 0.9854 | |

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

## 5.9 Discussion of the Results

The analysis of the findings generated by the current study shows that Saudi total GDP and oil GDP respond in comparable patterns, while non-oil GDP provides very different results. The results are summarised in Table 5.23, which is followed by a discussion of the results.

**Table 5.23: Results Summary from a Significance Perspective**

| Policy | Variable | Effect | Total GDP | Oil GDP | Non-Oil GDP |
|---|---|---|---|---|---|
| Fiscal policy | Government expenditure | Long-term | +ve;Sig | +ve;Sig | -ve;Sig |
| | | Short-term | -ve;Insig | +ve;Sig, First Lag<br>-ve;Sig Second Lag | indeterminate |
| | Government revenues | Long-term | +ve;Insig | +ve;Insig | -ve;Sig |
| | | Short-term | indeterminate | indeterminate | -ve;Sig, First Lag<br>+ve;Sig Second Lag |
| Merchandise trade | Merchandise exports | Long-term | +ve;Sig | +ve;Sig | +ve;Sig |
| | | Short-term | +ve;Sig | +ve;Sig | +ve;Sig |
| | Merchandise imports | Long-term | -ve;Sig | -ve;Sig | +ve;Sig |
| | | Short-term | -ve;Sig, First Lag<br>+ve;Sig Second Lag | -ve;Sig, First Lag<br>+ve;Sig Second Lag | indeterminate |

| Policy | Variable | Effect | Total GDP | Oil GDP | Non-Oil GDP |
|---|---|---|---|---|---|
| Monetary policy | Money supply | Long-term | -ve;Insig | -ve ;Sig | +ve;Sig |
| | | Short-term | indeterminate | indeterminate | +ve;Sig, First Lag -ve;Sig Second Lag |
| | Interest rate | Long-term | +ve;Sig | +ve;Sig | +ve;Insig |
| | | Short-term | indeterminate | indeterminate | indeterminate |
| | Commercial banks' claims on the private sector | Long-term | +ve;Sig | +ve;Sig | +ve;Insig |
| | | Short-term | indeterminate | indeterminate | indeterminate |
| | Inflation | Long-term | +ve;Sig | +ve;Sig | -ve;Sig |
| | | Short-term | -ve;Sig | -ve;Sig | -ve;Sig |

**Note:** +ve = Positive; -ve = Negative; Sig = Significant; Insig = Insignificant

The following sections discuss the specific results for the three variables, including fiscal policy, merchandise trade and monetary policy. The results for the monetary policy cover money supply, interest rates, commercial banks' claims and inflation. The reporting of findings on merchandise trade outlines the exports and impacts. The next section starts with the presentation of results for fiscal policy, including government expenditures and GR.

### 5.9.1 Fiscal Policy

#### *5.9.1.1 Government Expenditure (GE)*

The findings of the current study show that GEs have a significant and positive long-term effect on total and oil GDP but a negative and significant impact on non-oil GDP. In the short term, the impact of GE was negative and insignificant for total GDP, positive and significant for oil-based GDP for the first period only and negative after that; it had no impact on non-oil GDP.

With regard to GE, there is no overall agreement among researchers on whether or not GEs are strong enough to influence economic development and growth. For example, Fasano-Filho and Wang (2001) investigated the long- and short-term relationships between fiscal expenditure policy and real non-oil GDP on GCC countries and did not identify any correlation between them. This lack of influence of GEs on non-oil economies was attributed to fiscal policies. Moreover, Ghali (1997) found no evidence to support the claim that GE affected output in Saudi Arabia in the period between 1960 and 1996. Kireyev (1998) studied the relationship between growth in non-oil GDP and public spending in Saudi Arabia in the period from 1969 to 1997 and concluded that government spending is positively correlated with growth in the non-oil sector. Similarly, Albatel (2000) tested the effects of changes in GE on growth in Saudi Arabia using data from 1964 to 1995 and noted that government plays an important role in promoting growth and development. Al-Obaid (2004) examined the long-term relationship between total government expenditure and real GDP in the case of Saudi Arabia and found a positive, long-term relationship between the share of government spending in GDP and GDP per capita. Alshahrani and Alsadiq (2014) investigated economic growth and government spending in Saudi Arabia and noted a correction of 34% in the long-term equilibrium per year, providing evidence of a positive correlation between government, the private sector

and GDP in the long-term. However, the results of the study by Alshahrani and Alsadiq (2014) indicated no short-term causality running from either the government or the private sector to GDP.

With conflicting findings on the effects of government spending on GDP—both oil- and non-oil based—a further review of this variable in the context of Saudi Arabia was warranted. The specific components of government expenditure have varying impacts on economic development. For example, Al-Jarrah (2005) examined the causal relationship between defence spending and economic growth for the period from 1970 to 2003 and found evidence of bidirectional causalities, wherein higher defence spending lowered economic growth in the long term. Similar results were reported by Mann and Sephton (2015), who confirmed that public expenditures on healthcare and defence tended to decrease real non-oil GDP, while public expenditure on education and housing had little or no impact on economic development.

Reflecting on the findings of the current study, the long-term perspective on government spending suggests that government expenditure has an overall positive effect on Saudi Arabia's total and oil GDPs; however, the crowding-out effect on the non-oil sector is evident. In the short term, the government spending had no effect on the non-oil sector, which requires further attention by policy-makers in the light of the economy diversification underway in the non-oil sector. The negative effects of this variable on total and oil GDPs can be attributed to the overall inefficiency of public spending, corruption and the lack of implementation of government development plans (Apata et al. 2018).

*5.9.1.2 Government Revenues (GR)*

The findings of the current study on government revenue confirmed their significantly negative effect on non-oil GDP in the long term, with no significant impact observed on total GDP and oil GDP. Government revenue was shown to have a negative and significant effect in the short term for the first period but generated positive results in the next period. This finding is in line with the argument of Kabir (2016) on the mismanagement of oil revenue in Saudi Arabia. According to Kabir, government revenue from oil did not contribute to development and growth in other sectors. He recommended

that the government continue building the infrastructure needed for the diversification of the economic sector.

Persistent streams of oil revenues have a long-lasting impact on GDP in oil-exporting countries, including Saudi Arabia (Kabir 2016). This finding implies that GRs finance GDP and economic development. However, the impact of GR on economic growth differs for oil-exporting countries. The relationship between revenue and oil prices is straightforward and linear: higher prices lead to higher revenues. An increase in oil prices may help the Government of Saudi Arabia to address the current challenges of low savings without engaging in borrowing from abroad (Dreger & Rahmani 2016).

Considering the influence of GR on economic growth, it should be added that the scope of these effects can be hindered by the insufficient absorptive capacity of countries. The positive effects of GR on GDP, including oil GDP, are not to be taken for granted because higher oil prices can act as an obstacle to long-term growth. Cavalcanti, Mohaddes and Raissi (2012) and Mohaddes and Pesaran (2013) argued that this resource curse is related to the volatility of revenues and not to the endowment of resources per se.

Lane and Tornell (1996) stressed that price hikes may foster an increase in fiscal redistribution and that GDP growth could be lower if legal institutions are weak and the industry is controlled by influential interest groups. Mehlum, Moene and Torvik (2006) and Robinson, Torvik and Verdier (2006) reaffirmed that the abundance of natural resources will decrease overall income if institutions are 'grabber-friendly'. Consequently, the facts that Saudi Arabia is rich in natural resources and that its government revenue is heavily dependent on a single source of income (the oil sector) can be obstacles to its long-term economic development and growth.

As oil prices are not controlled by the government of a single country, the heavy dependence of government revenue on oil prices exposes the national budget to multiple risks. Alhateeb et al. (2017) urged that declining oil prices and their consequent impact on oil revenue may pose a challenge to the economy unless it diversifies its economic base and reduces its dependence on the oil sector. For Saudi Arabia, Al Rasasi, Qualls and Alghamdi (2018) added that the government's role in economic development will change in line with Vision 2030. Rather than being the distributor of oil largesse, the government will become more engaged in investing in and developing the infrastructure

for private sector development. This objective requires the shift away from oil-dominated economic models towards the growth and expansion of the private sector with the help of supportive regulations and policies. The government should continue overseeing the conversion of oil wealth into financial investments, where the monetary return would replace oil revenues. The government should also focus more attention on providing vital services to citizens as well as establishing business environments that are favourable to the development of non-oil sectors, which have the potential to contribute to the government revenue base in larger proportions than oil currently does (Raifu & Raheem 2018).

The results of the current study on government revenue suggested a positive and significant effect in the long term on total and oil GDPs. Saudi Arabia heavily depends on oil exports for its national income, but the price cannot be controlled and can directly affect short-term GR. At the same time, the results confirmed the hypothesis that government revenue has a positive impact on the non-oil sector in the short term, but this impact shifts towards negative effects in the long term.

#### *5.9.1.3 Concluding Remarks for Fiscal Policy*

The findings of the current study and the results generated through previous research clearly indicate the need for intensive fiscal spending programmes to be utilised in future generations. For non-oil GDP, the KSA should target GE more effectively because the current impact of this variable on non-oil GDP is negative. In addition, the active participation and involvement of the national government is required to further support the enhancement of economic growth and sustainable, long-term development. One of the key areas that requires immediate attention is investment in private sector development and the creation of a favourable business climate in the country.

### 5.9.2 Merchandise Trade

#### *5.9.2.1 Merchandise Export (ME)*

The results of the current study demonstrate that ME had a significant and positive effect on all GDPs in both the long and short term in the context of Saudi Arabia. This finding is consistent with the theoretical and empirical predictions. Given the fact that Saudi Arabia follows an export-led growth path, where economic growth has an influence on

the import growth process with export growth channels, it was found that export growth has a positive impact on output growth in the Saudi economy. This outcome contributes to the increased demand for imports and adheres to the secondary literature findings (Alhowaish 2014b).

The positive and significant relationship between exports and economic growth in Saudi Arabia and other Arab Gulf countries has been confirmed in an earlier study by Al-Yousif (1997) and via more recent findings by Altaee, Al-Jafari and Khalid (2016). Alodadi and Benhin (2015) further suggested that the economic growth of Saudi Arabia is fuelled by three factors: oil exports, investment in the oil sector and GE. Conversely, private investment has more influence on non-oil sectors when the export level is lower than that of the national oil sector. Currently, oil export remains the key driver of economic growth in Saudi Arabia (Haque & Khan 2019). Along with exports, gross capital formation and financial development, as discussed in earlier sections of this chapter, have an overall positive effect on the economic growth of Saudi Arabia (Altaee, Al-Jafari & Khalid 2016).

*5.9.2.2 Merchandise Imports (MI)*

Unlike the findings on exports, the study results for MI showed that this variable had a significant and negative effect on total and oil GDPs both in the short and long term. Both the total GDP and the oil GDP had positive and significant impacts in the second lag. For non-oil GDP, MI had a long-term positive and significant effect, which was indeterminate in the short term. The overall negative effect of imports on total and oil GDP—although positive in the second lag (short term)—was consistent with the standard trade theory, particularly with regard to leakage for the economy. The impact on non-oil GDP was positive in the long term because this variable mostly affects the private sector.

