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Master of Management: Finance and Investment Management

Foreign Direct Investment and the mining sector in South Africa: Implications for the current account balance

By

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Submitted in partial fulfilment of the requirements of a Master of Management: Finance and Investment degree in the Faculty of Commerce, Law and Management at the University of the Witwatersrand

Supervisor: Professor Kalu Ojah

DECLARATION

I, Tariro Roselyn Taruvinga, the undersigned, hereby declare that this dissertation is my own original work except for quotations and references of which the sources are acknowledged. This dissertation has not been submitted, and will not be presented at another University for the conferring of a similar or any other degree award.

Signature ……..

Date ……/……/…….....

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Firstly, I would like to express my sincere gratitude to my supervisor Professor Kalu Ojah, of the Wits Business School for his continuous support in steering me to think critically and laterally about the object of my study. While he provided me with guidance, he allowed me to own the research process. Through asking me some critical questions, he helped shape the final product of my research.

I am also grateful to Dr Emmanuel Ojo and Dr Sitabile Ndhlovu of the Wits School of Education who motivated and encouraged me at a critical moment in my research journey. They have become significant members of my "village". Dr Ojo (Uncle Emmanuel) became my mentor, and he consistently, patiently and expertly monitored and cajoled me to keep moving.

Finally, I must express my profound gratitude for the love and assured support that my entire family has always readily provided. I have a winning parental team. The different but equally important roles that all the family members play, synthesise to make an otherwise daunting undertaking appear easy. Without such unity of purpose and dedicated support, my accomplishments would not have been possible. I specifically acknowledge and thank my mother, Mandivavarira Maodzwa -Taruvinga, for encouraging me to study for a senior degree. Indeed, it has been an eye-opening and worthwhile development process. I believe a lifelong learning path has been opened.

In Africa, it takes a village to raise a child and I am a testimony of that. I would like to keep this legacy alive and pay it forward.

Dedication

I dedicate this research dissertation to all the departed (special mention of my father, Charles Ray Taruvinga) and living family members whose passion for education continues to inspire me. My grandmother, Norah Maodzwa is a pillar of strength and the glue that binds the family together. I salute you all.

Tariro Roselyn Taruvinga

Abstract

The mining sector contributes to South Africa's economic growth through tax revenue, employment creation and export revenue. Because of the abundance of the natural resource endowment of mining sector, it attracts FDI in line with the natural resource rents it fetches. However, the sector is subject to countervailing forces that threaten to hamper prospects of a positive economic growth contribution the sector can make.

With mining being the largest contributor of export revenue and investment income, there has been a trade balance and net investment income deficit over the past 10 years, due to South Africa importing more value-added goods and repatriating investment income to foreign investors. This raises the question of whether South Africa is attracting the appropriate FDI and encouraging the reinvestment of its export earnings.

This study reviews literature on the current account balance and how mining and FDI reflect theories identified in the literature. Government policies and incentives are analysed to evaluate their effectiveness in attracting appropriate kinds of FDI and the nature of their impact on economic growth. From the literature review, we identified a model for mapping the effect of FDI and the mining sector on the current account balance. Specifically, a VECM model is used to find the long-run and short-run effects of the variables considered to explain the impact of FDI inflows and outflows on the current account balance.

The first model examined the effects of relationship between FDI and the mining sector on the current account balance. The results showed that mining consumption has a positive relationship with the current account balance, and that FDI has a negative impact on the current account balance. There was, however, no short-run causality between FDI and mining consumption towards the current account.

The second model examined the relationship between the current account balance and FDI on GDP. The results show that the current account balance has a positive long-run relationship with GDP, and FDI has a negative impact on GDP. The probabilities yielded in the short run were significant in confirming short-run causality between the current account balance and FDI to GDP. The third model examined the relationship between FDI, mining consumption, exchange rate and commodity price index on GDP. The results show that mining consumption, FDI, commodity prices and real exchanges rate have a negative long-run relationship with GDP.

Overall, the results indicate the need for South Africa to encourage value-adding linkages within the mining sector in ways that will significantly shift the current account balance from a deficit to a surplus. Incentives that encourage a reinvestment of income to fund production activities that may come in the form of mergers and acquisition, brownfield investment and green field investments, are critical. The outcome of such guided production activities would result in a decrease in outflow of investment income from the economy.

Keywords: Current Account, Foreign Direct Investment, Mining Sector, South Africa

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List of Acronyms

ADF	Augmented Dickey-Fuller
ASGISA	Accelerated and Shared Growth Initiative for South Africa
BOP	Balance of Payments
BRICS	Brazil-Russia-India-China-South Africa
CA	Current Account
COMMP	Commodity Price
DF	Dickey Fuller
DTI	Department of Trade and Industry
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
GEAR	Growth Employment and Redistribution
J-B	Jarque-Bera
LM	Langrage Multiplier
OECD	Organization for Economic Co-operation and Development
PAYE	Pay as you earn
PP	Phillips Perron
PWC	Price Waterhouse Coopers
REXCH	Real Exchange Rate
R&D	Research and Development

SA	South Africa
SARS	South African Revenue Services
SARB	South African Reserve Bank
StatsSA	Statistics South Africa
TFP	Total Factor Production
UNCTAD	United Nations Conference on Trade and Development
VAR	Vector Autoregressive
VAT	Value Added Tax
VECM	Vector Error Correction Model

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Chapter 1

Introduction

"Slow growth and inflation have a tendency to accompany large deficits and increasing debt as a percentage of GDP"

Bill Gross

1.1 Background

The significance of the South African mining sector is reflected in its high profile ranking of the production of metal ores. South Africa is ranked as the world's number one producer of the platinum group metals (PGM), number three producer of diamonds, number three producer of gold, and the sixth largest producer of coal (Brooks, 2014; Luiz & Ruplal, 2010). Citibank valued the mineral wealth in South Africa at $2.5 trillion, the largest in the world (Harvey, 2013). The implication for economic growth is that mining in South Africa constitutes one-fifth of the South African economy contributing R468 billion in GDP. It contributes to half of the export earnings and employs over 1.3 million people (ECA & Union, 2013). The abundance of mineral resources allows for the creation of linkages across various sectors of the economy (Leeuw, 2012). As a result of the mineral wealth in South Africa, foreign direct investment has established a strong presence in the mining sector (Poelhekke & Van der Ploeg, 2010).

There is a dominant belief that FDI is a catalyst for economic growth and transformation, both of which in turn, contribute towards employment, infrastructure development, technology transfer, human resource development and increase in savings and investments (Ajayi, 2006). However, the reality of FDI on the African continent has been characterised by negative effects such as: tax evasion, transfer pricing, a balance of payment deficit, unethical competition practices, resource exploitation, environmental degradation and the use of economic power to influence governments' policy decisions (Samuel, 2013). This necessitates a closer study of the net effect of FDI on the current account balances, especially from the proceeds of the dominant mining sector where the production volumes of much sought-after natural resources are very high.

1.2 Problem Statement

An analysis of the South African current account balance is important given conflicting perceptions about the benefit of FDI on the South African economy, especially in the mining

sector. With South African mining contributing over half of the export earnings, the trade balance has been reflecting a deficit due to the value of imports exceeding the value of exports (Samuel, 2013). This is attributed to South Africa importing value-added goods of its export products (Draper & Freytag, 2008). The mining sector has also paid out an average of R12 billion in dividends annually and half of it has been repatriated to foreign investors (Chamber of Mines, 2013), contributing further to the net investment income balance deficit of the current account. This means outward investment income is more than inward investment income. This raises the question of whether government policy and incentives are attracting the appropriate kinds of FDI and encouraging the reinvestment of investment income in value added sectors.

1.2.1 The South African current account

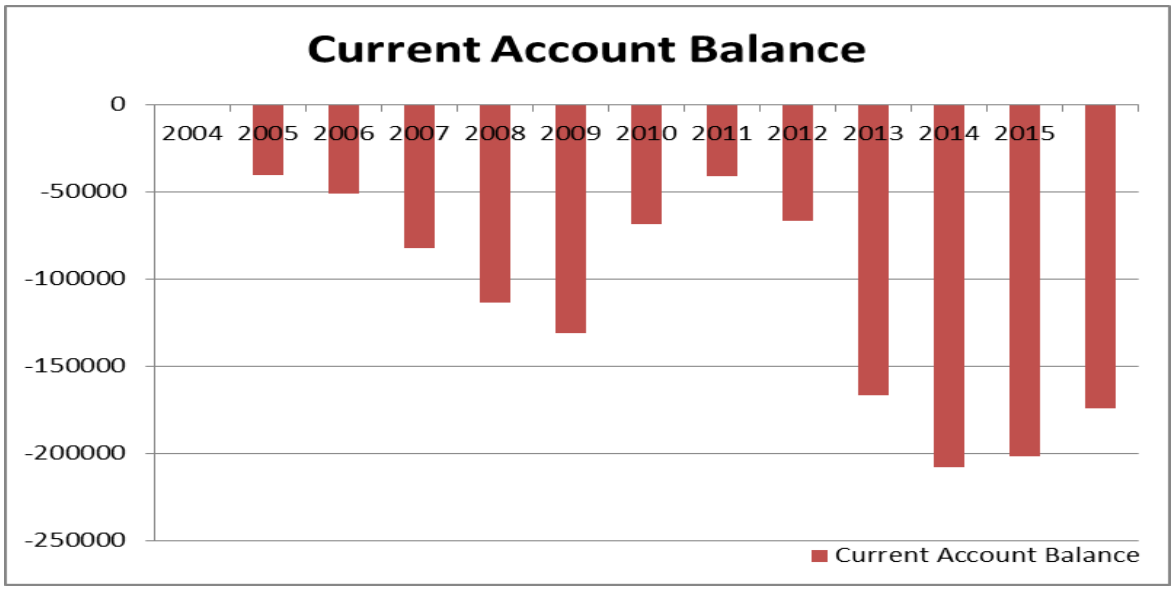


Figure 1 Current Account Balance for the period between the periods of 2005-2015

Source: Figure constructed from information obtained from SARB

According to Figure 1, the current account balance reflects a deficit since 2005 and has grown to four times its size over the past decade since 2005. Whilst the current account constitutes various components like the trade balance, net investment income and net transfers, it is important to unpack the current account components to understand the effects of FDI on the current account balance.