Previous studies on imports and their impact on economic growth confirm the findings generated through the current research. The negative impact of MI on economic development has been proven not only for Saudi Arabia, which has an oil-dependent economic model, but also for 82 countries worldwide, particularly developing countries (Liu, Luo & Shi 2003). Uğur (2008) confirmed the positive economic growth in the short term and the negative effects of imports in the long term for Turkey. The findings reported by Uğur (2008) were confirmed in the study by Altaee, Al-Jafari and Khalid (2016),

where the imports proved to make a negative contribution to economic growth both in the long and in the short term in Saudi Arabia. Alhowaish (2014b) provided evidence to support the claim that effects of imports on economic growth are too insignificant to play any role in export growth, regardless of the short-or long-term orientation of the analysis.

Investigating the relationship between the oil exports, economic growth, imports and non-oil exports of 12 OPEC member countries, Karamelikli, Akalin and Arslan (2017) found a positive correlation between exports and imports. Moreover, Karamelikli, Akalin and Arslan confirmed that higher oil exports lead to the increase of public consumption, higher demand for technology, intensified production of semi-finished goods and stimulated imports. For OPEC countries, an increase in oil exports does not have a negative economic effect (Karamelikli, Akalin & Arslan 2017).

*5.9.2.3 Concluding Remarks for Merchandise Trade*

Given that the nature of the Saudi economy is based on oil and other natural resources, it is reasonable to project that the oil sector—and oil export-oriented policies—will continue to be the most important and strongest player in the national economy and the dominant driver of real output growth, as argued by Alhowaish (2014b). Consequently, the revenue from oil exports is the key determinant of economic growth as measured by GDP. Even though the Saudi economy cannot, and should not, radically shift away from the oil industry, this source of national revenue is accompanied by uncertainty, particularly in light of the potential volatility of international oil markets and the geopolitical instability of the Middle East, in general, and of the Gulf States, in particular (Alhowaish 2014b).

To achieve long-term sustainable economic growth, Saudi policy-makers should gradually shift their focus from dependency on oil revenues to more intensive efforts to diversify national import-oriented policy and to substitute goods for oil and oil-related products, while also expanding the range of international markets. Paths to support the growth of non-oil export sectors include the liberalisation of the service and manufacturing sectors, the encouragement of foreign investment and the development of human and physical capital. These are the preconditions for sustainable, long-term economic growth in Saudi Arabia (Alhowaish 2014a).

### 5.9.3 Monetary Policy

The analysis of the four variables of monetary policy, namely, money supply, interest rates, CBC and inflation, revealed a number of interesting findings for further discussion. As an open economy and the largest oil producer and exporter internationally, Saudi Arabia faces challenges in maintaining the macro-stability necessary for improved economic performance. Therefore, the national policy conducted by SAMA should play the role of smoothening fluctuations and ensuring monetary stability. However, Saudi Arabia maintains a fixed exchange rate regime, pegging the riyal to the USD with the exchange rate as the nominal anchor. While SAMA must monitor the US federal funds rate to minimise pressure on the exchange rate, its mandate clearly emphasises policies targeting the containment of inflation and the accommodation of domestic demand. According to SAMA, the objectives of monetary policy in Saudi Arabia are focused on maintaining the stability of the price level and the development of the financial sector under strong supervision and control to prevent fluctuations that may cause disruptions in economic activities (Almounsor 2015).

#### *5.9.3.1 Money Supply (MS)*

The study confirmed that money supply has a significant and negative effect on oil GDP in the long term. In the short term, the money supply proved to be an indeterminate influence on oil GDP. With regard to total GDP, the money supply had no effect on the economy in the short term and an insignificant effect in the long term. These findings align with the conclusions generated through previous studies, such as that by Al-Yousif (2000), who argued that a lack of well-developed financial markets has led to the ineffectiveness of monetary policy in Saudi Arabia. The insignificant negative impact of money supply on economic growth was also confirmed in a number of studies conducted in economic models in developing countries other than Saudi Arabia. Further, Adusei (2013) investigated this issue in Ghana in the period from 1971 to 2010 and found that financial development (including money supply) undermines economic growth. Gatawa, Abdulgafar and Olarinde (2017) confirmed this with evidence that broad money supply and interest rate were negatively correlated with economic growth in their study in Nigeria in the period spanning 1973 to 2013. Ihsan and Anjum's (2013) study on the Pakistan economy between 2000 and 2011 found a statistically insignificant and negative impact of money supply on GDP, while Ehigiamusoe (2013), researching the impact of

the money market on economic growth in Nigeria from 1980 to 2012, ascertained that the link between the money market and the real sector of the economy remains very weak.

For non-oil GDP, the money supply variable had a significant and positive effect in the short term (for the first lag), but a negative and significant effect in the long term (for the second lag). This finding confirms the results and conclusions reported in previous research (e.g., Al-Yousif 2000; Adusei 2013; Gatawa, Abdulgafar & Olarinde 2017; Ihsan & Anjum 2013). However, Dingela and Khobai's (2017) South African study showed a positive relationship between money supply and economic growth in both short and long run. However, it should be added that South Africa differs from Saudi Arabia in terms of dependence on oil and the diversification of its economy. Al-Bazai (1999) further examined the role of money in Saudi Arabia and found bidirectional causation between money supply and nominal non-oil GDP.

Al-Jasser and Banafe (1999) explained that SAMA has little control over monetary policy, which is a contributing factor to SAMA's overall ineffectiveness in Saudi Arabia. In a pegged exchange rate regime, monetary policy is subordinated to maintaining the desired exchange rate. In addition, merchandise trade fosters the transmission of monetary influence from abroad, making it a challenge to sustain an autonomous monetary policy at a fixed exchange rate along with perfect asset substitutability.

*5.9.3.2 Interest Rate (I)*

Unlike money supply, the effect of interest rates on the economy showed the opposite result. In particular, the findings of the study on Saudi Arabia confirmed that interest rates have a strong positive effect on total GPD as well as oil GDP in the long term. Saudi riyal interest rates closely track US dollar interest rates with a minor premium (Ramady 2010). For these reasons, the interest rate has significant implications in the long term when the variable remains uncontrolled. In the short term, interest rates had indeterminate effects on total GDP, oil GDP and non-oil GDP, necessitating a closer analysis of the implications of this variable on the economy and the development of more independent policies. In the long term, the impact on non-oil GDP was positive and non-significant.

Similar findings were also reported in the study by Di Giovanni and Shambaugh (2008), who explored the relationship between interest rates in major industrial countries—one of which was KSA—and real output growth in other countries for the period from 1973

to 2002. In particular, they concluded that while interest rates in the base countries may have an effect on other countries' real economies, this impact is significant only for countries with pegged exchanged rates. Di Giovanni and Shambaugh (2008) did not argue in favour, or against, pegging but rather provided the estimates of costs and benefits to economies with fixed exchange rates. It should be emphasised that the lost monetary autonomy that accompanies pegging has significant real impacts on national economies. With a floating exchange rate, a country exposes itself to volatility owing to changes in the nominal exchange rate, but pegging does not eliminate volatility. Instead, it forces a country's interest rates to follow the base country rates, generating more volatility in GDP by eliminating countercyclical monetary policy as an option.

In the current study, the interest rate proved to have a significant and positive effect on total and oil GDP; however, it cannot be used as a monetary tool because charging interest is forbidden under Islamic law. In Saudi Arabia, even though the interest rate is not recognised officially, it exists on the market. In particular, in the private sector, commercial banks pay interest on savings and term/time deposits and charge interest on loans (Akikina & Al-Hoshan 2003). Figure 5.11 illustrates the change in interest rates for the previous 37 years; interest rates have been steadily decreasing since their exceptional rise in previous years. The downward shift is attributed to the US, the EU and Japan's joint near-to-zero interest rate move (Ahearn et al. 2002). This example supports an absence of interest rate; hence, an opportunity arises for other Islamic instruments to be introduced to enhance the control of monetary policy within the Saudi Arabian economy.

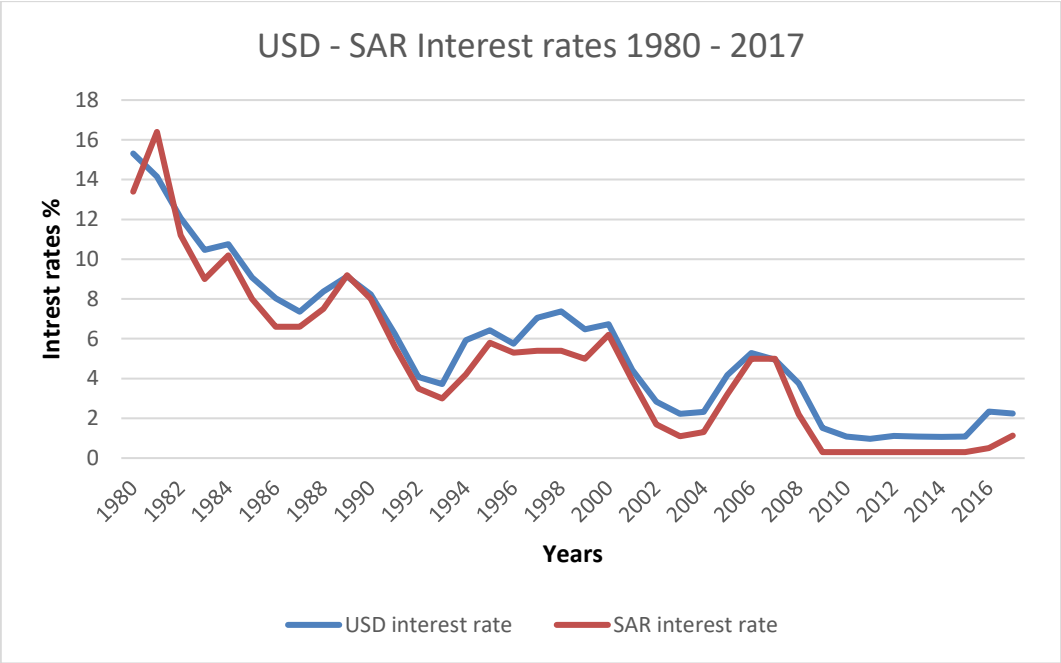



**Figure 5.11: USD–SAR Interest Rates 1980–2017**

*5.9.3.3 Commercial Banks' Claims on the Private Sector (CBC)*

The same scope and degree of influence as for interest rates is also reported for commercial bank claims on the private sector (CBC) under SAMA regulation. This variable proved to be indeterminate in the short term but had a significant and positive effect on both total GDP and oil GDP over the long term. Part of this finding matches the conclusions reached by Al-Bassam (1990), who confirmed that CBC has an insignificant effect on non-oil GDP, particularly over the short term.

There is no agreement among researchers on whether CBC has a positive or negative impact on growth. One of the fundamental principles in modern economics is the idea that finance plays a central role in economic development. As a result, banks act as financial intermediaries and have significant influence on transforming deposits into financial assets, facilitating capital formation and trade activities in the country. Further, credit by commercial banks to the private sector is an essential source of external finances. Molapo and Damane (2015) emphasised that the private sector is a highly efficient facilitator of economic development, which in turn makes commercial banks an important element in the economic chain. While the debate on the role of finance in economic development in developing countries is ongoing, the basic principles as outlined in the first works of Schumpeter (1912) are still valid. In particular, Schumpeter advocated the

concept of finance-led growth, according to which a 'financial intermediation role is generally performed by the financial sector, which channels savings into productive investment. Deposit-taking institutions, in particular, are well recognised for performing the crucial role of sourcing finance to support private sector consumption and investment'. Thus, CBC is an important variable shaping the development of the financial sector.