1.2.2 Current Account Trade Balance

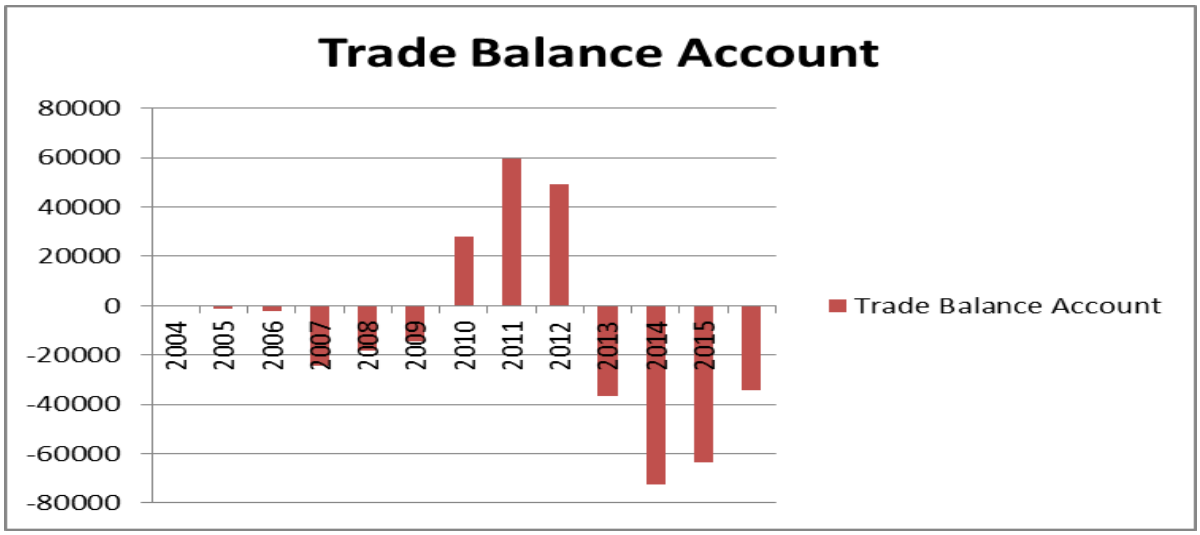
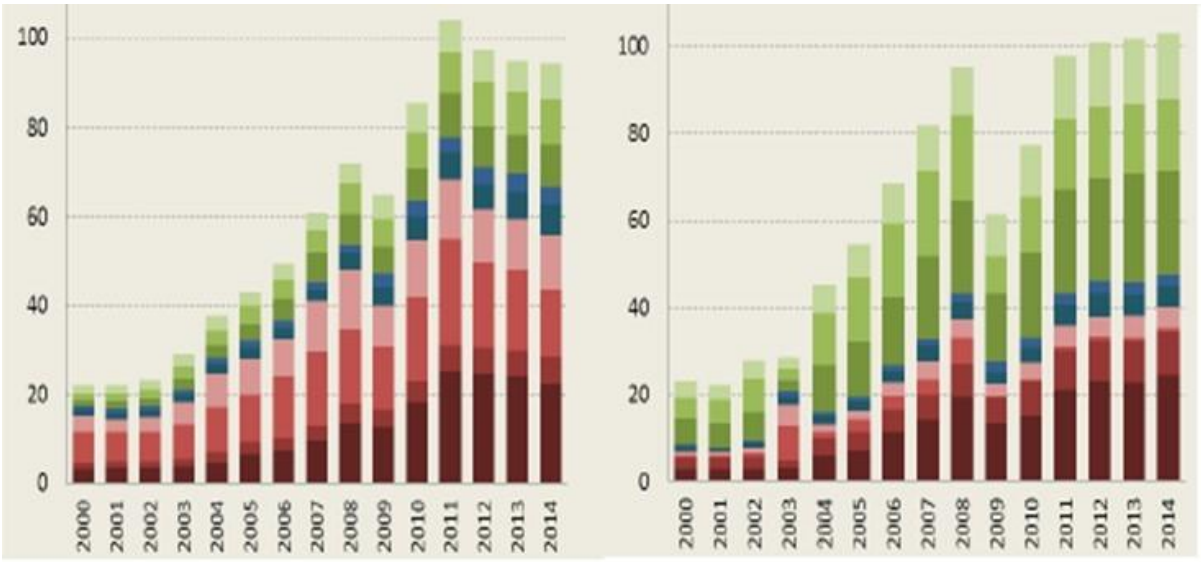


Figure 2: Trade Balance for the period between the periods of 2005-2015

Source: Figure constructed from information obtained from SARB

Figure 2 shows that the trade balance has been in deficit since 2005, improving into a surplus between the period of 2009-2011 and returning into a deficit in the period of 2012-2015. This is an indication that the value derived from exports is lower than the value of the imports. It is important to analyse the export composition to understand where exports derive most of their value. Figure 3 breaks down the export and import composition. It shows 63% of the exports are derived from minerals, metals and chemical products categories (National Treasury, 2015). This may be an indication for the need for South Africa to move into value-adding industries whose products are the current representation of the imports being brought into the economy as illustrated in figure 3 (National Treasury, 2015).



Exports to the World, by product (US$ 'b)

Imports from the World, by product (US$'b)

Mineral products	Salt, sulphur, earths and stone, plastic material, lime and cement, ores, slag and ash, mineral fuels, mineral oils, bituminous substances, mineral waxes
Chemical products	Insecticides, fertilizers, plant treatment, catalytic and reaction initiators with precious metals compound, fatty alcohols used in the production of detergents, emulsifiers, cosmetics etc
Precious metals	Precious or semi-precious stones, precious metals, pearls
Base metals	Iron, steel, copper, nickel, aluminium, lead, zinc, tin, cement, tools, implements, cutlery, spoons and folks, other base metal
Farm products	Live animals and products, vegetable products, fats and oils, wood, leather and fur products
Food and beverages	Prepared foodstuffs; beverages, spirits & vinegar; tobacco & manufactured tobacco substitutes
Machinery and appliances	Heavy-duty machinery and mechanical appliances; electrical equipment; 'white' electrical goods and parts
Vehicles and parts	Vehicles and parts
Other manufactured goods	Plastic, paper, textile, footwear and clothing, glassware and ceramics, automotive glass products

Figure 3 Export Composition per sector Source: National Treasury

1.2.3 Net Investment Income Balance of the Current Account Balance

Investment income in the form of dividends and interests constitutes an outflow within the current account balance, which further increases the current account deficit, which indicates further a reduction of capital resources available in the economy.

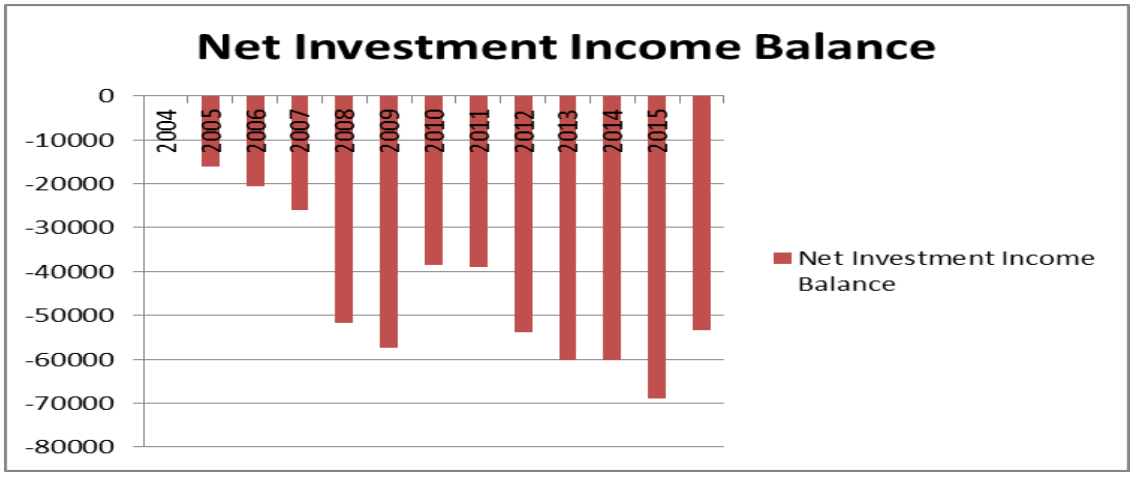


Figure 4 Net Direct Dividend Balance on FDI % of GDP

Source: Figure constructed from information obtained from SARB

The dividend declared by South African entities to foreign investors has an effect of contributing towards the current account deficit through net investment income. The amount of dividends repatriated to foreign investors is shown in Figure 4. Since 2005, the net investment income has reflected a deficit, which has grown to 1.75% of the gross domestic product. According to the mining indaba fact sheet, R12 billion was paid by mining companies, of which half went to foreign investment ((Chamber of Mines, 2013).

It is evident that the current account balances in the form of the trade balance and net investment income has been in deficit for the past 10 years. Whilst the mining sector has contributed over 50% of the export revenue, yet this has not been enough to result in a current account trade balance surplus. In addition, the sector paid out R6 billion in dividend income to foreign investors (Chamber of Mines, 2013), contributing to the net investment income deficit. This leads to the following question: Do government policy and incentives attract appropriate kinds of FDI and encourage the reinvestment of earnings income in value-added sectors?

1.3 Research Questions

- What are the determinants of the current account balance?
- What is the contribution of the mining sector towards the current account balance?
- How does FDI affect the current account balance?
- What government policies regulate and incentives mining related FDI?

1.4 Significance of the study

The study seeks to

- Highlight the match or mismatch between FDI incentives and the levels of FDI accruing to the economy in South Africa.
- The research has the potential of informing how an aspect of economic policy such as FDI incentive policy, can have a practical impact on the economy, and
- Provide some insights into determinants and benefits of FDI that can be accrued across various sectors of the economy.

1.5 Definition of terms

1.5.1 Definition of Foreign Direct Investment

According to the Organization for Economic Co-operation and Development, "FDI is defined as cross-border investment by a resident entity in one economy with the objective of obtaining a lasting interest in an enterprise resident in another economy. The lasting interest implies the existence of a long-term relationship between the direct investor and the enterprise and a significant degree of influence by the direct investor on the management of the enterprise." However, FDI comes in various forms.

1.5.2 Types of Foreign Direct Investments:

It is important to highlight types of FDI as this differentiation is the basis for thinking about opportunities, possibilities and challenges.

- **Cross Border Mergers and Acquisitions:** This refers to **"**the combination of two or more companies belonging to the same legal entity (or not) to achieve strategic and financial objectives. Companies involved in the operation may come from different economic sectors" (Bertrand, 2004).
- **Greenfield Foreign Direct Investments:** This involves the "creation of a subsidiary from scratch by one of more nonresident investors" (Bertrand, 2004).

1.5.3 Definition of Current Account Balance

The current account consists of net investment income balance, the trade balance account and net transfers balance (Strauss 2015).

When a country has a current account surplus, it is indicative that a country is saving as opposed to investing, putting it in a net creditor position to the rest of the world. This shows that the country is providing resources to other economies abroad to increase their productivity. Hence,

a surplus is referred to as a financing deficit. When a country has a current account deficit, it is indicative that a country is investing as opposed to saving putting it in a net debtor position to the rest of the world. This means it is using resources from other economies to meet consumption and investment needs.

1.6 A synopsis of the research method

The study uses a quantitative methodology to find the impact of the mining sector and inward foreign direct investment on economic growth. Econometric tools form part of the quantitative methodology, the VECM model is used to derive a model and estimation from the theoretical framework analysed in the literature review. The use of the VECM is to test for stationarity and co-integration. In order to test the reliability and efficiency of the model, diagnostic tests are carried out to verify the absence/presence of serial correlation, heteroscedasticity and the normality of the model. Variance decomposition and Impulse responses of the model are analyzed. A detailed outline on research methodology is provided in Chapter 3.

1.7 Brief orientation and chapter overviews

Chapter 1 Introduction: This chapter provides an introduction and background of the proposed research. It includes the problem statement, significance of study and methodology used

Chapter 2 Literature Review: This chapter provides a theoretical framework on theories affecting economic growth, the impact of mining and foreign direct investment on economic growth and the role of government in regulating and providing incentives that attract the appropriate inward foreign direct investment

Chapter 3: The research design and methodology: This chapter highlights the econometric methods used, model specification, definition and analysis of variables used and their data sources and estimation techniques.

Chapter 4: Analysis of results: This chapter provides a report of the interpretation of empirical findings of the data as per the methodology used.

Chapter 5: Conclusion and Recommendations: This chapter provides the main findings of the study, conclusion and policy recommendations.

Chapter 2

Literature Review

"The mining industry might make wealth and power for a few men and women, but the many would always be smashed and battered beneath its giant treads"

Katharine Susannah Prichard

2.1 Introduction

The aim of this chapter is to provide a review of literature on the effect of foreign direct investment and the mining sector on the current account balance. The chapter is divided into four sections. The first section discusses the determinants of the current account, the second section discusses the nature of the mining sector in South Africa, the third section discusses the effect of foreign direct investment on the current account and the fourth section discusses the impact of government policy in regulating and incentivising foreign direct investment.

2.2 What are the determinants of the current account?

It is important to analyse the determinants of the current account to understand the impact of foreign direct investment and the mining sector. The outcome of the current account balance is attributed to saving and investment decisions driven by productivity expectations, government spending, interests' rates and other factors (Makanza & Dunne, 2015). Over the past 10 years, South Africa has reflected a current account deficit. The current account deficit has been documented to be a sign or cause for economic weakness (Uz, 2010). However, a current account deficit is the outcome of interactions and decisions of households, firms, government and the nature of national and international markets (Obstfeld, 2012). The determinants of the current account are documented into internal and external factor categories (Calderon, Chong, & Loayza, 2002).