Ibrahim's (2013) study on the relationship between financial development and economic growth for Saudi Arabia between 1989 and 2008 found that domestic bank credit to the private sector had a significant and positive effect on economic growth in the long term but an insignificant and negative effect in the short term. Osman (2014) investigated the relationship between private sector credit and economic growth in Saudi Arabia in the period from 1974 to 2012 and provided evidence to support the claim that there is a significant long-term and short-term relationship between private sector credit and economic growth. This implies that commercial bank credits to the private sector would contribute to economic development in this country.

Overall, the effects of CBC on the private sector were positive and significant for total and oil GDP and not significant for non-oil GDP. Therefore, to improve the financial development of Saudi Arabia, the government is advised to ease credit constraints on SMEs and to reconsider the allocation of capital to accelerate economic growth.

*5.9.3.4 Inflation (INF)*

Reflecting on inflation, the results of the current study confirm that this variable has a significant, long-term positive effect on total GDP and oil GDP, whereas its impact on non-oil GDP is significant and negative. In the short term, its effects on all types of GDP were significant and negative. With a lack of agreement on the relationship between inflation and economic growth, there is a scholarly and empirical debate on inflation as a variable impacting GDP. A number of studies confirmed the negative correlation between inflation and economic growth. In particular, Erbaykal and Okuyan (2008) examined the relationship between inflation and economic growth in Turkey in the period from 1987 to 2006 and found no statistically significant relationship in the long term, while confirming a negative impact in the short term. Saaed (2007) explored the relationship between inflation and economic growth in the context of Kuwait for the period from 1985

to 2005 and generated evidence showing a long-term and strong inverse relationship. Ahmed and Mortaza (2005) also found a statistically significant, long-term negative relationship between inflation and growth in the context of Pakistan. Exploring the correlation within the Brazilian economy, Faria and Carneiro (2001) concluded that inflation does not affect economic growth in the long term, while noting a negative relationship between inflation and economic growth in the short term.

Conversely, there are a number of studies providing findings that indicate positive correlation between inflation and economic growth. For example, Mallik and Chowdhury (2001) examined the short- and long-term relationships between inflation and economic growth for four South Asian economies (Bangladesh, India, Pakistan and Sri Lanka) and found the variable to be positively and significantly influential for all these countries. The findings for Saudi Arabia adhere to these positive correlation results. Alkahtania and Elhendy (2014) examined the threshold effect of inflation on real GDP over the period spanning 1980 to 2010 and found a non-linear relationship between the two variables and an optimal inflation rate for GDP growth at 4%. Below this threshold level, inflation has a statistically significant and positive effect on GDP, but this positive relationship becomes a negative one when it exceeds 4% (Alkahtania & Elhendy 2014).

Al Khathlan (2011) suggested that inflation in the world economy is the major factor influencing inflation in Saudi Arabia. A study by Altowaijri (2011) linked inflation in Saudi Arabia to foreign prices and exchange rates. Ramady (2009) concluded that, in addition to these factors, money supply, interest rates and riyal depreciation are the main causes of inflation in Saudi Arabia; however, pegging to the USD also causes the Saudi economy to experience imported inflation.

Global factors, including the appreciating US dollar, affect the inflation path in Saudi Arabia. However, inflation is also attributed to domestic causes, such as ongoing fiscal consolidation, which results in a slowdown of non-oil economy development, a negative output gap and monetary growth ease. As fiscal consolidation continues, a lower inflation environment could be longer lasting. In recent years, with positive long-term inflation in total and oil GDP, the contributing factors include high government spending, high monetary growth and imported inflation. These factors have a negative effect on non-oil GDP inflation. Al-Hamidy (2009) noted that one positive outcome of this is the intensification of economic activity, especially in the private sector, as the economy

approaches its capacity. It should be added that an increase in government spending in Saudi Arabia caused an accelerated growth in the money supply, implying that a rise in GE correlates with the income generated through oil exports, rather than with the negative effects triggered by monetary policy impulses.

In addition, the results of the study suggested that inflation for all GDP sectors is significantly negative in the short term. Although ongoing fiscal strengthening might influence prices, transient shocks, such as taxes, energy and water-price reforms, VAT and higher fees for expatriate workers, will temporarily raise inflation. With effective monetary instruments for all GDP sectors, policy-makers can ensure compliance with SAMA, following the strategy of inflation targeting to achieve price stability.

#### *5.9.3.5 Concluding Remarks for Monetary Policy*

The findings on monetary policy suggest that the case of Saudi Arabia only partially fits existing theoretical models and primary data results on the impact of monetary policy variables on economic growth. Currently, Saudi Arabia has an open economy but it lacks well-developed, independent financial markets. The nation's earnings accrue mostly through the sale of oil, which makes the country vulnerable to oil prices. Moreover, as interest rates are not officially recognised in Saudi Arabia, SAMA is limited in the availability and effectiveness of monetary tools and targets. In the study by Akikina and Al-Hoshan (2003) regarding the monetary dependence of the Saudi Arabian Monetary Authority, researchers shed light as to how SAMA can be effective and shape both monetary and fiscal policy in KSA. In this study, four proxies for monetary policy were examined. The analysis revealed contrary effects of monetary policy in the long term and indeterminate effects in the short term. Therefore, SAMA should explore the development of innovative Islamic instruments, such as Sukuk as well as pursuing an independent monetary policy to achieve economic goals.

### 5.9.4 Concluding Remarks for Fiscal and Monetary Policy

Given the size of the oil sector and its dominance in GR in Saudi Arabia, the fiscal policy appears to be the most suitable macroeconomic instrument to sustain economic stability and contribute to economic growth in the country in the context of total and oil GDP (Alshahrani & Alsadiq 2014).

The positive relationship between fiscal policy variables and economic growth, as concluded with the findings generated through the current study—namely, GE on total and oil GDP—has also been reported in previous research (Kumar 2017; Bokreta & Benanaya 2016; Chowdhury & Afzal 2015; Cyrus & Elias 2014; Moayedi 2013; Topcu, Kuloglu, & Lobont 2015; Malawi 2009; Kaur & Kaur 2008; Latif & Chowdhury 1998). Kumar (2017) empirically proved a positive correlation between fiscal policy and economic growth. In addition, previous studies supported the hypothesis that the correlation between monetary policy, namely, money supply and economic growth, is also positive, as shown in the results for oil GDP (Richard, Muriu & Maturu 2018; Ajayi & Aluko 2016; Saqib & Aggarwal 2017; Hasan et al. 2016; Hussain 2014; Havi & Enu 2014; Adeniji & Evans 2013; Rakic & Radenovic 2013; Musa & Asare 2013; Senbet 2011; Jawaid, Qadri & Ali 2011). Although different parts of the GDP are affected differently by these policies, the current study findings are in agreement with the conclusions on the relationship between monetary policy and fiscal policy as well as its effects on economic growth, as discussed in the following studies: Adegoriola (2018), Okorie, Sylvester and Simon-Pete (2017), and Mahmood and Sial (2011), Jawaid, Arif and Naeemullah (2010).

## 5.10 Summary

The objective of the current research was to identify the most effective policy to positively affect national GDP in Saudi Arabia. A number of variables reviewed in this research had the potential to affect Saudi GDP sectors in both the short and long term.

As this study investigates the effectiveness of fiscal and monetary policies, along with openness to the world, the results of the short- and long-term perspectives demonstrated the substantial effects of each instrument on the sectors of the Saudi GDP. Saudi Arabia's heavy dependence on the oil sector led to ME being most influential on GDP sectors in the short and the long term. These results suggest the importance of divorcing the economy from oil because fluctuations in the oil price will have a substantial effect on Saudi GDP. Regarding the most effective policy instrument for each part of the GDP, fiscal policy proved to have significant substantial effects on the total and oil GDPs; however, monetary policy was more effective on non-oil GDP. Hence, monetary policy must be greater utilised to divert the economy away from oil. The provision of empirical results on the effectiveness of fiscal and monetary policy on the GDP sectors of Saudi

Arabia is crucial for policy-makers in Saudi Arabia in their attempt to diversify the economy and make it more stable.

Saudi Arabia is a fiscally dominant and open economy. Fiscal policy plays a more significant role than monetary policy in influencing economic conditions in general and total and oil GDP in particular. Monetary policy has been circumscribed by GE and the openness of the economy, which means it cannot be controlled, even though it still has a positive effect on non-oil GDP. Chapter 6 will summarise the study and its key conclusions, providing a discussion of policy implications and recommendations. It will revisit the research problem, reflect on the results and outline the contributions to knowledge, setting the directions for future research and defining the limitations of the current study.

# Chapter 6: Summary, Conclusion and Implications

## 6.1 Introduction

Chapter 5 discussed the details of the estimates of the three models employed by this study. The purpose of Chapter 6 is to provide a summary of the study and its key conclusions, to examine the policy implications, to specify the limitations and to offer specific recommendations on how to support the economic development of Saudi Arabia. The current thesis has made a valuable contribution to the discourse on the role of the key economic policies in the Saudi economy. This chapter is arranged as follows. Section 6.2 summarises the research, addressing the research problem introduced in Chapter 1. Section 6.3 offers a discussion of the research conclusions drawn from the results in Chapter 5. Section 6.4 outlines the policy implications, while Section 6.5 reviews the study's contribution to knowledge based on the analysis of the findings. Section 6.6 acknowledges the limitations of the study and Section 6.7 proposes future directions for research.

## 6.2 Research Summary

Fiscal and monetary policies are the two main macroeconomic policies adopted by countries to control and stabilise their economies. It is, therefore, vital for policy-makers to gain a detailed understanding of the effects of these policies and their interactions to aid the process of policy formulation. With this in mind, the aim of this research is to measure the impacts of fiscal and monetary policies on the economy of KSA.

Effective monetary policy sustains efficiency in the management of money supply and demand and of inflation control. In contrast, effective fiscal policy implies the management of governmental expenses and revenues to facilitate economic growth and development. When both policies are well-designed and properly planned, national governments are empowered to achieve sustainable GDP growth both in the short and in the long term.

As outlined in Chapter 1, the research proplem for the current study was 'To examine the effectiveness of fiscal policy and monetary policy on Saudi economy'.

In the case of the KSA, decision-makers must deal with the reality of Saudi overreliance on petroleum-based products. Because of its large reserves of fossil fuels, Saudi Arabia has managed to maintain a successful position on the global scene as one of the major oil producers in the world. However, the impending depletion of fossil-fuel reserves has motivated the government to diversify the economy. Although the kingdom is currently a commodity-based economy, the government has stated its clear intentions to shift the country to a diversified knowledge economy through the strategic Vision 2030. These changes to the Saudi society and economy mean that authorities must revise their monetary and fiscal policies, incorporating the dynamic nature of the economy's revenue base.

Following the above research problem, the following research questions were addressed in the thesis:

**Research Question 1**: What is the long-term effect of fiscal policy on the Saudi economy, measured by GDP, oil GDP and non-oil GDP?

**Research Question 2:** What is the short-term effect of fiscal policy on the Saudi economy, measured by GDP, oil GDP and non-oil GDP?

**Research Question 3:** What is the long-term effect of monetary policy on the Saudi economy, measured by GDP, oil GDP and non-oil GDP?

**Research Question 4:** What is the short-term effect of monetary policy on the Saudi economy, measured by GDP, oil GDP and non-oil GDP?

**Research Question 5**: What is the long-term effect of merchandise trade on the Saudi economy, measured by GDP, oil GDP and non-oil GDP?

**Research Question 6:** What is the short-term effect of merchandise trade on the Saudi economy, measured by GDP, oil GDP and non-oil GDP?

Following from the above, the specific research objectives were:

**Research Objective 1:** To estimate the effect of fiscal policy on Saudi Arabia's economy.

**Research Objective 2:** To estimate the effect of monetary policy on Saudi Arabia's economy.

**Research Objective 3:** To estimate the effect of merchandise trade (imports and exports) on Saudi Arabia's economy.

Based on the literature and the adopted model, the following variables were identified as the most relevant determinants of total GDP, oil GDP and non-oil GDP: money supply (MS), interest rates (I), commercial banks' claims on the private sector (CBC), inflation (INF), merchandise exports (ME), merchandise imports (MI), government expenditures (GE) and government revenues (GR).

The main model was estimated under an ARDL process for the period from 1980 to 2017. A series of pre-estimation diagnostics were conducted to determine the optimal model specification and a series of post-estimation robustness tests were also undertaken.

## 6.3 Research Conclusions

Table 6.1 presents the summary of the findings concerning the impact of the selected variables of fiscal policy, merchandise trade and monetary policy on total GDP, oil GDP and non-oil GDP.

**Table 6.1: Results Summary**

| Policy | Variable | Effect | Total GDP | Oil GDP | Non-Oil GDP |
|---|---|---|---|---|---|
| Fiscal policy | Government expenditure | Long-term | +ve;Sig | +ve;Sig | -ve;Sig |
| | | Short-term | -ve;Insig | +ve;Sig, First Lag -ve;Sig Second Lag | indeterminate |
| | Government revenues | Long-term | +ve;Insig | +ve;Insig | -ve;Sig |
| | | Short-term | indeterminate | indeterminate | -ve;Sig, First Lag +ve;Sig Second Lag |
| Merchandise Trade | Merchandise exports | Long-term | +ve;Sig | +ve;Sig | +ve;Sig |
| | | Short-term | +ve;Sig | +ve;Sig | +ve;Sig |
| | Merchandise imports | Long-term | -ve;Sig | -ve;Sig | +ve;Sig |
| | | Short-term | -ve;Sig, First Lag +ve;Sig Second Lag | -ve;Sig, First Lag +ve;Sig Second Lag | indeterminate |
| Monetary policy | Money supply | Long-term | -ve;Insig | -ve;Sig | +ve;Sig |
| | | Short-term | indeterminate | indeterminate | +ve;Sig, First Lag -ve;Sig Second Lag |
| | Interest rate | Long-term | +ve;Sig | +ve;Sig | +ve;Insig |

| Policy | Variable | Effect | Total GDP | Oil GDP | Non-Oil GDP |
|---|---|---|---|---|---|
| | | Short-term | indeterminate | indeterminate | indeterminate |
| | Commercial banks' claims on the private sector | Long-term | +ve;Sig | +ve;Sig | +ve;Insig |
| | | Short-term | indeterminate | indeterminate | indeterminate |
| | Inflation | Long-term | +ve;Sig | +ve;Sig | -ve;Sig |
| | | Short-term | -ve;Sig | -ve;Sig | -ve;Sig |

**Note:** +ve = Positive; -ve = Negative; Sig = Significant; Insig = Insignificant

The monetary policy analysis generated the results related to money supply, interest rate, CBC and inflation. The results indicated that money supply has a negative long-term impact on oil GDP and total GDP but a positive impact on non-oil GDP. The research showed that the long-term relationship between money supply and oil GDP was negative. Information on the current monetary policy was found to be ineffective in its interactions with the total GDP. At the same time, the short-term relationship between money supply and non-oil GDP was significantly positive. The findings on money supply entailed recognition of its poor impact on the economy, which concurred with the findings of Al-Yousif (2000), Adusei (2013), Gatawa, Abdulgafar and Olarinde (2017) and Ihsan and Anjum (2013). The present study found that interest rates had a major influence on total GDP and oil GDP in the long term but an insignificant effect on non-oil GDP. This finding affirms the currently held view that the impact of the interest rate is strengthened in pegged countries as opposed to those on a floating exchange rate regime (Di Giovanni & Shambaugh 2008). Therefore, the current policy of the pegged exchange rate of the KSA was justified as being instrumental in shaping the growth of GDP. The influence of CBC on the private sector was found to be indeterminate for total GDP and oil GDP in the short term and positive and significant in the long term. CBC had no significant effect on non-oil GDP. Based on these results and in line with the findings generated by Al-Malkawi, Marashdeh and Abdullah (2012), Samargandi, Fidrmuc and Ghosh (2014) and Alghfais (2016), credit constraints should be reduced for SME companies.

The research found a significant and positive influence of inflation on total and oil GDP and a significant and negative impact on non-oil GDP in the long term. The short-term effects were negative and significant for the two components of GDP and the total GDP. Regarding the merchandise trade, the total exports were found to have a significant positive impact on the two components of GDP both in the short and long term. These findings support those of Al-Yousif (1997), as well as more recent studies, such as those by Alodadi and Benhin (2015) and Altaee, Al-Jafari and Khalid (2016). MI had significant, negative results for total GDP, oil GDP and non-oil GDP in the long term. For the short term, the effects were indeterminate for non-oil GDP and mixed for total and oil GDP.

GE had positive, long-term impacts on the total and oil GDPs, but a negative effect on non-oil GDP. Previous research produced conflicting results on the role of this variable

in fiscal policy. The GR variable had a negative impact on non-oil GDP in the long term and an insignificant influence on the other types of dependable variables, agreeing with the results of Kabir (2016). In the short term, the result was significant and negative for the first lag, but significant and positive for the second lag for non-oil GDP. For total GPD and oil GDP, the short-term effects of GRs were indeterminate. The provision of services to citizens is a priority of the government (Raifu & Raheem 2018). Hence, the use of revenues should be revised, while their further use should correspond with the national goals that would benefit all members of society.

With the findings inclining towards a recommendation to diversify the country's non-oil economies, the results nonetheless confirmed that total, oil and non-oil GDP are positively affected by fiscal instruments in the long term. However, the findings did not support the overall effectiveness of monetarist tools, necessitating a more focused approach to minimise the conflict and disproportionate growth among sectors. Macroeconomic stabilisation is a particularly challenging objective given the risk of trade shocks and the absence of a monetary policy independent of the Government of KSA. With a lack of strong automatic stabilisers and a rather narrow tax base, autonomous spending is the main macroeconomic instrument available to dampen the effect of large oil price swings in Saudi Arabia. According to the Keynesian model, government spending boosts economic activity and has the capacity to promote economic development in the long term.

Conversely, the monetarist policy emphasises money supply as the key macroeconomic component in the strategic planning of national economic development. Changes in the money supply are the most essential determining factor of the rate of economic growth and behaviour (Omodero 2019). The monetarists consider the size of the money supply to be more significant than any other factor influencing the economy. According to Khabo and Harmse (2005), there is a direct link between the monetary sector and the real economic sector. The implication of these conclusions is that SAMA has the authority to exert more influence on economic growth rates because the monetary policy tools are under its control. Whereas the Keynesian framework argues in favour of government intervention and the monetarists emphasise the importance of free trade and market, the case of Saudi Arabia offers a unique landscape for theory development and knowledge

building for economies with strong governmental intervention, mono-industry focus and diversification efforts.

As the findings of the study reported the conflict between monetary policy and fiscal policy, the Government of Saudi Arabia should consider the mutual effects of these policies on one another. The recommendation is to develop fiscal policies first and, only afterwards, for the relevant departments to detail monetary policies to prevent conflict between policies (Adam & Billi 2014). The strategy of policy implementation should include a stage in which experts explore possibilities for policy interactions to be either positive or neutral. Omitting this action would make the KSA vulnerable to the potentially ineffective implementation of fiscal and monetary policies, hindering economic growth in the short and long term (Chen, Leeper & Leith 2015). The KSA would benefit from the use of an unconstrained fiscal policy alongside the automatic stabilisation of business cycle fluctuations, while the monetary policy should focus on the dual mandates of mitigating inflation and stabilising output. The findings of the study showed that the KSA should resort to untraditional and creative approaches in the development of fiscal and monetary policy and act innovatively in finding the best combination (Chuku & Middleditch 2016). Typically, commodity-oriented countries should create fiscal and monetary policies that would enhance the functioning of their central commodities (Chuku & Middleditch 2016).

## 6.4 Policy Implications

The empirical results yielded important monetary and fiscal policy implications for the Saudi government, as discussed in this section. Based on the results of the current research and academic knowledge generated through previous studies on macroeconomics, in general, and the situation in Saudi Arabia, in particular, the suggestion is for the government to invest revenue in different industries to propel the country into economic growth, as outlined by Vision 2030. The analysis of the findings on fiscal policy, monetary policy and merchandise trade set the foundation for the following implications.

The implementation of a new policy would not render immediate results because changes require time to come into full effect. The evaluative processes, the assessment of global factors affecting the economy and national reforms should be considered at early stages to ensure the effective development of fiscal and monetary policies (Ellis 2018). Some of

the policy lessons from these results are to place more emphasis on the productive part of government spending[8] in the form of public investment and to alleviate barriers to trade to facilitate higher growth rates. It is advisable to allocate government spending to maintain existing infrastructure and social projects and to start new projects. These projects should be concentrated in areas that provide public services and facilitate research and development and human capital. The government should involve the private sector in these projects by allocating some subsidies from oil revenues to ensure the efficiency and accountability of the operations. These steps will also help to achieve fiscal sustainability over the medium and long term by diversifying non-oil revenue sources and enhancing the efficiency of spending through the development of a medium-term expenditure framework.

### 6.4.1 Fiscal Policy

The challenges confronting Saudi Arabia's fiscal policy-makers arise from the finite, volatile and uncertain nature of the oil revenues on which the government budget depends. Currently, exports have a substantial effect on the economy because of dependence on oil exports.

Given the size of the oil sector, fiscal policy will be a significant macroeconomic instrument for the economic stability of Saudi Arabia. Intensive fiscal spending programmes should be employed as an investment in future generations by allocating them to the productive sectors, especially during periods of the GFC. In addition, the development and growth funds of the aforementioned categories should be properly managed to enhance economic growth and sustainable development and they should be implemented while simultaneously improving the overall business climate in the country. The continued influence of the oil sector on the country suggests that the government should emphasise this type of policy in macroeconomic operations. Although the country wants to diversify the economy, the petroleum industry will continue its functioning with major effects on the KSA. Therefore, fiscal policy is the best choice for the government to regulate the economy. This research suggests that intensive fiscal spending initiatives would be a useful option for maintaining present stability and protecting the country from future crises. For example, the applied Keynesian approach makes it reasonable to

[8] Expenditure on education, health, defence, housing, economic affairs and general public services.

conclude that the KSA economy is mostly affected by changes in GE and oil revenue. As oil revenues decrease, it is essential to maintain expenditures, particularly given the lack of standard tools to control the money supply.

Currently, Saudi Arabia is swapping oil revenues for monetary reserves to develop and expand its economic base. Considering the dominance of fiscal policy in Saudi Arabia, the primary objective of its monetary policy is to assure exchange rate stability, while creating an environment conducive to financial sustainability and attractiveness. With the greater role of fiscal policy in the macroeconomic system of Saudi Arabia, its interaction with monetary policy is vital to meet the national growth objectives (Al-Jasser & Banafe 1999; Al-Hamidy 2012).