Internal factors are derived from the gross national product, goods and service markets, and current account identities. It shows public and private savings, investment and domestic output growth as major determinants of the current account balance (Brissimis, Hondroyiannis, Papazoglou, Tsaveas, & Vasardani, 2012). External factors show that exports, terms of trade, real exchange rate, Black Market Premium on Foreign Exchange, Output Growth Rate of Industrialised Countries, International Real Interest Rate and external indebtedness as major determinants of the current account balance (Calderon et al., 2002).

National accounting identities help to shed light on macro-economic determinants of current account fluctuations (Olivei, 2000). The need to start with the gross national product identity will be useful which is denoted as GNPt in equation (1) which is the sum of the country's gross domestic product Yt and the net income from abroad rtBt

$GNP_t = Y_t + rtB_t$…… (1.1)

In the goods and services markets, the equilibrium is the sum of private sector consumptions C_t, government spending G, investment and net demand from exports, NX.

$Y_t = C_t + G_t + I_t + NX_t$..... (1.2)

The current account identity is derived from its definition as the sum of trade balance and net income from abroad.

$CA_t = NX_t + r_tB_t = GNP_t – (Ct + Gt + It)$ …… (1.3)

The difference between the gross national product and private and government consumption equates to national saving. This makes the current account the difference between public and private saving and investment.

$CA_t = S_t – I$……... (1.4)

2.2.1 Internal Economic Determinants if the current account:
Public and Private Saving.

Using the identities above, a current account balance deficit is derived as an excess net inflow of capital into the country that increases the country's net borrowing position to the world. Similarly, a current account surplus is derived from an excess of domestic savings which increases the net lending position of a country to the rest of the world (Sahin & Mucuk, 2014). Olivei (2000) argues that to the extent that a country does not default on its debt obligations, current account deficits should result in high national savings or lower investments. Feldstein (1992) argues that in the short run, FDI inflow will offset the difference between investment and savings and in the long run, the rebalancing of the current account can only be achieved through changes in investment. This is attributed by, in the long run, the household's attitude towards savings, and fiscal incentives for private savings and the public's attitude towards a budget deficit. Low levels of national savings lead, in the long run, to low levels of investment,

with potentially important implications for a country's future standards of living. Hence, policy inclusion in raising the savings rate as low savings constrains investment is necessary.

Domestic output growth. The domestic output growth is represented by productivity output in the goods and services market (Blanchard & Johnson, 2013). Productivity affects the current account more than investment because consumption and investment decisions respond to change in productivity (Kent, 1997). This makes the response to the current account larger than consumption and investment.

2.2.2 External Economic Determinants of the Current Account:

Exports. "A temporary increase in exports, relative to GNDI, has the effect of lowering the current account deficit by contributing to a positive trade balance" (Calderon et al., 2002).

Real Exchange Rate: When the demand for foreign currency is higher than the local currency, this lowers the local country's exchange rate until the goods and services are cheap for foreigners and foreign assets are too expensive to generate sale for domestic interests. Therefore, an appreciation of the currency causes an improvement in the current account balance and portfolio theorists explain this through the importance of investment income accruing to the domestic economy as a result of foreign assets holdings. In the short run, an increase in value of foreign holdings will result in an increase in interest income on foreign assets and will result in an increase in the surplus required on current account items. Therefore, appreciations of currencies are associated with surpluses and depreciating currencies are associated with deficits. " (Calderon et al., 2002)

Terms of Trade. Terms of trade (ToT) is defined as the price index of exports of goods and services divided by the price index of imports (Reinsdorf, 2010). A terms-of-trade deterioration decreases "real income," and the decrease in real income reduces saving out of any given income, both measured in terms of exportables (Dibooglu, 1997). Thus, if investment is constant and there is no government deficit, the change in saving is equal to the change in the current account surplus, and hence the Harberger-Laursen-Metzler effect implies that the current account will deteriorate in response to a terms-of-trade deterioration (Svensson & Razin, 1983).

Black Market Premium on Foreign Exchange.

The black market on foreign exchange is a tax on exports, creating a conflict between the financing of government spending and the allocative goal of stimulating exports (Pinto, 1991). An increase in black market premium will lead to a reduction in the current account deficit (Drazen & Easterly, 2001).

Evolution of the World Economy:

Output Growth Rate of Industrialised Countries

Industrialised countries tend to import their input product for production that comes in the form of raw materials making them customers to countries of their input products. Therefore, an increase in the growth rate of industrialised countries would increase the exports of developing countries reducing the current account deficits of developing countries (Calderon et al., 2002).

International Real Interest Rate

International real interest rate determines international investment. Low interest rate will deter investment to countries that offer high interest rates hence international investors seek investment opportunities in developing countries (Obstfeld, 2012). Therefore, a temporary increase in the international real interest rate will lead to a current account deficit reduction creating a negative association between international real interest rate and current account deficit in developing countries (Calderon et al., 2002).

External Indebtness

High indebtness is likely to decrease the level of investment as chances of default are high. High private savings would result in a reduction in the current account deficit for highly indebted countries than for non-heavily indebted countries, as an increase in private savings would stimulate domestic investment (O'BRIEN, Blommestein, & DITTUS, 1991). A decrease in the international interest rate is likely to have no significant impact on the current account deficit, as international investors will avoid putting capital in debt-ridden countries (Edwards, 1989).

2.2.3 The Current Account in South Africa

The current account plays a major role in determining the business cycle and macro-economic policy in South Africa. No attention was paid to the current account over the past two decades because the deficits' were minute and financed by private capital flows (Smit, 2006).

Prior to the political transition in 1994, South Africa's macro-economy was characterised by the following indicators of poor economic growth, current account balance surpluses, high inflation and low foreign exchange reserves and this was caused by South Africa's isolation from the world market due to sanctions imposed by the international community which saw an outflow of capital (Faulkner & Loewald, 2008).

The issue of current account sustainability is dependent on whether foreign investors are prepared to finance the deficit. A framework was established to determine the sustainability of the current account based on the country's solvency as a ratio of the external liabilities to GDP. However, since the sustainability of the current account is solely based on foreign investment, it is impractical for it to be sustainable as investor reactions are unpredictable (Brissimis et al., 2012).

The South African Current Account

The current account is composed of trade balance of goods and services (X-M), net investment income (NY) and net transfers (NCT) (Draper and Freytag 2008). The effects of FDI permeates through the current account balance through investment income in the form of dividend and interest income repatriated towards foreign investors as well as the trade balance of goods and services (Strauss, 2015).

The South African current account

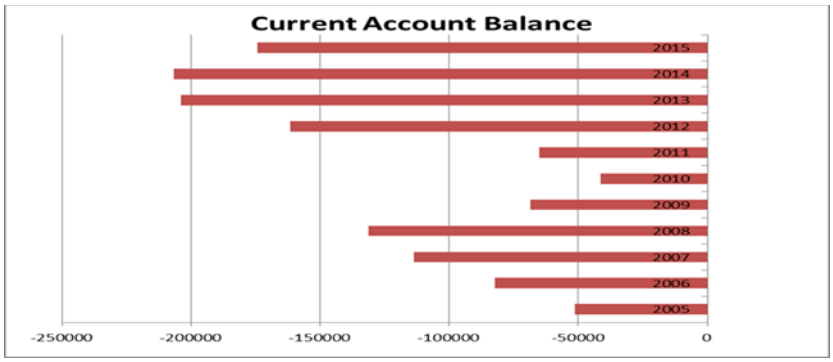


Figure 5 Current Account Balance

Source: Own calculation from information obtained from SARB

The current account balance has reflected a deficit since 2005 and has grown to four times its size over the past decade since 2005. Whilst the current account constitutes various components like the trade balance, net investment income and net transfers, it is important to unpack the current account component to understand the effects of FDI on the current account balance.

Trade Balance

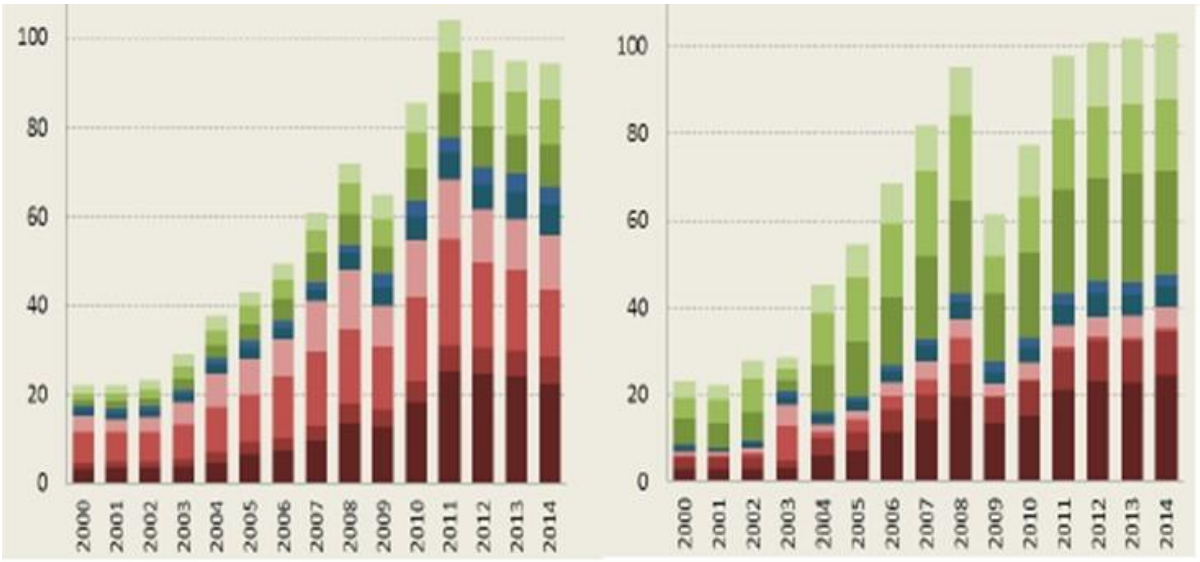


Figure 6 Trade Balance of the current account for the period between 2005-2015

Source: Own calculation from information obtained from SARB

The trade balance has been in deficit since 2005, improving into a surplus between the period of 2009-2011 and returning into a deficit in the period of 2012-2015. This is an indication that the value derived from exports is lower than the value of the imports. It is important to analyse

the export composition to understand where exports derive most of their value. Figure 7 breaks down the export and import composition, it shows 63% of the exports being derived from minerals, metals and chemical products categories. This may be an indication for the need for South Africa to move into value-adding industries whose products are the current representation of the imports being brought into the economy as illustrated in figure 7.



Exports to the World, by product (US$ 'b)

Imports from the World, by product (US$'b)

Mineral products	Salt, sulphur, earths and stone, plastic material, lime and cement, ores, slag and ash, mineral fuels, mineral oils, bituminous substances, mineral waxes
Chemical products	Insecticides, fertilizers, plant treatment, catalytic and reaction initiators with precious metals compound, fatty alcohols used in the production of detergents, emulsifiers, cosmetics etc
Precious metals	Precious or semi-precious stones, precious metals, pearls
Base metals	Iron, steel, copper, nickel, aluminium, lead, zinc, tin, cement, tools, implements, cutlery, spoons and folks, other base metal
Farm products	Live animals and products, vegetable products, fats and oils, wood, leather and fur products
Food and beverages	Prepared foodstuffs; beverages, spirits & vinegar; tobacco & manufactured tobacco substitutes
Machinery and appliances	Heavy-duty machinery and mechanical appliances; electrical equipment; 'white' electrical goods and parts
Vehicles and parts	Vehicles and parts
Other manufactured goods	Plastic, paper, textile, footwear and clothing, glassware and ceramics, automotive glass products

Mineral products	Salt, sulphur, earths and stone, plastic material, lime and cement, ores, slag and ash, mineral fuels, mineral oils, bituminous substances, mineral waxes
Chemical products	Insecticides, fertilizers, plant treatment, catalytic and reaction initiators with precious metals compound, fatty alcohols used in the production of detergents, emulsifiers, cosmetics etc
Precious metals	Precious or semi-precious stones, precious metals, pearls
Base metals	Iron, steel, copper, nickel, aluminium, lead, zinc, tin, cement, tools, implements, cutlery, spoons and folks, other base metal
Farm products	Live animals and products, vegetable products, fats and oils, wood, leather and fur products
Food and beverages	Prepared foodstuffs; beverages, spirits & vinegar; tobacco & manufactured tobacco substitutes
Machinery and appliances	Heavy-duty machinery and mechanical appliances; electrical equipment; 'white' electrical goods and parts
Vehicles and parts	Vehicles and parts
Other manufactured goods	Plastic, paper, textile, footwear and clothing, glassware and ceramics, automotive glass products

Figure 7 Export Composition per sector

Current Account Net Investment Income Balance

Investment income in the form of dividends and interests constitutes an outflow within the current account balance that further increases the current account deficit which further contributes to the reduction of capital resources available in the economy.

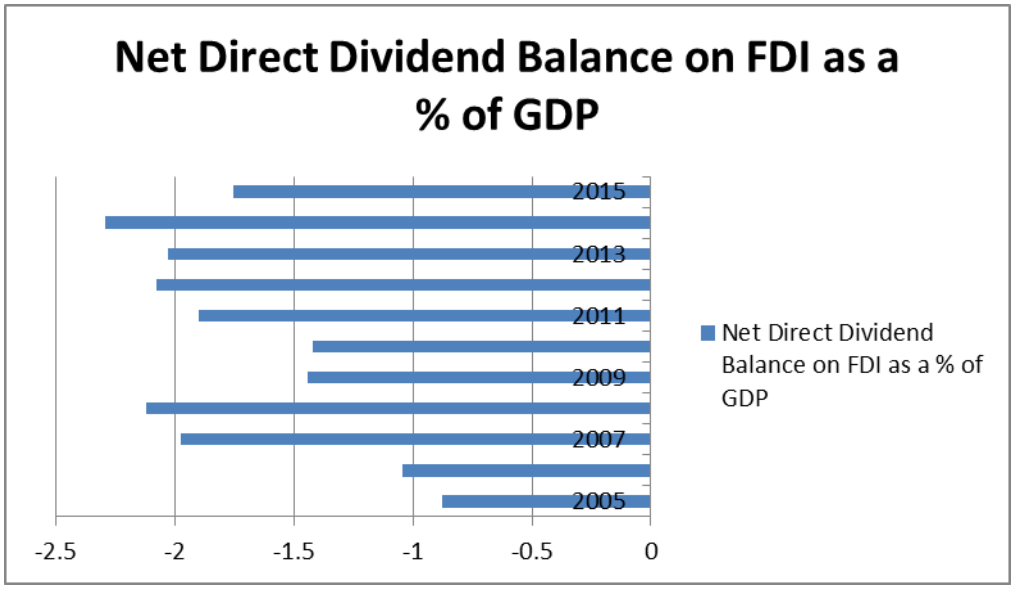


Figure 8 Net Direct Dividend Balance on FDI % of GDP

Source: Own calculation from information obtained from SARB

The dividend declared by South African entities to foreign investors has an effect of contributing towards the current account deficit through net investment income. The amount of dividends repatriated to foreign investors is shown in Figure 8. Since 2005, the net investment income has reflected a deficit that has grown to 1.75% of the gross domestic product.

The following factors are identified by Edwards (2004) and show that degree of openness of the economy, the extent of dollarisation of foreign liabilities and the exchange rate regime affect the extent of current account reversals on economic activities. The current account deficit seems to be associated with poor export performance, strong investment growth, a weakening savings and strong capital inflows.

It is important to analyse the drivers of economic growth in South Africa in relation to foreign direct investment in the mining industry in order to see how economic growth can be achieved. The responsibility to ensure economic growth is not the responsibility of the state alone but lies with all stakeholders that participate in economic activities.

2.2.4 The relationship between the current account balance and economic growth in South Africa

South Africa's political history has heavily influenced its economic landscape (Magubane, 1995). During the apartheid regime, the South African economy was isolated from the world market due to sanctions imposed by the international community forbidding minority rule (Wise, 2004). This forced the apartheid regime to reconsider the notion of democracy by un-banning the ANC in 1990 and holding its first democratic election in 1994 (Klug, 2007).

Post-apartheid, South Africa implemented a macro-economic policy known as the Growth, Employment and Redistribution (GEAR) policy as a mechanism to ensure sustainable economic growth (Michie & Padayachee, 1998). The integrated strategy of the policy included

- "a renewed focus on budget reform to strengthen the redistributive thrust of expenditure;
- a faster fiscal deficit reduction programme to contain debt service obligations, counter inflation
- and free resources for investment;
- an exchange rate policy to keep the real effective rate stable at a competitive level;

- consistent monetary policy to prevent a resurgence of inflation;
- a further step in the gradual relaxation of exchange controls;
- a reduction in tariffs to contain input prices and facilitate industrial restructuring, compensating
- partially for the exchange rate depreciation;
- tax incentives to stimulate new investment in competitive and labour absorbing projects;
- speeding up the restructuring of state assets to optimise investment resources;
- an expansionary infrastructure programme to address service deficiencies and backlogs;
- an appropriately structured flexibility within the collective bargaining system;
- a strengthened levy system to fund training on a scale commensurate with needs;
- an expansion of trade and investment flows in Southern Africa; and
- A commitment to the implementation of stable and coordinated policies" (Finance, Roux, & Abedian, 1996).

The contributors of economic growth in South Africa

However, since the establishment of GEAR, the following were identified as the main contributors of economic growth, set in achieving the long-term strategy of the policy:

There is a debate in literature on whether South African growth is primarily driven by an accumulation in factor inputs or total factor productivity (TFP) measured by efficiency gains (Fedderke & Simkins, 2009). When it is the accumulation in factor inputs, there is a need to determine the factors that drive investment in physical capital and define the characteristics of the labour market.

The investment in physical capital stock sets the foundation of long run economic growth in South Africa. The notion is reiterated in the neo-classical model theory (Solow, 1956) and new growth theories. To understand the determinants of investment expenditure will set the foundation of understanding contributors of economic growth. This is found in the mismatch between private investment rates and private savings rates. In this scenario, the need for intervention by the financial sector is important. The role of the financial sector is analysed through the importance of international capital flows in South Africa and the role of domestic financial markets.

International Capital Flows

South Africa's private sector has not produced enough savings to cover the demand for capital formation, leading to the dependency of international capital inflows to finance its physical capital formation. South Africa's improved rate of return and reduced risk has resulted in an inflow of capital (Mohamed, 2012). Capital inflows are sensitive to political risk and the need for government policy to manage the risk factors will not deter investors from pulling out their investment (Mina, 2015).

Domestic financial markets

The financial system in South Africa is now attributed to contribute to the high real growth rates and thus, is essential for development (Gordhan, 2011). However, the increase in per capita output may be the reason for financial market development (Levine & Zervos, 1998). Credit extension and stock market liquidity has a positive impact on per capita GDP (Gondo, 2009). Credit extension facilitates the liquidity of stock markets (Demirgüç-Kunt & Maksimovic, 1999). The development of the equity market in turn stimulates the investment in physical capital which attributes to economic growth through output (Levine, 2001).

Demand-side policy

Demand side policy creates a conducive environment for long run capital accumulation through government consumption expenditure as a proxy of fiscal policy stance and inflation rate as a proxy for the monetary policy (Aron, Kahn, & Kingdon, 2009). Demand side policy interventions contribute to the growth process in South Africa through the government providing a stable and predictable macro-economic environment which creates an environment for investment to flourish through lowering uncertainty and improving predictability rather than providing a demand-side stimulus to output growth which only succeeds in contractionary pressures and is short lived (Fedderke, 2005).

Institutions

History has shown that South Africa's political dispensation has contributed to the process of physical capital formation, as well as the ability to attract capital inflows, with sanctions imposed on the apartheid government by the international community on the lack of democracy by the minority government.

Fedderke, De Kadt and Luiz (2001b) state that institutional factors on South Africa's economic growth appear to have an effect on the capital-labour ratio, evidence suggest political instability and property rights are important in determining factors of capital accumulation (Fedderke, 2006). The importance of property rights has a positive impact on capital accumulation given the long-term nature of capital commitments and political instability is harmful for capital accumulation. However, evidence suggests that institutions do not directly affect output, but indirectly affect output through the investment rate. Economic development is said to drive institutional development (Fedderke, 2002).

Labour market inefficiencies

The labour market in South Africa has contributed to the decline in long-term growth through mispricing of labour and labour market rigidities. Empirical studies have shown that wage elasticity of employment has consistently been negative, showing obstacles in employment creation (Fedderke, 2005).

Innovation and Human Capital

Innovations and Human Capital are determinants of total factor productivity in South Africa. South Africa contributes to the investment of human capital process by the proportion of matriculants and university graduates engaged in the mathematical, scientific and engineering (NES) disciplines and R&D development activity. However, such investment has been deemed to be unproductive with a decline of matriculants in the schooling system and a decrease in students in NES disciplines at university and R&D activity. The need to invest in the education system is important given the history of the country. However, such investment can only be futile if the citizens value the need for an education and are not dictated to what professions or disciplines they need to take at higher education. Therefore, the need to invest in education of all disciplines will not lead to unutilised allocation of resources (Fedderke, 2006).

The six constraints to economic growth in South Africa were identified by Asgisa as

- "Infrastructure backlogs
- Shortage of skills and cost impact on low-skilled labour of the apartheid spatial system
- Poor international competitiveness of much of our manufacturing and tradable services sectors

- The relative volatility of the currency
- The regulatory environment for small and medium-sized business and the weakness of the Second Economy
- The inadequate capacity of government organs to support economic development."

2.2.5 The relationship between economic growth and the current account

The relationship between economic growth and the current account lies within the sustainability of the current account relative to economic growth (Milesi-Ferrett & Razin, 1996). Current account deficits are sustainable with high economic growth as investment rates increase as a result of high GDP. High growth rates will result in high expectations of future income, which in turn lead to low private savings. High growth rates are an indication of the ability of a country to services its external debt which will lead to a smaller increase of foreign debt to GDP ratio (Roubini & Wachtel, 1999).

A current account deficit can be an indication of economic growth rather than a country consuming more than it can afford. As a country grows at a faster pace than its trading partners do, the need to import is necessary to sustain economic growth. Low economic growth by trade partners will result in low exports. This results in a trade deficit (Abedian, De Wet, & Pitso, 2006).

From an investment perspective, high economic growth results mean high returns on investment. High returns attract foreign investment providing natural financing for the high economic growth (Faulkner, Loewald, & Makrelov, 2013).

The societal implications caused by the current account imbalances, such as the trade balance deficit, is that domestic jobs are lost as a result of importing more goods than the consumption and exportation of domestic goods eliminating local firms (Abedian et al., 2006).

The sustainability of the current account deficit is dependent upon the investment climate of a country. High expected returns attract financial flows. A stable political environment, fair legal system, free movement of capital and a stable macro-environment creates little uncertainty for financial flows (Abedian et al., 2006). Emerging markets are deemed to be high risk and experience a turnaround in investment sentiment as seen by the Asian crisis in 1997 and 1998 where Asian countries had current account deficits due to superior economic growth and this

was attributed to international capital flows (Corsetti, Pesenti, & Roubini, 1999). However, when investment sentiment changed and there was a capital outflow this resulted in a depreciation of the currency and this makes local goods cheaper, resulting in a trade balance surplus (Abedian et al., 2006).

From an economic sense, a current account deficit is not a bad thing if it is sustainable through capital inflows of the financial account. As demonstrated by the Asian crisis, the greater the deficit, the greater the probability of correction when investment sentiment changes in emerging markets and this is done through a free-floating currency which should lead to the depreciation of the currency.

In conclusion, the interactions of the determinants of the current account and economic growth are necessary to achieve sustainable economic growth. The determinants of the current account balance are attributed to internal factors, such as public and private savings, investment and domestic output growth and external factors such as exports, terms of trade, real exchange rate, Black Market Premium on Foreign Exchange, Output Growth Rate of Industrialised Countries, International Real Interest Rate and external indebtedness. An analysis of the South African current account balance was examined and it showed that South Africa has been operating within a deficit for the past 10 years and this is mainly attributed to poor export performance, strong investment growth, a weakening savings and strong capital inflows. Therefore, the need to examine the contributors of economic growth in South Africa was important to better explain the relationship between economic growth and the current account balance. Demand side policy, international capital flows, labour market efficiency, domestic financial markets, institutions, innovation and human capital were found to be major contributors to economic growth. These determinants cannot work in isolation of each other to achieve economic growth. Human capital and human developments are the basis to which each determinant exists. It is through human capital and development that innovation and research and development contribute towards economic growth. The relationship between economic growth and the current account balance was explained, Literature explains that high economic growth would result in high investment rates and the sustainability of a current account deficit as an economy will be able to service its debt. The most important aspect of managing the sustainability of the current account balance lies with the performance of the economy.