#### *6.4.1.1 Government Expenditure and the Crowding-out Effect*

The results of the current study confirmed that GE has a positive, long-term effect on total and oil GDPs in Saudi Arabia and a significant and negative long-term effect on non-oil GDP. The adverse outcomes on non-oil GDP can be attributed to the crowding-out effect, according to which the short-term impact is less significant and remains noticeable only for the oil GDP. The implication of this finding refers to the conclusion that GEs are currently channelled in a way that does not attract sufficient private investment in the economy. The recommendation is to encourage the participation of private investors in government expenditure plans. With the crowding-out effect on non-oil GDP in the long term, the findings of the current study indicate the need to prioritise expenditures that complement private investment.

Fiscal and monetary policies both influence the development of financial markets. On the fiscal level, liquid markets that facilitate deficit funding are crucial for sustainable economic development and growth, simultaneously enabling the central bank to conduct market-based operations. The crowding out of private investment, as hypothesised by Keynesian economics, can be alleviated by combining expansionary fiscal policy with accommodating monetary policy (Wang 2005; Laopodis 2001). For the Saudi Arabian economy, the implication is to create complementarities with domestic industries through exploration, innovation, technology transfer and domestic market development.

*6.4.1.2 Government Revenue and Public Funds*

With regard to GR, the findings of the study showed insignificant but positive long-term effects on total and oil GDPs, but significantly negative effects on non-oil GDP. In the short term, this variable proved to be indeterminate for total and oil GDPs. The implication for policy-makers is to identify and explore alternative paths to enhance GR by diversifying public income, especially through the introduction of as modern taxation system.

The opportunities stemming from oil dependence mean that the government must invest in an efficient use of resources. A preventative philosophy would help the country and decision-makers to accrue revenues for use when the KSA needs additional funds. Norway is another oil producer that exemplifies the importance of having substantial revenues and undertaking the economic use of resources. After the banking crisis of 1991 to 1992, Norway ran fiscal surpluses to pay back the government debt caused by the fiscal deficits associated with its dependence on the petroleum sector in previous decades (Steigum 2013/4). Norway established sovereign wealth funds and adopted a new fiscal policy guideline, along with a new inflation targeting framework for monetary policy, ultimately reducing its dependence on oil and creating an internal framework for the efficient management of GR and expenses. As Kabir (2016) stated, the preventative saving of resources is a method of mitigating damages in the case of economic crises because of its ability to absorb economic shocks. Vision 2030 agrees that the public investment fund (PIF) will improve the position of the KSA in the global arena because foreign investment is expected to improve local economies and diversify the national business landscape. Under diversification, exports from the KSA should strengthen and the overall rate of exports should also increase, leading to higher competition in which for SME companies to thrive. Diversification is also crucial for reducing the reliance on oil price volatility (Ramady 2010).

One opportunity currently missed by the KSA government is the creation of fiscal policy framework and formal sovereign wealth fund structures. Saudi Arabia has an opportunity to accumulate more assets without reducing spending. Decoupling spending from uncertain oil revenues is a necessary step in providing stability in the national economy. The Saudi fiscal stance is countercyclical in the sense that the government runs surpluses in times of abundance and deficits when oil prices drop (Banafe & Macleod 2017). There

is also a countervailing force because spending tends to overrun more when oil prices are high rather than when they plunge, in which case it is curtailed. In this case, oil prices must keep rising in line with the country's needs; yet, there is no reason to presume that oil prices will rise.

An issue that requires attention is the observation that policy-makers in Saudi Arabia have a tendency to increase government spending at a higher pace than the building up of reserves. While reserves are held for exchange rate management and intervention purposes, sovereign wealth funds can diversify public income with long-term portfolios and highly liquid fixed-income portfolios (Alsweilem & Cummine 2015). The government should also intervene in the economy by increasing public capital expenditure when private investment is low.

*6.4.1.3 The Taxation System as a Potential Fiscal Instrument for Saudi Arabia*

Another implication stemming from the conducted research is the potential for the implementation of a modern taxation system as the fiscal instrument. Studies by Hertog (2013), Callen et al. (2014) and Al-Kibsi et al. (2015) emphasised the importance of reshaping the tax policy in Saudi Arabia. The country receives income in the form of dividends only and not as taxes. It is recommended that the KSA build a modern system of taxation as a tool for transforming the economy. Income tax in both the private and public sectors should be considered a fundamental fiscal policy for enhancing economic development and ensuring the long-term sustainable diversification of revenue sources.

As a deflationary government, the government could use VAT to implement effective monetary policy, which may have positive impact on GDP growth in Saudi Arabia. The absence of taxes is a challenge for economic development. With the focus on diversification as a national economic strategy, Saudi Arabia requires a broadening of its governmental revenue sources, along with the implementation of radically new monetary policies. VAT, as a fiscal instrument, offers the benefit of compatibility with international trade and the complexity of evasion (Alavuotunki, Haapanen & Pirttilä 2017). Therefore, VAT introduction is a necessary step for Saudi Arabia and a critical element of its diversification strategy.

### 6.4.2 Monetary Policy

#### *6.4.2.1 Commercial Banks' Claims on the Private Sector*

The results of this study on the variable of CBC on the private sector showed significant positive effects in the long term only for total and oil GDP and insignificant effects on non-oil GDP. In the short term, this variable had no effect on all three sectors of the economy. Based on these findings, the policy implications require the national government to pay more attention to the needs of the private sector, particularly in terms of alleviating the constraints that are still imposed on SME enterprises. Intensive fiscal spending programmes, especially with a focus on entrepreneurship development in the long term rather than in the short term, should be employed as an investment in the future. In addition, development funds should be properly managed to enhance economic growth and sustainable development and to improve the overall business climate in the country.

#### *6.4.2.2 Non-oil Sector and Commercial Banks' Claims on the Private Sector*

The private sector is the source of efficiency, innovation and competition. The recommendation for reforming the banking sector is to align incentives with the national plans and to induce sophisticated instruments that cater to the financing needs of SMEs. The development of SMEs is one of the main directions for the national government to pursue in its long-term orientation towards economic diversification. The government should invest in the drafting and implementation of laws that would help SMEs to gain needed financial support. SMEs dealing with commercial goods and products of high value require especial attention (Callen et al. 2014). Additionally, a commitment to improving the private sector would mean that the KSA would create more jobs for citizens and job creation is one of the goals of the Vision 2030.

#### *6.4.2.3 Interest Rate and Islamic Monetary Policy Interventions*

Although interest rates have shown positive and significant long-term effects on total and oil GDP along with a positive but insignificant effect for the non-oil GDP, it was proven that it does not affect any of the sectors in the short term. These results explain that interest rates should not shape economic development in the short term and that the monetary authority should consider applying other instruments to gain more control over the economy. An example of previous efforts to re-establish control over the national

economy includes the introduction of Islamic bonds by the Saudi Ministry of Finance in 2017. The recommendation is to consider introduction of other Islamic framework-compliant instruments, such as Mosharakah, Mudarabah, Murababah and Ijarah, as detailed in Appendix B.

#### *6.4.2.4 Inflation and Inflation Targeting*

Inflation was the only variable of monetary policy that proved to be effective in the short term. The results of this research demonstrate that inflation has significant effects on all GDP sectors in the long and short terms. Asab, Cuestas and Montagnoli (2018) investigated the relationship between inflation and inflation uncertainty under inflation targeting and a fixed exchange rate system for a group of emerging countries—one of them was Saudi Arabia—and confirmed that inflation targeting was successful at lowering both average inflation and inflation persistence. Therefore, policy-makers in SAMA should consider inflation targeting as an option when assessing Saudi limited monetary instruments and as a central strategy to pursue in both the short and long term. Saudi Arabia could fight inflation more successfully by combining an opportunity-designed exclusion and statistical methods (Alkhareif & Barnett 2015). The Government of Saudi Arabia should consider inflation because it presents economic perils. Similarly, SAMA should put to the test different combinations of tools against inflation, particularly in light of the changing environment and the need for new approaches and new monetary policy perspectives.

### 6.4.3 Merchandise Trade

In addition to the results detailing the limited instruments of monetary policy, the study expanded the current knowledge on exports and imports in terms of their contribution to the economic development of Saudi Arabia. The analysis of the primary data confirmed the importance of exports, discerning a strong positive effect of exports in both the short and long term for all sectors of GDP. The Government of Saudi Arabia relies heavily on oil exports in GDP planning. However, this reliance on a single commodity poses potential risks for an economy that is not diversified. The contribution of ME to GDP directly correlates to the international prices of oil, meaning that any fluctuations in price have an immediate impact on GDP. The recommendation is to diversify the economy

with the ultimate goal of reducing dependence on international oil prices by decreasing the contribution of oil exports to GDP.

The findings show that MIs are a significant contributor to GDP. At the same time, previous studies have suggested that imports may have negative effects on economic growth. To strengthen their positive influence, the recommendation is to intensively diversify the economic base in import-substituting industries.

## 6.5 Contribution to Knowledge

The current study has contributed to knowledge on current monetary policy, fiscal policy and merchandise trade in terms of their short- and long-term impacts on Saudi GDP in the following three ways:

First, the study addresses the gap in the literature by offering a systematic analysis of the correlation between fiscal and monetary policies with regard to their impacts on the Saudi economy, including oil GDP, non-oil GDP and total GDP. The current study was the first empirical investigation to build a comprehensive approach using eight independent variables to examine instruments in Saudi Arabia: money supply, interest rates, CBC on the private sector, inflation, ME, MI, GE and GR.

Second, the current study evaluated the monetary and fiscal policies and added to the understanding of their short- and long-term effects on the total GDP, oil GDP and non-oil GDP, with reference to the ongoing economic changes in the KSA economy, in general, and in the context of Vision 2030, in particular.

Third, this study contributes to the current knowledge by offering an analysis of the lack of taxation, the dependence on a single sector of the economy (oil) and the pegging of the national currency to the US dollar. The results provided empirical evidence for policies and the development of the government taxation system that may lead to economic diversification and stabilisation both in the short and long term.

## 6.6 Limitations

To fulfil the intent of this study and form a basis for future research, it is important to reflect critically and recommend directions for subsequent work. The first limitation is the small sample size and this research would have benefitted from the inclusion of

broader data sets with quarterly based information. However, such data were unavailable for KSA.

The second limitation of the current thesis relates to monetary policy and arises because of the openness of the economy and with effective pegging of the riyal to the US dollar since the mid-1980s. This long-established arrangement has an effect on the Saudi domestic economy as it is not interest rate sensitive (in the short term) and tends to diminish the responsiveness of 12-month loans and deposit rates to monetary policies that are outside SAMA's terms of reference. Future studies should address this limitation by exploring the variable of the openness of the economy in greater detail and in light of the upcoming changes in monetary policy orientation within the context of Vision 2030.

## 6.7 Future Directions for Research

In light of the above-mentioned limitations of this thesis, the first recommendation for future research to be conducted in Saudi Arabia is to base the analysis on quarterly data, which were unavailable at the point when this study was performed. With more economic data available, future studies will produce more accurate and informative results, suggesting specific courses of action in economic policy-making to match the Vision 2030 objectives.

Next, the current study did not take into account the VAT variable, which was introduced in Saudi Arabia in 2018. Future studies may consider integrating this variable into their analyses as the tax instrument used by the national government to secure income and control possible fluctuations in the oil industry. VAT represents an interesting case for future research, particularly with reference to the introduction of income tax in Saudi Arabia, which may, in its turn, shape the course of economic development, especially in the private sector. The specific recommendation is to further explore how a potential increase in VAT from 5% to 10% may affect the economic landscape in the country.