2.3 The nature of the mining sector in South Africa

The South African mining sector is one of the most lucrative industries in the economy producing metals such as coal, gold, uranium and diamonds (Fedderke & Pirouz, 2000). With 37 mining companies listed on the JSE, it is without doubt that the mining sector contributes towards GDP growth, employment and tax and export revenues and is a major supplier and customer of complementary industries (Fedderke & Pirouz, 2000). Whilst the mining industry plays a major role towards economic growth, it faces major risks that may threaten prospects of achieving high economic growth such as volatile commodity prices and foreign exchange fluctuations and an unstable regulatory, political and legal environment (PWC, 2014). The poor performance in the mining industry in South Africa has been explained by labour market inefficiency, corruption and infrastructure constraints (Harvey, 2013). Therefore, the need to harness natural resources for structural transformation is needed in order to achieve sustainable economic growth (Outlook, 2013).

2.3.1 Market Capitalisation of Mining Companies on the JSE

According to the Mining Indaba Fact sheet, there are 67 basic resources companies out of 391 listed companies. 35 out of 67 companies are dual listed. This gives mining companies access to foreign capital. Dual listed companies constitute 87% of the basic resources companies' market capitalisation. The market capitalisation of basic resources companies constitutes 18% of the overall JSE market capitalisation. Figure 9 shows an illustration of the JSE mining index to the overall JSE All Share Index.

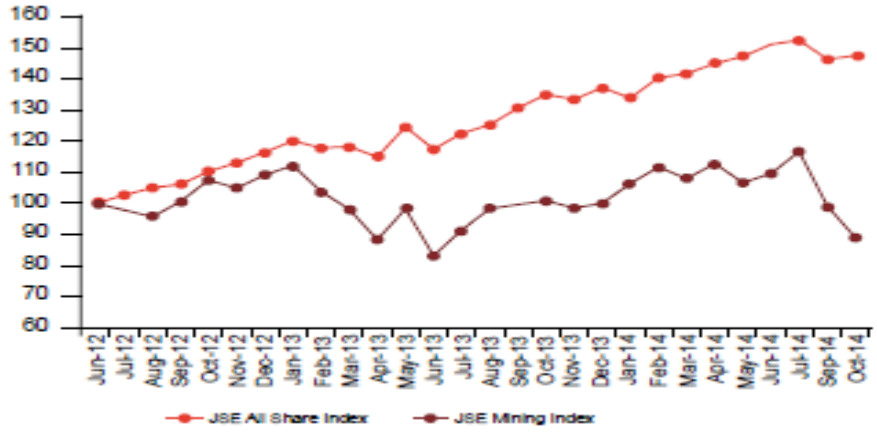


Figure 9 JSE mining index vs JSE all share index

JSE mining index vs JSE all share index

Source: PWC Highlighting trends in the mining sector

Figure 9 illustrates the JSE all-share index and the JSE mining index. The challenges facing the mining sector, which include low commodity prices and the challenging local environment relating to labour strikes, can explain the performance of the mining index relative to the JSE all-share index (Antin, 2013).

2.3.2 Contribution of the Mining Sector towards GDP

Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Agriculture, forestry and fishing	39172	42884	55762.18	67743	68044.4	65605.209	68591.02	70244.91	73458.2	84662.32	83497
Mining and quarrying	107400	132843	157672.19	197643.2	200824.285	230349.741	262391.33	271410	284802.2	286606.6	286522
Manu-facturing	266515	269769	302990.8245	341697	341657.799	358699.339	363173.88	385653.757	419930.57	452326	462956
Electricity, gas and water	28417	30849	33278.001	37778.76	53473	67939.6	86904.9	105773.2	117466.001	125377.7	129794
Construction	42519	49117	65630.7	92953	95753.2	95452.7	103301.9	111039.5	126434.6	138917	143301
Wholesale, retail, motor trade and accomodation	208034	231999	258907.8	297518.3	317654.599	370580.35	405860.22	441038.14	471008.164	505460	535472
Transport, storage and com-munication	159554	196054	210994.88	221548.8	223426.99	229498.999	258730.5	292840.793	317973.989	339929.6	354296
Finance, real estate and business services	306093	347755	418979.8	446756.2	482872	523526.2	565055.9968	606030.632	643166	699531	743524
General government services	217665	236104	264777	309629	356819	404647	449360	482144	532122	578030	618167
Personal services	93870	104847	115728.6	123922.8	136620.6	148561.2	161652.671	173465.561	186599.03	194260.4	203029.1
Total value added at basic prices	1469239	1642222	1884721.976	2137190	2277145.873	2494860.338	2725022.418	2939640.493	3172960.754	3405101	3560558
Taxes less subsidies on products	170015	197179	224779	231873	230531	253148	299928	322902	361365	391967	430395
GDP at market prices	1639254	1839401	2109500.976	2369063	2507676.873	2748008.338	3024950.418	3262542.493	3534325.754	3797068	3990953
% Contribution of mining towards GDP	7.309901589	8.089245	8.365806313	9.247807	8.819122542	9.232971381	9.628960418	9.232761647	8.975913101	8.416979	8.047109

Figure 10: GDP contribution per sector

Source: Own calculation obtained from StatsSA

Figure 10 illustrates the sectoral contribution to GDP, the mining sector has directly contributed an average of 8.66% towards GDP over the last 10 years. However, during the financial crisis, the contribution towards GDP was highest due to a weakening rand as commodities are US denominated (Industrial Development Cooperation, 2013). However, in consecutive years, the contribution decreased due to the prolonged labour strikes that saw a halt in production.

2.3.3 Contribution of the Mining Sector towards Employment

Year and Quarter	Total Number of Employees	Total Employees in the Mining sector	Percentage contribution to employment
2013 June	8965000	511000	5.699944228
September	8979000	507000	5.64650852
December	9009000	499000	5.538905539
2014 March	8985000	491000	5.464663328
June	9105000	491000	5.392641406
September	8947000	498000	5.566111546
December	8986000	491000	5.464055197
2015 March	8945000	490000	5.477920626
June	8944000	489000	5.467352415
September	8949000	476000	5.319030059
December	8992000	462000	5.137900356
Average			5.470457565

Figure 11: Total Employees relative to the employees employed by the mining sector

Source: StatsSA publication on employee Statistics

The mining sector contributes an average of 5.47% towards the employee pool. However, since 2013, there have been a drop of 49000 employees and this may be attributed to retrenchments because of restructuring and job losses, as a result of labour tensions in the mining sector (StatsSA, 2016).

2.3.4 Contribution of the Mining Sector towards Tax Revenue

The mining sector contribution towards tax revenue is assessed according to PAYE and Companies Tax.

PAYE payments received by economic activity 2010/11 - 2014/15

Tax Year		PAYE payments received				
Economic Activity		2010/2011 R(million)	2011/2012 R(million)	2012/2013 R(million)	2013/2014 R(million)	2014/2015 R(million)
Primary Sector		16507	19537	20718	22689	24212
Agriculture, forestry and fishing		5346	5850	6601	7531	8186
Mining and quarrying		11161	13687	14115	15158	16025
Secondary Sector		26877	29706	32559	35600	40161
Manufacturing		15171	17345	18911	20673	23734
Electricity, gas and water		3409	3912	4920	5016	5768
Construction		8297	8447	8728	9910	10658
Tertiary Sector		176918	196361	217626	244594	280108
Wholesale and retail trade, catering and accomodation		14404	16066	18103	19969	20804
Transport, storage and communication		7959	8810	10425	11307	13300
Financial intermediation, insurancem reak estate and business services		113254	125389	138819	156821	181564
Community, social and personal services		41301	46097	50278	56498	64439
Other		6	10	13	12	43
Total		220308	245612	270913	302886	344523
Percentage of Total						
Primary Sector		7.5%	8.0%	7.6%	7.5%	7.0%
Agriculture, forestry and fishing		2.4%	2.4%	2.4%	2.5%	2.4%
Mining and quarrying		5.1%	5.6%	5.2%	5.0%	4.7%
Secondary Sector		12.2%	12.1%	12.0%	11.8%	11.7%
Manufacturing		6.9%	7.1%	7.0%	6.8%	6.9%
Electricity, gas and water		1.5%	1.6%	1.8%	1.7%	1.7%
Construction		3.8%	3.4%	3.2%	3.3%	3.1%
Tertiary Sector		80.3%	79.9%	80.3%	80.8%	81.3%
Wholesale and retail trade, catering and accomodation		6.5%	6.5%	6.7%	6.6%	6.0%
Transport, storage and communication		3.6%	3.6%	3.8%	3.7%	3.9%
Financial intermediation, insurancem reak estate and business services		51.4%	51.1%	51.2%	51.8%	52.7%
Community, social and personal services		18.7%	18.8%	18.6%	18.7%	18.7%
Other		0.0%	0.0%	0.0%	0.0%	0.0%
Total		100.0%	100.0%	100.0%	100.0%	100.0%

Figure 12: PAYE contribution per sector Source: Obtained from Sars Tax Statistics

PAYE: A pay-as-you-earn tax (PAYE) is a withholding tax on income payments to employees. Amounts withheld are treated as advance payments of income tax due. They are refundable to the extent they exceed tax as determined on tax returns (SARS, 2016).

The mining sector contributes an average of 5% of PAYE payments as illustrated in Fig 12, the largest payment in the primary sector. This is in line with the number of employees employed by the mining sector (SARS, 2015).

Tax Year	2011			2012			2013			2014		
Economic Activity	Number of taxpayers)	Taxable Income R(million)	Tax Assessed R(million)	Number of taxpayers)	Taxable Income R(million)	Tax Assessed R(million)	Number of taxpayers)	Taxable Income R(million)	Tax Assessed R(million)	Number of taxpayers	Taxable Income R(million)	Tax Assessed R(million)
Primary Sector	24609	16648	21256	22849	-3788	16835	20793	-3040	18609	15342	-24375	5215
Agriculture, forestry and fishing	22063	-22714	2023	20739	-25035	2338	18773	-24329	2782	14106	-15856	2047
Mining and quarrying	2546	39362	19234	2110	21247	14497	2000	21289	15827	1236	-8518	3168
Secondary Sector	135460	-14283	33372	128253	5491	37957	116765	13756	42658	79458	-5065	18932
Manufacturing	59992	6773	28353	56214	19621	33005	56451	31890	36602	39791	9210	14243
Electricity, gas and water	2681	-14247	1295	2943	-3274	1366	3066	-7392	1823	2024	-10569	1366
Construction	72787	-6809	3724	67096	-10857	3586	57248	-10742	4292	37663	-3706	3322
Tertiary Sector	481093	74261	94397	412541	74544	100193	328046	74777	101561	237511	54494	56444
Wholesale and retail trade, catering and accomodation	137368	25492	23292	114155	26423	23660	85088	27314	23648	60835	11570	11130
Transport, storage and communication	25467	767	11480	21125	-7521	12418	16989	-1128	14483	11782	8757	10217
Financial intermediation, insurancem reak estate and business services	275536	39239	54179	233983	46576	57587	181214	42737	54596	135031	27418	30015
Community, social and personal services	42622	8763	5447	43278	9066	6529	44755	5857	5854	29863	6719	4082
Other	71370	-1176	167	132116	-2167	24	187243	-3824	41	144620	-2482	14
Total	712534	245612	149192	695759		155009	652847		162868	476941		79605
Percentage of Total												
Primary Sector	3.5%		14.2%	3.3%		10.9%	3.2%		11.4%	3.2%		6.6%
Agriculture, forestry and fishing	3.1%		1.4%	3.0%		1.5%	2.9%		1.7%	3.0%		2.6%
Mining and quarrying	0.4%		12.9%	0.3%		9.4%	0.3%		9.7%	0.3%		4.0%
Secondary Sector	19.0%		22.4%	18.4%		24.5%	17.9%		26.2%	16.7%		23.8%
Manufacturing	8.4%		19.0%	8.1%		21.3%	8.6%		22.5%	8.3%		17.9%
Electricity, gas and water	0.4%		0.9%	0.4%		0.9%	0.5%		1.1%	0.4%		1.7%
Construction	10.2%		2.5%	9.6%		2.3%	8.8%		2.6%	7.9%		4.2%
Tertiary Sector	67.5%		63.3%	59.3%		64.6%	50.2%		62.4%	49.8%		70.9%
Wholesale and retail trade, catering and accomodation	19.3%		15.6%	16.4%		15.3%	13.0%		14.5%	12.8%		14.0%
Transport, storage and communication	3.6%		7.7%	3.0%		8.0%	2.6%		8.9%	2.5%		12.8%
Financial intermediation, insurancem reak estate and business services	38.7%		36.3%	33.6%		37.2%	27.8%		33.5%	28.3%		37.7%
Community, social and personal services	6.0%		3.7%	6.2%		4.2%	6.9%		3.6%	6.3%		5.1%
Other	10.0%		0.1%	19.0%		0.0%	28.7%		0.0%	30.3%		0.0%
Total	100.0%		100.0%	100.0%		100.0%	100.0%		100.0%	100.0%		100.0%