The third area for future research covers the Sukuk or Islamic Bonds introduced in 2017. Because of the recent introduction of this monetary policy tool, the current research lacked evidence for analysis of the potential impact of this variable on the national economic development. Sukuk may encourage SAMA to introduce other monetary transition approaches if its positive impacts on the economy are proven. Therefore, future

research should offer an economic analysis of Sukuk and similar tools to evaluate their effectiveness in Saudi Arabia.

A fourth area of future research is to incorporate the interactive effect of monetary and fiscal policy on Saudi GDP sectors. Such an approach could assist policy-makers to expand policy options when needed.

Another area of future research involves secular stagnation, specifically to focusing on timely predictions of secular stagnation that may occur under the pressure of different factors. Summers (2014) recommended addressing the issues of secular stagnation alongside re-equilibration of the economy, economic hysteresis, adverse cyclical changes and the role of the zero lower bound that exerts positive effects on the monetary and fiscal situation. Future research should take these issues into account to estimate the possibility for the KSA to develop secular stagnation.

Further research could assess the extent of income inequality in the KSA. As Bibi and Nabli (2009) asserted, the creation of measures to battle inequality is an important consideration to the development of many policies, including macroeconomic ones. For this reason, future research could focus on income inequality in the KSA and its impact on the country's policies and barriers to economic growth.

Another area for further study would be to incorporate the panel data on oil-exporting countries to provide more precise estimates of variable coefficients than were achieved by the ARDL approach implemented in this study.

This study has provided a strong foundation for these future research possibilities by uncovering the potential for more in-depth analyses in this important area of academic research.

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## Appendix A: Empirical Studies on the Relative Effectiveness of Monetary and Fiscal Policies (1968–2018)

| Empirical Study | Period | Country | Method and/or Model | Empirical Findings |
|---|---|---|---|---|
| Richard, Muriu and Maturu (2018) | 1996–2014 | Rwanda | VAR model | Monetary policy is more effective than fiscal policy in explaining changes in nominal output in Rwanda. In addition, monetary policy explains better output when VAR model contains domestic exogenous variables than when they are not included, suggesting the relevance of including domestic exogenous variables in VAR specification of monetary and fiscal policies effectiveness on economic variables. |
| Adegoriola (2018) | 1981–2015 | Nigeria | Error Correction Model (ECM) | There is a positive relationship between money supply, government expenditure and revenue while interest rate and deficit finance have negative relationship with economic growth. |
| Tuncer and Akinci (2018) | 2006–2016 | Turkey | ARDL | Monetary policy has been determined to be more efficient. |
| Mahmood and Sial (2018) | 1973–2014 | Pakistan | ARDL | Fiscal policy plays important role in the steadiness of domestic price levels in Pakistan. |
| Ajayi and Aluko (2016) | 1986–2014 | Nigeria | Modified St Louis equation<br>OLS method | Growth in money supply and export are positively and statistically significant on output growth while growth in government expenditure is negatively and not statistically significant related to output growth. |
| Saqib and Aggarwal (2017) | 1984–2014 | Pakistan | Cointegrtion test | The Cointegration tests confirm positive long run relationship between monetary and fiscal policy with |

| Empirical Study | Period | Country | Method and/or Model | Empirical Findings |
|---|---|---|---|---|
| | | | | economic growth. However, monetary policy has more concerned with economic growth than fiscal policy. |
| Kumar (2017) | 1996–2016 | India | St Louis equation<br>OLS method | Fiscal policies have a larger influence on nominal GDP growth than that of the monetary policies. |
| Okorie, Sylvester and Simon-Peter (2017) | 1981–2012 | Nigeria | Auto Regressive Distributed Lag (ARDL) | Monetary and fiscal policies both have significant positive impact income. |
| Hasan et al. (2016) | 1974–2015 | Bangladesh | Cointegration and Vector Error Correction Model (VECM) | Monetary policy has a greater long run positive impact on economic growth over fiscal policy |
| Bokreta and Benanaya (2016) | 1970–2014 | Algeria | VECM Approach | Fiscal policy is more powerful then monetary policy in promoting economic growth in Algeria. |
| Usman (2017) | 1972–2015 | Pakistan | Cointegration and VECM | Fiscal and monetary policies positively affect the growth of GDP per capita in the long run. |
| Indalmanie (2016) | 1968–2014 | Jamaica | Modified St Louis equation<br>VAR model | Both fiscal and monetary policy instruments had very little influence on output, where the sign for fiscal policy was negative and monetary policy was positive. |
| Mahfoudh and Ben Amar(2016) | 1990–2013 | Group of Arabic countries (Algeria, Bahrain, Egypt, Jordan, Lebanon, | Modified St Louis equation<br>Panel Model (FMOLS) | Fiscal policy has a negative effect on real activity, commercial opening positively affects economic growth. Monetary policy could boost economic growth, although an increase in the Inflation rate would have a negative impact on the economic activity. Finally, an exchange policy based on the slip of the real exchange rate improve the competitiveness of local products on international markets and subsequently the progress of economic growth |

| Empirical Study | Period | Country | Method and/or Model | Empirical Findings |
|---|---|---|---|---|
| | | Morocco and Tunisia) | | |
| Petrevski, Bogoev and Tevdovski (2015) | 1999: Q1–2011:Q4 | Three south-eastern European countries: Bulgaria, Croatia, and Macedonia | VAR model | Monetary tightening produces a negative response in output in Bulgaria, but responses of fiscal policy are counterintuitive. In Croatia and Macedonia, fiscal authorities react in a countercyclical manner by adjusting the budget balance as a response to economic activity. |
| Falade and Folorunso (2015) | 1970–2013 | Nigeria | St Louis equation<br>Error Correction Mechanism | The current level of exchange rate and its immediate past level, domestic interest rate, current level of government revenue and current level of money supply are the appropriate policy instrument mix in promoting economic growth both in the short and long run. The paper concluded that fiscal and monetary are still complementary. |
| Makun (2015) | 1986–2011 | Pacific Islands: Fiji, Samoa, Tonga and Vanuatu | St Louis equation<br>A Panel study Pedroni's cointegration tests | Although fiscal and monetary policies were effective, relative effectiveness depended on country-specific characteristics. |
| Chowdhury and Afzal (2015) | 1980–2012 | Bangladesh | St Louis equation<br>Cointegration tests | Monetary and fiscal bot h the policies are equally effective in simulating economic growth in Bangladesh. Moreover, it has long run relationship with cointegrated impact on economic growth. |
| Hussain (2014) | 1974–2007 | SAARC (South Asian Association | St Louis equation<br>VAR model | Monetary policy has been more effective on output than fiscal policy in the case of Pakistan and Sri Lanka, whereas |

| Empirical Study | Period | Country | Method and/or Model | Empirical Findings |
|---|---|---|---|---|
| | | of Regional Cooperation) countries: Bangladesh, India, Nepal, Pakistan, and Sri Lanka | | fiscal policy has had a more powerful effect than monetary policy on Bangladesh, India and Nepal. |
| Havi and Enu (2014) | 1980–2012 | Ghana | OLS method | Although fiscal policy affects growth positively, monetary policy has a more powerful effect on it. |
| Cyrus and Elias (2014) | 1997–2010 | Kenya | VAR | Fiscal policy has a significant positive impact on real output growth while monetary policy shocks are completely insignificant with fiscal policy shock significantly change the real output for a period of almost eight quarters. |
| Memon and Ghumro (2014) | 1972–2007 | Pakistan | Vector Autoregressive Model | Fiscal stimulus positively affects inflation but its effect on output gap is negative. Changes in interest rate – monetary policy instrument, discourages aggregate demand thereby reducing aggregate demand which helps curbing inflation. |
| Moayedi (2013) | 3Q 1990, 1 Q 2008 | IRAN | St Louis equation revisited VAR model | Fiscal policy and exports exert a lasting significant effect on the Iranian economy, by contributing to economic growth .monetary policy on the other hand, had a significant effect on economic growth, but this study fails to shed a positive light on monetary policy as a reliable stimulator of economic growth in Iran. |
| Adeniji and Evans (2013) | 1970 – 2012 | South Africa, Nigeria, | Panel Data Approach to St Louis equation | Monetary base as a policy tool is more powerful than using government expenditure. This is in line with the predictions of Milton Friedman and Schwartz (1963) and other advocates |

| Empirical Study | Period | Country | Method and/or Model | Empirical Findings |
|---|---|---|---|---|
| | | Niger, Cote Divoire, Malawi, Togo, Tanzania and Madagascar | | of the St Louis equation. Therefore, to attain higher output growth, these economies should rely more on monetary policy as compared with fiscal policy. |
| Rakic and Radenovic (2013) | 2003–2012 | Serbia | OLS liner regression | Monetary policy is more effective in stimulating economic growth compared with fiscal policy. |
| Musa and Asare (2013) | 1970–2010 | Nigeria | VEC Model Approach | Monetary policy exacted greater impact on the economic growth, but the effects of fiscal policy had lower magnitude more specifically when there is decrease in the inflation rate |
| Saibu and Apanisile (2013) | 1960–2011 | Nigeria | ARDL | The result shows that monetary policy is more effective than the fiscal policy but a coordination of both fiscal and monetary would give a better result. |
| Chingarande (2012) | 1981: Q4–1998: Q3 | Zimbabwe | Modified St Louis equation<br>Cointegration and error correction approach | The monetary influence is relatively stronger and more predictable compared with fiscal policy in determining economic activity. Fiscal policy has an insignificant effect on economic activity. |
| Jayaraman, Choong and Kumar (2011) | 1983–2010 | Vanuatu | St Louis equation<br>VAR Model | Fiscal policy is a more important policy tool than monetary policy in stimulating economic growth, especially in the short run. In the long-run, it is clear innovations in monetary aggregate have a more significant effect on the output growth over all the time horizons in Vanuatu. |
| Younus (2012) | 1980–2011 | Bangladesh | St Louis equation | The empirical results show that both the monetary and fiscal policies have significant and positive impact on real output growth in Bangladesh with varying degree. The outcomes of |

| Empirical Study | Period | Country | Method and/or Model | Empirical Findings |
|---|---|---|---|---|
| | | | Cointegration and Vector Error Correction Approach | the study demonstrate that monetary policy has relatively stronger impact than that of fiscal policy in altering output growth in Bangladesh. This support the view of the proponent of St. Louis model that avowed monetary policy is relatively more effective than fiscal policy in stimulating real economic activity. |
| Dikmen (2012) | 1981–2008 | Turkey | St. Louis model estimates OLS method | Keynesian policies based on expansionary fiscal policy via increased government expenditures had more influence on GDP growth in Turkey than the monetarist approach. |
| Sanni, Amusa and Agbeyangi (2012) | 1960–2011 | Nigeria | Error correction model | In general, monetary policy instruments are more effective. |
| Iyeli, Uda and Akpan (2012) | 1970–2001 | Nigeria | Modified St. Louis Cointegration and error correction modelling | Money Supply appears to influence significantly the GDP in Nigeria. |
| Topcu (2012) | 2004–2011 | Romania | OLS method | Fiscal policy is more effective rather than monetary policy in both short and relatively long run. |
| Belliveau (2011) | 1956–2007 | US | St Louis equation OLS method | Both monetary and fiscal policy are available options for policy-makers seeking to stabilise output |
| Senbet (2011) | 1959: Q1–2010: Q2 | US | St Louis equation Granger causality tests and VAR model | Monetary policy affects the real output relatively better than fiscal policy. |
| Jawaid, Qadri and Ali 2011 (2011) | 1981–2009 | Pakistan | Cointegration and error correction model | Monetary policy is more effective than fiscal policy in Pakistan. |

| Empirical Study | Period | Country | Method and/or Model | Empirical Findings |
|---|---|---|---|---|
| Mahmood and Sial (2011) | 1973–2008 | Pakistan | Autoregressive Distributed Lag Model technique (ARDL) | Monetary and fiscal policies both play a significant role in the economic growth of Pakistan. |
| Jawaid, Arif and Naeemullah (2010) | 1981–2009 | Pakistan | OLS method | Both monetary and fiscal policies have significant and positive effect on economic growth. |
| Adefeso and Mobolaji (2010) | 1970–2007 | Nigeria | OLS method | The effect of monetary policy is more dominant compared with fiscal policy on economic growth. |
| Tesfay(2010) | 1971–2009 | Ethiopia | (VARs)<br>St Louis equation | The outcome of this study, thus, supports the views of the proponents of the St. Louis model that monetary policy is relatively more effective than fiscal policy in stimulating economic activity. |
| Khosravi and Karimi (2010) | 1960–2006 | Iran | bounds testing (ARDL) | The results indicated the impact of exchange rate and inflation on growth was negative, government expenditure was found to have significant positive impact on growth. Conclusion: According to results for a sustainable economic growth in Iran, policy-makers must try to decrease inflation rate and exchange rate also to find an equilibrium point for government expenditure in futures. |
| Rahman (2005) | 1975–2003 | Bangladesh | VAR<br>St Louis equation | Monetary policy alone has a significantly positive impact on real output growth in Bangladesh. The impact of fiscal policy on real output growth remains completely insignificant. |
| Malawi (2009) | 1972–2004 | Jordan and Tunisia | St. Louis-type | Fiscal policy has stronger effect than monetary policy has on economic activity, whence fiscal policy can be utilised as a stabilisation policy in both countries. |
| | 1990–2007 | Four South Asian | ARDL | Monetary policy is more powerful macroeconomic policy instrument than fiscal policy in enhancing economic growth. |

| Empirical Study | Period | Country | Method and/or Model | Empirical Findings |
|---|---|---|---|---|
| Ali, Irum and Ali (2008) | | countries: Pakistan, India, Sri Lanka, and Bangladesh | | |
| Kaur and Kaur (2008) | 1980–2005 | India | St. Louis VAR model | Fiscal policy is more effective in pre-reforms period whereas monetary policy is more effective in post-reforms period. VAR model concludes that both the monetary and fiscal policies are complementary and not substitutes to each other, i.e., for economic growth<br>Indian economy needs both the policies. |
| Atchariyachanvanich (2007) | 1990: Q2–2004: Q4 | Six industrialised and six developing countries (Australia, Brazil, Mexico, the Netherlands, Peru, the Philippines, South Africa, Spain Sweden, Switzerland, | St Louis equation<br>OLS method | Developing countries that the higher degree of openness results in the lower effectiveness of public policy, the evidence was not clear in industrialised countries. Monetary aggregate was no longer significant as a monetary policy instrument in industrialised countries that adopted inflation targeting, while it still appeared significant in developing countries that just adopted the framework. Government spending tended to be more influential in developing countries than in industrialised countries. |

| Empirical Study | Period | Country | Method and/or Model | Empirical Findings |
|---|---|---|---|---|
| | | Thailand, and the US | | |
| Arestis and Sawyer (2004) | | | | In this paper, it is argued that shifts in the level of aggregate demand (arising from shifts in confidence and world demand) cannot be readily offset by monetary policy. Further, fiscal policy remains a potent tool for offsetting major changes in the level of aggregate demand. |
| Hassan (2004) | 1974–2002 | Bangladesh | St Louis equation OLS method | The finding of the study supports the monetarists' clam that growth in money supply has a statistically significant impact on nominal income growth. |
| Halcon and De Leon (2004) | 1986: Q1 -2003: Q1 | Philippines | St. Louis model approach | Fiscal policy remains is more effective than monetary policy. |
| Ramathilagam and Amudha (2004) | 1970–2000 | Indian | Modified St Louis equation and Granger causality frameworks | Monetary policy is relatively more potent than fiscal policy. The findings of the study revealed that there was not much change in the impact of monetary versus fiscal policy. They underlined the need for limiting government expenditure that results in crowding-out effect and recommended that the government should focus on monetary policy targets and strive for central bank independence to ensure stability in the policy environment. They concluded that fiscal policy is a necessary but not a sufficient condition for stability in the economy. |
| Fatima and Iqbal (2003) | 1970–2000 | Five Asian countries: Pakistan, India, Thailand, | Granger causality test and ECM | For Thailand, there exists a strong bidirectional causality between fiscal policy and economic growth as well as between monetary policy and economic growth. For Indonesia, there exist a unidirectional causality between monetary policy and economic growth and a unidirectional |

| Empirical Study | Period | Country | Method and/or Model | Empirical Findings |
|---|---|---|---|---|
| | | Indonesia and Malaysia | | causality between fiscal policy and economic growth. As for Malaysia, for this country there exist only unidirectional causality between the variables representing both of the policies and economic growth. In the case of Pakistan, monetary policy is found to be influencing economic growth. While for India, the study found a unidirectional causality between monetary policy and economic growth. |
| Kulkarni and Saxena (2003) | Quarterly data 1960–2002 | India | VAR system | Monetary policy was more effective than fiscal policy during the whole study period. However, five percent of the proportion in output was explained by fiscal and monetary policies before the crisis in 1991, but both policies were very strong after the crisis. From the results of VD, the study showed that fiscal policy had a more powerful effect on output than monetary policy after three years. |
| Ajisafe and Folorunso (2002) | 1970–1998 | Nigeria | Cointegration and error correction modelling techniques | Monetary policy rather than fiscal policy exerts a great impact on economic activity. |
| Jayaraman (2001) | Fiji (1980–1995), Samoa (1983–1995), Tonga (1983–1995), Vanuatu (1984–1995) | Four South Pacific Island countries: Fiji, Samoa, Tonga and Vanuatu | OLS | Fiscal policies are effective in any of the four countries for promoting economic growth. In Samoa, in particular, both fiscal and monetary policies have no influence on growth. In Fiji, Tonga and Vanuatu, monetary policy has a positive impact on growth. In short, fiscal policies are found to be less effective. |
| Hasan (2001) | 1974–1996 | Bangladesh | Modified St Louis equation | Both monetary as well as fiscal policies are important for economic growth. |

| Empirical Study | Period | Country | Method and/or Model | Empirical Findings |
|---|---|---|---|---|
| Asogu (1998) | 1960–1995<br>Quarterly data | Nigeria | Modified St Louis equation | Money supply and export as being significant and government expenditure are not. |
| Latif and Chowdhury (1998) | 1974–1993 | Bangladesh | Modified St Louis equation<br>OLS method | Fiscal policy is more effective over monetary policy. |
| Sechtem,Kotcherlakota and Veluri (1997) | 1971–1992 | United States, Canada and Mexico | Ordinary least squares (OLS) and Cochrane-Orcutt<br>(C-O) methods | The study concluded that contemporary economic policies do have a stabilisation impact. |
| Ansari (1996) | 1963–1993 | India | VAR model | Monetary policy appeared to have accommodated growth in government expenditure, prices, and output. |
| Dhanasekaran (1996) | 1971–1991 | Indian | Modified St Louis equation | Monetary actions have a stronger, more predictable and faster impact on nominal GNP than fiscal actions. The effectiveness of monetary policy is more effective when it is supported by government expenditure. Monetary policy can be used to influence the aggregate economic activity in India. |
| Olaloye and Ikhide (1995) | 1986–1991 | Nigeria | St Louis equation<br>OLS method | Fiscal policy exerts more influence on the economy than monetary policy. |
| Kaur (1995) | 1950–1991 | India | St Louis equation<br>Multiple regression analysis | Fiscal policy influence are stronger faster and more predictable than monetary policy influence. Because maybe underdeveloped financial markets and the existence of informal credit markets which limit monetary policy work in India |

| Empirical Study | Period | Country | Method and/or Model | Empirical Findings |
|---|---|---|---|---|
| Owoye and Olugbenga (1994) | 1960–1990 | Ten African countries: Burundi, Ethiopia, Ghana, Kenya, Morocco, Nigeria, Sierra Leone, South Africa, Tanzania and Zambia | VAR model | Monetary policy is more important than fiscal policy in the half of countries. However, for the other half of countries fiscal policy is more important than monetary policy. |
| Bynoe (1994) | 1965–1990 | Five African countries: Ghana, Kenya, Nigeria, Sierra Leone and Tanzania | Modified St Louis equation<br>OLS method | Fiscal influence had a greater impact than the monetary influence.In fact, the fiscal influence was appreciably significant in only one country, Nigeria, and insignificant in all the other four countries. In two countries, Sierra Leone and Tanzania, neither fiscal nor monetary influences was significant in determining nominal income. |
| Kretzmer (1992) | 1950: Q2–1979: Q4<br>1962: Q2–1991: Q4 | US | VAR model | Monetary policy becomes less effective over time but is still more effective than fiscal policy. |

| Empirical Study | Period | Country | Method and/or Model | Empirical Findings |
|---|---|---|---|---|
| Orsmond (1992) | 1970–1985 | Sub-Saharan countries | St Louis equation Regression | Relative potency varies across countries, with fiscal policy tending to be more effective at relatively low-income levels and monetary policy more effective at relatively higher income levels. |
| Upadhyaya (1991) | 1957–1987 | South Asian developing countries: India, Nepal, Pakistan and Sri Lanka | Modified St. Louis OLS method | The fiscal policy variables were insignificant for both Nepal and Sri Lanka. Monetary variable were significant for Nepal and Pakistan, which indicated that the monetary policy was more effective for each of these two countries. On the other hand, fiscal action was significant for India. This meant that the fiscal variable was more effective than the monetary variable. In the case of Sri Lanka, the fiscal and monetary variables were insignificant, indicating that neither monetary nor fiscal policy was effective. |
| Cardia (1991) | 1960–1985 | US and Germany | | Fiscal policy and monetary policy are playing only a small role in influencing economic growth. |
| Looney (1989) | 1965–1985 | Saudi Arabia | Macroeconomic simulation model | The relationship between money and economic activity is more predictable than that stemming from changes in autonomous expenditures. |
| Raj and Siklos (1988) | 1954Q1–1984Q4 | Canada | St. Louis model OLS method | These results suggest that both monetary and fiscal policy have a long-lasting effect on aggregate demand and that bidirectional causality exists between income and policy instruments. |
| Chowdhury (1988) | 1966: Q1–1984:Q4 | Six European countries: Austria, | OLS method | Monetary policy, rather than fiscal policy, appears to have a stronger more predictable effect on GNP in Denmark, Norway, and Sweden. However, in the case of Belgium and the Netherlands, fiscal policy appears to have a greater influence on GNP. |