Figure 13: Taxable Income and Tax assessed per economic activity

Source: Sars Tax Statistics

Company Income Tax (CIT) is a tax levied on the taxable income (gross income less exemptions and allowable deductions) of companies and close corporations. The company tax rate is levied at 28%. Mining is the third largest economic activity to contribute towards company income tax. However in 2014/2015, mining only contributed 4% of companies' income tax due to unforeseen disruptions to the economy, such as the labour disputes in the mining sector; this was further caused by a fall in commodity prices (SARS, 2015).

Value Added Tax

Value-Added Tax is commonly known as VAT. VAT is an indirect tax on the consumption of goods and services in the economy. Revenue is raised for government by requiring certain businesses to register and to charge VAT on the taxable supplies of goods and services. These businesses become vendors that act as the agent for government in collecting the VAT. According to the Value Added Tax Act, exports are zero-rated supplies. Since the mining and

quarrying sector export large volume of mineral exports, it is a negative contributor of net VAT (SARS, 2015).

2.3.5 Contribution of Mining towards Export Revenue

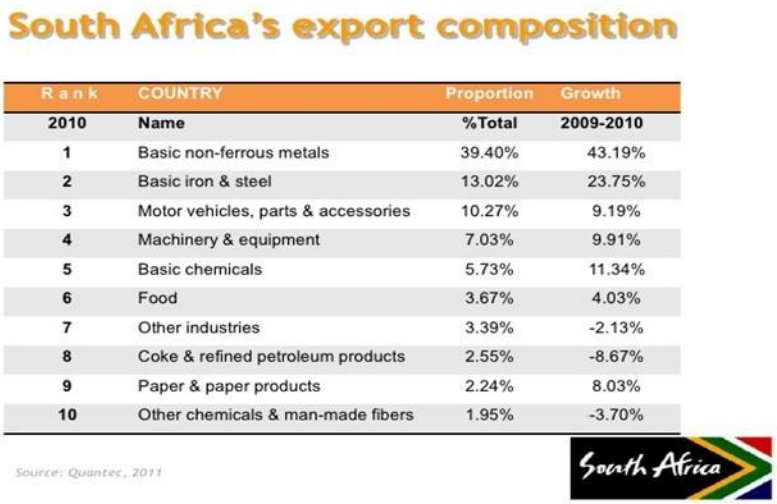


Figure 14: South Africa's export composition

Source: Department of trade and industry

Basic non-ferrous metals and basic iron and steel are the largest contributors to export revenue constituting 52.42% of total exports in South Africa as illustrated by Figure 14.

2.3.6 Risks associated with the Mining Industry

Labour Relations

According to the Fraser Institute Survey, South Africa was ranked 93rd on labour regulation. The World Economic Forum puts together annually, a report called the *Global Competitiveness Report* that examines the competitiveness of countries and South Africa was ranked the 52nd. However, it is noted to enhance its competitiveness, it needs to address its weakness, such as

- Labour market efficiency which it ranked 113th
- Rigid hiring and firing practices which it ranked 143rd
- Lack of flexibility in wage determination by companies which it ranked 140th
- Tensions in labour-employer relations which ranked 144th

The highest proportion of respondents identified an uneducated workforce as their primary obstacle in doing business in South Africa (Harvey, 2013).

The second highest proportion stated restrictive labour regulations were an obstacle to doing business in South Africa (Harvey, 2013).

Volatile Commodity Prices and Foreign Exchange Fluctuations

Volatile commodity prices are beyond South African mining companies' control. The impact on volatile commodity prices affects revenue, cash flows, profitability, asset value and the overall valuation of the company (PWC, 2014).

Due to the mining industry being an export driven industry and commodity prices being set in foreign currency, the mining industry faces a risk of foreign exchange fluctuations which could result in a significant accounting volatility (Greenbaum, 2011).

Political, Regulatory and Legal Environment

Political Environment

The Freedom Charter of 1955 of the African National Congress states that "The mineral wealth beneath the soil, the Banks and monopoly industry shall be transferred to the ownership of the people as a whole" (Davies, 1986).

This statement has been used as the basis to justify the nationalisation of mines by political leaders in the economy. The ANC commissioned the State Intervention in the Mineral Sector document which advocated for the other forms of nationalisation (Cawood & Oshokoya, 2013). Policy uncertainty can have an impact of causing uncertainty with regard to shareholder wealth which can cause a loss of investor confidence in South Africa.

Unions

The mining sector is operated by union groups, such as National Union of Mineworkers (NUM) and the United Association of South Africa (UASA), as well as trade union federations, such as the Congress of South African Trade Unions (COSATU). The aim of unions is to maximise the role of the wages of its members. The competition amongst different unions reduces the bargaining power of unions due to the lack of coherence in the demands communicated by workers (Gwatidzo & Benhura). This results in wildcat strikes that are "spontaneous or unannounced illegal industrial action by a section of employees, without following the proper

procedure for striking such as majority approval through a union ballot." Unprocedural strikes affect productivity which in turn, affects income and creates disturbances in the business operations.

Legal and Regulatory Environment

Companies and Investors state that regulatory uncertainty is a major concern in the industry.

2.3.7 Harnessing natural resources for structural transformation

South Africa is one of the most resource rich countries on the continent of Africa. However, South Africa's mining environment is characterised by negative indicators such as volatile labour tensions, volatile commodity prices and fluctuations in foreign exchange and uncertainty with regard to the political, legal and regulatory environment. To mitigate these risk factors, South Africa needs to ensure mineral wealth yields positive economic growth due to the interconnectedness of industries in South Africa. This is achieved by using revenue derived from resource production to promote growth and structural transformation, creating and promoting growth in various sectors by creating linkages into and out of the mining sectors and ensuring connection with the global economy through nurturing and an environment that promotes foreign direct investment.

The *African Economic Outlook* recommends a four-layer approach on harnessing structural transformation. In the first layer, is the need to invest in the fundamentals that include high quality public services, access to finance and markets and a favourable institutional and regulatory environment (Outlook, 2013).

In the second layer towards harnessing natural resources for structural transformation deals with the natural resource specific environment. It relates to the policies, rules or terms of exploration and exploitation of extractive resources, their ownership and management (Outlook, 2013).

The third layer towards harnessing natural resources for structural transformation deals with natural resource management; this includes optimising revenue in the form of taxes from resource production. The revenue is spent and the impact of the extraction of resources on the environment and community also needs to be monitored and managed (African Economic Outlook, 2013).

The fourth layer towards harnessing natural resources for structural transformation deals with the realm of government policies pushing for structural transformation. The active push should be different from what has been implemented in the past in the following ways; it must focus on making natural resources more productive and focus on viable linkages for business development. In both strategies, the main objective should be the creation of capabilities (African Economic Outlook, 2013).

In conclusion, the mining industry contributes to economic growth through GDP growth, employment and tax and export revenues. However, the risk associated with the industry includes volatile commodity prices and foreign exchange fluctuations, an unstable regulatory, political and legal environment, labour market inefficiency, corruption and infrastructural constraints. The need to harness natural resources for structural transformation is needed to eliminate the risk associated with the mining industry using the four-layer approach suggested by the African Economic Outlook.

2.4 Implications of FDI on the current account and economic growth

2.4.1 The relationship between FDI and the current account

Policymakers use the current account as an important indicator of economic development and performance (Arabi, 2014). FDI is the less desirable macro-economic effect of a widening current account (Ahmed SIDDIQUI, Hasnain AHMAD, & Asim, 2013). In an open economy, there is a need to borrow or lend in international markets in response to income and consumption shocks. A current account deficit is as of a result of decisions of consumption and savings with capital mobility in the open economy (Sarisoy-Guerin, 2003).

The impact of capital inflows on the current account are illustrated by the Irvings Fisher model which state that in an open economy when interest rates fall, this induces income and substitution effects, resulting in a consumption boom for debtor countries, resulting in the widening of the current account deficit (Calvo, Leiderman, & Reinhart, 1996). For capital importing countries, a decrease in interest rates would result in the decrease in present value of the debt, making borrowing cheaper. A rise of capital inflow induces consumption and investment contributing to the widening of the current account deficit. This correlates with the impact of reduced interest rates.

The consumption smoothing theory formalises the relationship between the current account and FDI by combining the assumptions of high capital mobility and permanent income theory of consumption in a small, open economy to predict what capital flows would be if agents

behave in accordance with the permanent income theory. The approach states that a deficit is derived when the national cash flow will rise and there will be a surplus when the cash flow is expected to fall. Ghosh and Ostry (1995) argue that the inter-temporal model of the current account therefore provides a benchmark for judging what capital flows should be, given specific shocks affecting economy.

The current account is a function of savings less investment; if savings remains stable, an increase in FDI will result in a current account deficit. Therefore, capital inflows ultimately affect the current account balance through savings and investment.

Lehman (2002) showed that FDI affects the external accounts of a country. Country risk of host country and trade openness affects FDI profitability and repatriation of profits. Therefore, trade openness will affect the trade balance and repatriation affects the net income balance. However, this is reiterated by Kumar (2002) who found that FDI inflows to be risky for developing countries as during economic crises, this would result in a distressed sale of domestic assets as well as a repatriation of profits to countries of origin and this exerts a negative impact on the current account. Mencinger (2008) argued that an increase in FDI inflow leads to an increased competition which drives out local business, increases imports and decreases in efficiency which in turn, leads to a higher current account deficit. Bhagwati (1998) states that the positive impact of FDI inflow on the current account can be realised through exports for export processing countries which may not be the case of the developing economies.

2.4.2 The relationship between FDI and Economic Growth

There is a dominant belief that FDI is a catalyst for economic growth and transformation which in turn, would contribute towards employment, infrastructure development, technology transfer, human resource development and increase in savings and investments (Mosia 2012). However, the reality of FDI on the African continent has been characterised by negative effects such as tax evasion, profit appropriation, transfer pricing, a balance of payment deficit, unethical competition practices, resource exploitation, environmental degradation and the use of economic power to influence governments' policy decisions (Mwilima, 2003). This necessitates an analysis of the role of governments in facilitating and regulating FDI. The two arguments that illustrate the effect of FDI on economic growth are the modernisation theory

and the dependency theory. Whilst some theories argue for a FDI led economic growth, some argue that good economic fundamentals are a catalyst for a positive impact on FDI on economic growth (Seyoum, Wu et al. 2015).

2.4.3 Theoretical Perspectives on FDI

Modernisation Theory is based on the neo-classical and new-growth model which suggests that FDI promotes economic growth in developing countries (Seyoum, Wu, & Lin, 2015). The basis of the modernisation theory is based on the fundamental principle of economics that economic growth requires capital investment (Maitah, Hodrab, Tomsík, & Benesová, 2015).

Neo-classical Theory: The neoclassical growth theory is an economic growth theory that states, in order to achieve a stable economic growth rate, a combination of labour, capital and technology are the needed driving forces to achieve this.

This theory emphasises technology change as a major determinant of economic growth. It argues that sustainable economic growth is only achieved when there are advances in technology.

New Growth Model: The new growth theory is also known as the endogenous growth theory. Technological progress is viewed as a product of economic activity as it internalises technology into a model of how the market functions. It states that knowledge and technology are characterised by increasing returns which drive the process of growth unlike physical objects. The basis of the new growth model is derived from knowledge. Knowledge can be accumulated without limit and be infinitely shared and reused, therefore the new growth theory is not subject to diminishing returns (Cortright, 2001).

The impact of FDI on economic growth and on the current account

Figure 15 is an illustration of the impact of FDI on economic growth and the current account balance.

Inward FDI will result in capital inflow in the economy

• Capital inflows are accompanied by an increase in output, private spending and real exchange appreciation.

- The effects of the increase in net worth, private investment and currency appreciation will result in a shift in the aggregate demand curve from AD0 to AD1 and a simultaneous shift in the IS0 to IS1. Hence, an increase in growth rate from g0 to g1 and inflation from $\pi 0$ to $\pi 1$.

- In the labour market, a growth rate increase from g0 to g1 will lead to a decrease in the unemployment rate from u0 to u1

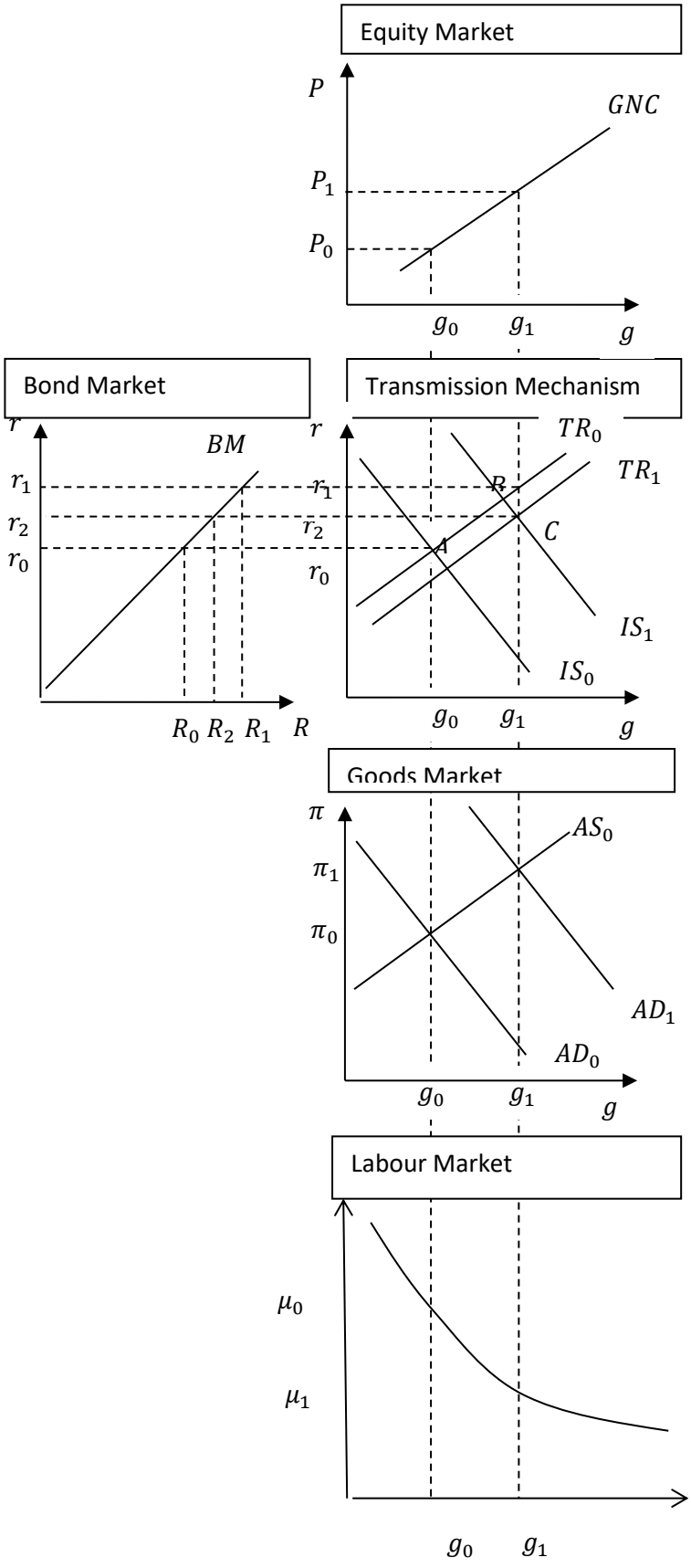
- Assuming that monetary policy responds to exchange rate movements, the Central Bank will respond to the currency appreciation by decreasing interest rates in order to counter currency appreciation. This is shown by a shift in the Taylor Rule curve from TR1 to TR2

- The point of equilibrium shifts from point A to B due to the shift in IS and AD. This shows the increase in interest rate from r0 to r1. The point of equilibrium further shifts from point B to C due to central bank intervention, resulting in the interest rate decreasing from r1 to r2. A decrease in interest rate will result in an increase in the price of bonds, hence a boom in bond prices

- Corporate policy is responsive to growth, therefore this assumes a good news case meaning a rise in growth will result in an increase in price of equities. Equity prices will rise due to increased growth.

- An expectation of the appreciation in the domestic currency will result in a shift in the net export curve from NX0 to NX1

- An appreciation in domestic currency will result in a net export deficit which will prompt the rise in foreign debt (Blanchard & Johnson, 2013).


Equity Market
P
GNC
P1
P0
g0
g1
g
Bond Market
Transmission Mechanism
r
BM
r1
r2
r0
R0 R2 R1 R
TR0
TR1
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IS1
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Goods Market
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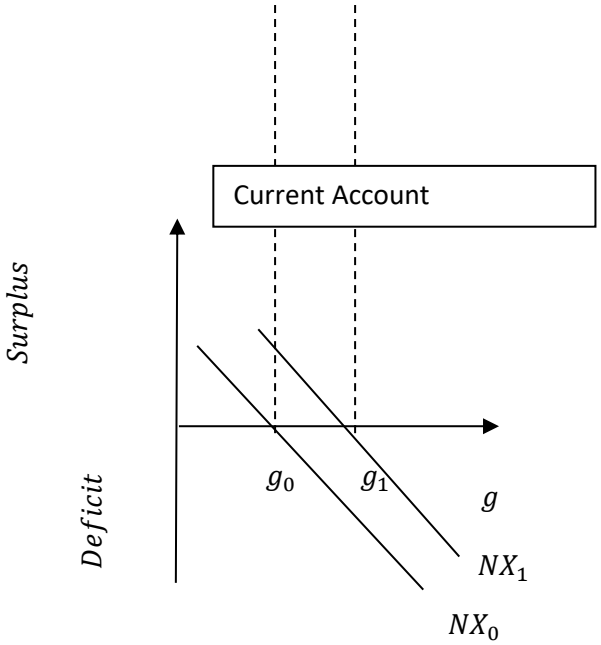

Figure 15 Illustration of the effect of FDI on economic growth and the current account balance

Dependency Theory argues that the dependence of foreign investment is expected to have a negative effect on growth and distribution of income.

Dependency theorists are critical of the role of FDI on the economic growth of host developing countries. It argues that the benefits of FDI are distributed unequally and they trigger market distortions on the local economy by crowding out enterprises with the creation of monopolies and the employment of inappropriate technologies that contribute towards the rise in unemployment (Maitah et al., 2015).

2.4.4 Fundamental principles necessary to ensure FDI has a positive impact on economic growth

The dependency theorists argue that FDI has a negative impact on the host's economy. However, ensuring fundamentals such as high quality of housekeeping and efficient plumbing, can negate any negative impact FDI could have on the host economy.

According to Ladekarl and Zervos (2004), the quality of housekeeping includes ensuring good macro-economic conditions, a stable political environment and good corporate governance practices.

Efficient plumbing includes clear legal and regulatory framework, custody, clearing, settlement arrangements, and clear tax laws.

Quality of housekeeping

Macro-economic conditions include the economy having a positive growth potential, high profitability, managing its inflation rate, having a positive current account and fiscal balance and a favourable exchange rate regime. The industrial and natural resource base of an economy are the basis to which an economy is determined as investable (Ladekarl & Zervos, 2004).

Political Environment

In order for an economy to be investible, the political environment should exhibit the following factors

- Transparency and Predictability
- Democracy and Totalitarian regime
- Direction of future policy and leadership

A stable political environment reduces the amount of uncertainty and shocks that will result in capital outflow of FDI (Ladekarl & Zervos, 2004).

Quality of local financial markets

The importance of a stable local financial system is of importance. A weak financial system will deter investors due to fear of repercussions in both value and the ability to move funds through the system.

The need for a local investor base is important as it reduces the reliability of the economy to external sources for funding deficits, making it less susceptible to external shocks (Ladekarl & Zervos, 2004).

Corporate Governance

The OECD Principles of Corporate Governance are the most widely used benchmark of corporate governance which covers five main areas, such as the rights of shareholders, equitable treatment of shareholders, role of shareholders in corporate governance, disclosure and transparency and responsibility of the board.

South African companies are governed by the King report on corporate governance. The code is enforceable on all listed companies and is applied on an “Apply or Explain” basis.

The need for good corporate governance practices protects stakeholders from unfair treatment by entities that will embark on decisions not in their best interests (Ladekarl & Zervos, 2004).

Efficient Plumbing

Efficiency of plumbing involves a country having a clear legal and regulatory framework, clear custody, clearing and settlement of transactions and clear tax rules.

Legal and regulatory framework is the rule of law and the strength of the judiciary. It involves having an international language, such as English, on its legal documents, rules should be changed infrequently and in a transparent manner and consequences of non-compliance must be clearly defined.

Custody, clearing and settlement laws need to recognise sub-custodians and allow them to represent the interest of the final owner. The need for robust implementation of final registration of ownership, the clear separation of client and proprietary assets and low settlement costs are necessary for effective custody, clearing and settlement of transactions.

There is a need for a clear tax code and low taxes form part of efficient plumbing in ensuring investability of a country (Ladekarl & Zervos, 2004).

2.4.5 Determinants of FDI in South Africa

It is important to understand the factors that FDI entities use as proxies in establishing their operations in host countries. Several theories have been put forward to explain the location pattern of FDI based on corporate strategies and investment decisions of firms. The following were determined to be possible determinants of FDI:

Market Demand and Size: A larger market size will result in more FDI inflows than that of smaller countries with a smaller market size (Asiedu, 2006). The proxies of market size used are GDP per capita, Population and GDP Growth (Arvanitis, 2005).

Infrastructure and other externalities: There is a significant positive relationship between infrastructural development and FDI inflows. Therefore, a country will try to attract FDI inflows by equipping itself with good infrastructural facilities (Vijayakumar, Sridharan, & Rao, 2010). Proxies for infrastructure and other externalities include infrastructure, degree of industrialisation and stock of foreign investment (Arvanitis, 2005).

Cost-related locational factors: There is a negative relationship between cost related factors and an inflow of FDI as a higher cost would result in high cost of production (Aziz & Makkawi, 2012). The proxies of cost related locational factors are dollar wages, unit labour costs, quality of labour, Cost of Capital, Exchange rate volatility and Level of taxation (Arvanitis, 2005).

Investment Environment: Literature identifies the investment environment proxied by openness as an important determinant of FDI inflows because FDI is export oriented and imports complementary, intermediate and capital goods (Demirhan & Masca, 2008). Therefore, the volume of trade is enhanced, creating a positive relationship between FDI inflow and openness (Vijayakumar et al., 2010).

Economic stability and growth prospects: A stable economy with sustained economic growth will attract positive FDI inflows (Dabour, 2000). The proxies used are GDP growth rates, Interest rates and inflation rates (Vijayakumar et al., 2010).