| Empirical Study | Period | Country | Method and/or Model | Empirical Findings |
|---|---|---|---|---|
| | | Belgium, Denmark, The Netherlands, | | |
| Saqib and Yasmin (1987) | 1959–1985 | Pakistan | reduced Form Anderson–Jordan<br>OLS method | Monetary policy is more effective and more dependable, compared with fiscal policy, as a tool of influencing GDP, though fiscal policy is important in its own right. |
| Chowdhury (1986a) | 1972–1983 | Bangladesh | St Louis equation<br>OLS method | Fiscal actions exert greater impact on economic activity in Bangladesh than monetary actions. |
| Chowdhury (1986b) | 1966–1984 | Korea | OLS method | Growth in the monetary policy has a greater impact on real income than fiscal policy. The long-run effects of monetary and the fiscal policy variables are also different. The effects of a change in the growth rate of M1 on real income last for a relatively longer period. Moreover, the magnitude of the effect is also greater in case of the monetary policy variable. |
| Batten and Thornton (1986) | original A-J data, 1952: Q1–1968:Q2 | US | St Louis equation<br>Ordinary Least Squares | Divided criticisms on the A-J Equation into three main aspects: misspecification due to exclusion of some important exogenous variables; possible simultaneous bias due to the use of the OLS technique; and lack of robustness of the equation. In defending the A-J Equation, they performed statistical tests together with citing supportive literature. They concluded that while there was no strong evidence that other more sophisticated equations were free from the first two criticisms, the A-J Equation proved its validity with the original data despite its simplicity. |
| Darrat (1986) | 1955:1–1982:4 | US | St Louis equation | Neither government expenditures nor money supply have significant lasting impact upon real output. |

| Empirical Study | Period | Country | Method and/or Model | Empirical Findings |
|---|---|---|---|---|
| | | | OLS method | |
| Darrat (1984) | 1950–1981 | Five Latin American countries: Brazil, Chile, Mexico, Peru and Venezuela | Modified St Louis equation | Fiscal policy have significant influence on GNP growth in all countries |
| Batten and Hafer (1983) | 1960–1980 | Six industrialised countries: Canada, France, the UK, the US, Japan, and Germany | St Louis equation<br>OLS method | Monetary actions have a significant as well as lasting effect on nominal GNP growth in all six countries. However, fiscal actions exert no statistically significant and lasting influence on growth in these countries. |
| Hussain (1982) | 1949–1971 | Pakistan | St Louis equation<br>OLS method | Fiscal policy is a more powerful influence on output than monetary policy. |
| Masood and Ahmad (1980) | 1959–1977 | Pakistan | multiple regression analysis | Results show that the variations in autonomous expenditures are more important than the variations in money supply in determining the variations in the induced expenditures. |
| Stein (1980) | 1947: Q2–1969:Q4 | US | St Louis equation | Results forced to conclude that the St Louis equation is incapable of yielding accurate estimates of the true ceteris paribus monetary and fiscal multipliers. |
| Carlson (1978) | 1953–1976 | US | St Louis equation | Argues that Benjamin Friedman's equation was suffering from the heteroskedasticity problem. His findings suggested |

| Empirical Study | Period | Country | Method and/or Model | Empirical Findings |
|---|---|---|---|---|
| | | | | that only monetary policy has significant impact on economic activity and fiscal policy does not have any impact on real output. |
| Friedman (1977) | 1953–1976 | US | St. Louis model | Fiscal policy to be more effective St. Louis model now believes in fiscal policy. |
| Elliott (1975) | 1953:Q1–1969:Q4 | US | St. Louis model | Fluctuations in nominal GNP more importantly attach to monetary movements than to movements in federal expenditure. |
| Waud (1974) | 1953: Q1–1968: Q4 | US | OLS method | Fiscal influences and monetary influences on economic activity represented by GNP are both significant and appear equally important. |
| Ajayi (1974) | 1960–1970 | Nigeria | OLS method | Monetary influences are much larger and more predictable than fiscal influences. |
| Gramlich (1971) | 1953–1968 | US | Reduced form equations | Both monetary and fiscal policies have impact on real economic activity with the indication that money matters greatly. |
| De Leeuw et al. (1969) | 1952: Q1–1968: Q2 | US | St. Louis model<br>Modified St Louis equation | Fiscal policy appears to exert a significant influence on GNP in the expected direction. Monetary policy also appears to exert a powerful influence. |
| Andersen and Jordan (1968) | 1952: Q1–1968: Q2 | US | OLS method | The influence of monetary actions on economic activity is more certain than that of fiscal actions. Further, monetary influence is stronger and operates more quickly in relation to fiscal influence. In short, monetary policy is more effective than fiscal policy in influencing the economy. |

# Appendix B: Islamic Economic Prohibitions and Financial Instruments

## 1. Prohibitions

There are a number of prohibitions in an Islamic economy that is dictated by the Islamic framework. An Islamic economy must honour the guidelines to prohibit certain activities. Apart from Riba, discussed in the paper, the prohibitions include Gharar and Israf.

### 1.1 Prohibition of Risk of Uncertainty (Gharar)

The prohibition of risk and uncertainty is called Gharar. Some individuals may fall victim to ventures associated with risk and uncertainty, while others can use the naiveté or despair of the victims for the purposes of enrichment. This concept is also called the prohibition of speculation. Literally, Gharar means a 'hazard' (Bello & Abubakar 2014). Islam prohibits undertaking perilous business or banking activities because the philosophy of this religion endeavours to protect individuals and companies from different hazards. Even more so, Islam does not allow banks to participate in activities associated with excessive risk (Bello & Abubakar 2014). This prohibition echoes the prohibition of gambling because individuals who enter dubious ventures gamble to an extent by not knowing whether they will succeed or not. Kamali (2017) explained that sometimes the prohibition of risk or uncertainty is not respected by authorities because the public interest outweighs the need for adhering to the law laid out in Qur'an. Specifically, leaders sometimes forgive those who fail to honour Gharar when there is uncertainty in some agricultural agreements associated with sharecropping and plantation agreements as well as irrigation and gardening contracts that cannot be fully deprived of ambiguity in quantitative terms of exchange.

### 1.2 Prohibition of Wastefulness (Israf)

Wastefulness and extravagance are other vices condemned by Islam. The religion, therefore, prohibits them and refers to them as Israf. Ariff (1982) mentioned that 'the line between moderation and excess or between necessities and luxuries is changing over time and space' (p. 5). Although the changing times and values make people question whether they squander money, Askari, Iqbal, and Mirakhor (2014a) confirmed the idea that Islam

imposes a strict mandated obligation for all followers of the faith not to waste money. For this reason, people should be careful in their expenditures, including business and banking affairs. Askari, Iqbal, and Mirakhor (2014b) added that a lack of over-consumption or over-use is one of those rules that are internalised by customers, manufacturers, service providers, and distributors before their entering into the market. Excessive consumption is forbidden by Islam because Israf leads to a dissonance of earthly harmonies.

## 2. Islamic Financial Instruments

Islamic finance instruments play a role in the development of policies that ensure the stability of the country. The instruments are Mudarabah, Musharakah, Ijarah and Sukuk. This subsection includes basic information about these concepts.

### 2.1 A Distinct Type of Partnership (Mudarabah)

Mudarabah is one of the tools to maintain justice and fairness in business. Mudarabah represents a partnership related to venture capital, in which one partner provides finances, while the other partner provides business expertise to invest the funds into a viable business undertaking (Rizvi, Bacha & Mirakhor 2016). In this case, partners share profits in a pre-agreed ratio. In a scenario when an enterprise suffers losses, the partner who had invested money would lose money, while the partner who contributed experience and knowledge would lose other resources, like the time and effort used on the project. This type of partnership is acceptable in an Islamic economy. Faridi (1983) stated that Mudarabah or other profit-sharing tools lead to restructuring of the capital market, which is succeeded by the establishment of a direct connection between bank funds and productive investment. Pure Mudarabah agreements are flexible because there are no strict time constrains to execute a plan (Kamali 2017). These partnerships do not have many other restrictions because it is imperative to support the free circulation of goods and services to improve the economy. However, Mudarabah is also flexible because jurists admit that this type of partnership is not sacred (Askari, Iqbal & Mirakhor 2014b). Therefore, if such a need arises, these contracts can be revisited and changed, as long as an outcome corresponds with the Islamic framework.

### 2.2 Joint Enterprise or Partnership (Musharakah)

Additionally, Musharakah is another ancient instrument used in business. Like Mudarabah, Musharakah also takes into account the need for the sharing of profits and losses. Therefore, Musharakah is another great tool to counter possible issues that may arise from elimination of an interest rate from the operations of an economy. Al-Tally (2014) explained that Musharakah is an agreement of an Islamic bank to invest finances of depositors into joint enterprises and of entrepreneurs who carry out management functions to achieve profits from a project for a particular period alongside a capital contribution. While Mudarabah includes a silent partner, who is an investor and who does not take other responsibilities, a Musharakah contract enables any partner to become involved in business management (Al-Tally 2014). Understandably, all parties united by a Musharakah partnership share profits and losses. Profits are distributed in accordance with the preliminary agreements of partners, while losses depend on the amount of capital that was invested by specific parties. As a rule, an Islamic bank does not prevent clients to manage all aspects of such a joint enterprise, while the bank and the clients also share profits and losses. Like the first discussed profit-and-loss sharing instrument, Musharakah is rather flexible because there are no fixed amounts of capital that must be invested by partners (Rizvi, Bacha & Mirakhor 2016). This partnership is also flexible because there are no rigid regulations about how partners contribute to management of their joint enterprise.

### 2.3 Mark-Up or Cost-Plus Financing (Murabahah)

Apart from the two partnerships prevalent in Islamic economies, Murabahah is an important notion to explore. Al-Tally (2014) defined Murabahah as a trading agreement that allows for a payment to be made after some time elapses after the delivery of goods or services. Basically, Murabahah stands for a cost-plus-profit sale. This instrument is part of the bigger strategy in Islamic system to avoid illegal dealings. Tahir (2013) stated that Murabahah is a tool that can effectively coexist with monetary and fiscal policies required for the maintenance of an Islamic economy. It is understandable that traders who had purchased a product with the intention to resell the product will need to add an amount of money to gain something from such a transaction. Murabahah entails that a person truthfully admits to the cost that he or she paid for goods and specifies how much cost has been added for the trader to receive a certain profit (Al-Tally 2014). While Murabahah

can be used in regular transactions, Murabahah can also be employed as a debt instrument. In spite of effectivity of Murabahah, Harper (1994) suggested that unexpected inflation changes negate the benefits of Murabahah and motivate financiers to resort to Musharakah. Evidently, a range of finance instruments provide Islamic banks and businesses with different alternatives.

### 2.4 Leasing as an Agreement (Ijarah)

Since Islamic finances require a particular treatment to follow Islamic framework, another tool was developed to ensure that banks, other businesses and customers have an array of lawful tools to conduct their business affairs. Al-Tally (2014) wrote that Ijarah is an Islamic type of leasing and simultaneously a quasi-debt tool. Importantly, Ijarah resembles leasing processes found in Western economies. Flexibility is one of the advantages of Islamic leasing that can be easily employed in securitisation, secondary trading and collaboration with conventional institutions (Al-Tally 2014). Ijarah is an agreement that specifies the relationship between a customer and an Islamic bank that buy an asset to lease the asset to the customer under the condition that the latter will make regular fixed-amount payments that will usually occur monthly for a fixed period (Bello & Abubakar 2014). Additionally, Askari, Iqbal and Mirakhor (2014a) stressed that Ijarah is the most common type of funding for SMEs because leasing diminishes start-up costs and simultaneously increases security of the lessors' position.