Goldman Sachs investment report identified South Africa as the biggest economy on the African continent, but also amongst the emerging economies in the world, the following characteristics would deem it desirable for investment:

- An enormous potential consumer market
- Abundant supply of natural resources
- Well-developed financial parameters
- Good communication and networks
- Effective energy and transport sectors
- Sound legal system and modern infrastructure supporting an efficient distribution of goods and services (Vijayakumar et al., 2010).

In conclusion, FDI can have a positive impact on economic growth through a combination of labour, capital and technological progress as identified by the neo-classical model. However, the new growth model states that for sustainable economic growth to be achieved, FDI has to contribute towards the knowledge base of an economy as knowledge can reproduce itself and inspire innovation unlike physical objects. However, the notion of an FDI-led economic growth is disputed by dependency theorists that state economic growth cannot be achieved through FDI due to the use of economic power to manipulate the environment in which it operates. This manipulation can only be achieved if economic fundamentals, such as good quality housekeeping and efficient plumbing are absent.

2.5 Policies that regulate and incentivise inward Foreign Direct Investment?

The dependency theorists view is that FDI has a negative effect on economic growth and some of the pitfalls highlighted are tax evasion, transfer pricing, a balance of payment deficit, unethical competition practices, resource exploitation, environmental degradation and the use of economic power to influence governments' policy decisions (Samuel, 2013). The need for government to create policy that protects the economy from such practices is tantamount to creating a favourable investment environment that fosters economic growth that is dependent upon an investment incentive regime within the policy framework that encourages sustainable investment.

2.5.1 Regulation with regards to Investment Income declared by FDI entities

Investment income mainly comprises dividend and interest income. Regulations pertaining to investment income mainly is illustrated by the Companies Act and the Income Tax Act. The effect of investment income is analysed according to the Income Tax Act

Income Tax Act

Dividend Income

Any local dividend income earned should be included in gross income for tax purposes in terms of section 1 of the Income Tax Act. However, in terms of s10 (k) of the Income Tax Act (Act 1962), dividend is income that is exempt, making the net effect zero for income tax purposes.

Interest Income

Interest income will be included in a foreigner's income tax in terms of s1 of the Income Tax Act. Interest income for foreign residents is only subject to a 15% withholdings tax. Since interest income on foreign investors is subject to a withholding tax, it is exempt from normal tax in accordance to s10 (1) (h)(Act, 1962). Therefore, this will lead to a net effect of zero for income tax purposes.

Companies Act

The Companies Act defines a dividend in the wider definition of a distribution. This is set out in section 1 as "The definition of a "distribution" in the 2008 Act is very wide, broadly including a direct or indirect –

- Transfer of money or other property of the company to or for the benefit of holders of shares of that company or another group company. This includes dividends, cash payments in lieu of capitalisation shares and consideration for share buy-backs;
- The incurrence of debt or other obligation by the company for the benefit of holders of shares of that company or another group company. This is likely to include the provision of deeds of suretyship and guarantees; or
- The waiver of a debt or other obligation owed to the company by holders of shares of that company or another group company" (Companies Act, 2008).

The requirements of declaring a dividend is set out in section 46 of the Companies Act and is summarized below, as a dividend must be

- Authorised by a board by resolution; and
- Immediately after giving effect to the resolution, it reasonably appears that the company will satisfy the solvency and liquidity test; and
- The board resolution acknowledges that the board applied the solvency and liquidity test; and
- The board reasonably concluded that the company will satisfy that test immediately after completing the proposed distribution.

The solvency and liquidity test state that the assets (as fairly valued) of the company must be equal to or exceed its liabilities (including reasonably foreseeable contingent liabilities) and it must appear that the company will be able to pay its debts as they become due for the following twelve months after the date of the distribution.

Government Policy to encourage inward Foreign Direct Investment

The impact of FDI on economic growth is represented in the current account in the form of the trade balance and the net investment income. When policy is created to regulate and promote FDI, it is essential to consider that the policies set will encourage a current account surplus through attracting appropriate FDI inflows and encouraging the reinvestment of investment income.

2.5.2 The current existing policy framework regulating inward FDI in South Africa

The volume of FDI is affected by several policy and institutional variables. According to the restrictiveness regulation on the FDI index compiled by the OECD (from most to least restrictive), South Africa was middle ranked getting the 21st position out of 48 countries.

The regulation of inward FDI is based on public interest considerations that cover a diverse range of economic and social issues with regard to ownership of firms and the mode of entry of FDI.

It is important to understand regulation of FDI in the mining sector to understand and evaluate its usefulness in encouraging net inflows of foreign capital whilst safeguarding public interests, such as, employment, growth and competition.

Sector Specific Regulation

The mining resource sector is regulated by the Mineral Resources and Petroleum Development Act of 2002. The Act may grant or refuse permission or right to mine, retain, remove or trade in these resources. The Minister of Mineral Resources can grant or refuse applications upon submission for application of mining permits, mining rights and retention permits. However, the Act does not express the difference in the treatment of domestic or foreign investors.

The Act further sets out the basis to which mining companies should subscribe to socio-economic principles to allow historically disadvantaged South Africans to benefit from the exploitation of its mineral resources.

Whilst it is encouraged for FDI firms to create forward linkages with enterprises in the value chain, this would yield exports with greater value to eliminate a current account deficit. Forward linkages can come in the form of greenfield investments, brownfield investment or mergers and acquisitions.

Greenfield investments and brownfield investments are regulated by the normal rules that govern FDI; however, mergers and acquisitions are governed by the Companies Act and the Competition Act.

Regulation on Mergers and Acquisition Transactions

Mergers and acquisitions by foreign entities are subject to screening by the Competition Commission if they are above a certain rand threshold. In reviewing proposed mergers, the Competition Commission reviews the impact on competition. Any negative implications would be outweighed with any offsetting gains and if the merger was justifiable based on public interest grounds. The Competition Act does not make a distinction between local and foreign mergers, meaning that there is fair and equitable treatment of domestic or foreign transactions.

Whilst there are regulations that govern how FDI entities operate in South Africa, the South African government has put in place incentives that will attract the inflow of FDI into the country. The purpose of incentives is for the government to shift an investment decision towards a particular region, sector or project (Wentworth, L. 2012).

2.5.3 FDI Promotion Incentives

Investment Incentives are important in the investment decision of whether FDI entities will invest in the host country. Econometric studies show that FDI is a major determinant of FDI inflow to host countries (Blomström, Kokko, & Mucchielli, 2003). Global trade liberalisation has made it easy for FDI entities to set up production linkages across the globe for international customers making market size an irrelevant determinant of FDI inflow allowing small economies to compete for foreign investment. Thus, policy makers use incentives to promote local production, employment and the general welfare of the economy (Christiansen, Oman, & Charlton, 2003). The motive behind the host country using incentives to lure investment is to compensate for potential operational difficulties, challenges in local accessibility, levels of development, state of security or any factors which would exclude it from being considered as an investment destination (Telford & Ures, 2001). Therefore, incentives are meant to be compensation for any risks FDI is likely to face in the host country

To evaluate the impact of incentives, the host country needs to weigh the cost of providing the incentives to the benefit yielded from the operation of FDI entities (Blomström et al., 2003). However, using the cost benefit analysis approach can draw the following challenges, which include the possible inaccurate calculation of expected future benefits especially for FDI

incentive motivated entities that can simply move to an economy that offers other generous incentives (Blomström et al., 2003), and when FDI entities are not offering a different product from local investors (Asafo-Adjei, 2009), incentives may distort competition and result in significant losses for local businesses (Kostoska & Mitrevski, 2013). Incentives are justifiable when there is a bias in the rules and regulations against foreign investors.

An analysis of the different incentives

FDI incentives fall under three categories, namely, fiscal, financial and rule based incentives.

Fiscal incentives are generally defined as tax provisions granted to qualified investment projects which represent a favourable deviation from the provisions applicable to other investment projects (Calitz, Wallace, & Burrows, 2013). In principle, the primary objective of fiscal incentives is to influence investment decisions by either directly affecting the potential profit streams of projects or reducing the risks attached to these (Cleeve, 2008). This comes in the form of reduced tax rates, tax holidays, subsidies, import duty exemptions, accelerated depreciation allowances, investment and reinvestment allowances and specific deductions from gross earnings for national income tax purposes (Wentworth, 2012).

The Advantages and Disadvantages of Fiscal Incentives are

Advantages of Fiscal incentives include:

- Simple administration
- Revenue costs are more transparent
- Tax administration (which is important when the existing administration is corrupt or complex)
- Can be targeted to certain types of investments with high positive spillovers
- Does not generally discriminate against long-lived assets
- Accelerated Depreciation deduction moves the corporate income tax closer to a consumption based tax, reducing the distortion against investment typically produced by the regular corporate income tax (Botman et al. 2010, pg 7).

Disadvantages of Fiscal Incentives

- Largest benefits go to high-return firms that are likely to have invested even without incentives
- Invites tax avoidance through high-tax enterprises shifting to low-tax ones via transfer pricing (intra-country and international)
- Unlike specific benefits, may not be tax-spared by home country tax authorities
- Creates competitive distortions between old and new firms Revenue costs are not transparent unless tax filing is required, in which case administrative benefits are foregone
- Distorts choice of capital assets in favour of short-lived ones since a further allowance is available each time an asset is replaced
- Qualified enterprises may attempt to abuse the system by selling and purchasing the same assets to claim multiple allowances
- Discriminates against investments with delayed returns if loss carryover provisions are inadequate
- VAT exemptions may be of little benefit – under regular VAT, tax on inputs is already creditable; outputs may still be taxed at a later stage
- Prone to abuse – easy to divert exempt purchases to unintended recipients
- Distorts locational decisions
- Typically results in substantial leakage of untaxed goods into domestic market, thus eroding the tax base (Botman et al. 2010, p. 7).

• Financial incentives include the issuance of grants and loan and loan guarantees.

Financial incentives refer to financial assets to companies for financing foreign direct investments; they are motivated by three considerations. First, a host area may be perceived as being disadvantaged relative to comparable sites elsewhere, e.g. because of the stage of development in that area. In this case, authorities assist investors by means of a policy of levelling the playing field which is construed as a help in infrastructure subsidies (providing physical infrastructure or communication tailored to meet the needs of the investors), and job training subsidies (the education of working force). Second, the costs that enterprises incur when relocating, or establishing new subsidiaries at a distance from previous sites, may hold them back from choosing the most suitable locations. Because of this, host authorities offer a subsidy toward meeting the relocation costs by means of relocation and expatriation support

(authorities may offer grants to help meet enterprises' additional capital spending and concrete relocation costs); administrative assistance (includes preferential treatment by regulatory authorities whereby administrative impediments – such as for example, the speed of obtaining permissions – are eased), and temporary wage subsidies (the start-up phase can be supported through the temporary coverage of part of the new corporate unit's wage bill). Third, a policy of targeted incentives is used as a supplement with the first two incentives by means of credits to investors (authorities grant soft loans or interest subsidies to foreign enterprises for the specific purpose of an investment project; alternatively, they may ease investors financing costs by issuing loan guarantees); real estate (selling land or buildings to foreign investors at below market values), and cost participation (helping investors cover their start-up costs, help in marketing and developing costs).

- Rules-based incentive "rely on discrimination (according to nationality) of investors to be stipulated by law, and specific approaches that tailor incentives to individual foreign investors or investment contexts. The rules-based approaches in many cases represent a relatively straightforward selective application of investment subsidies. Specific approaches, on the other hand, produce a multitude of different incentives, including specially negotiated fiscal derogations, grants and soft loans, free land, job training, employment and infrastructure subsidies, product enhancement, R&D support and ad hoc exceptions and derogations from regulations. The dividing line between the two categories is, however, in practice often blurred" (OECD, 2003, p103). Rule based incentives include modifying rules for workers' rights, modifying environmental standards and greater protection for intellectual property rights (Mwilima, 2003).

Other measures have also been put in place, such as the establishment of Investment Promotion Agencies (hereafter referred to as IPAs)

- Investment Promotion Agencies

IPA's were established specifically to attract FDI and monitor the operations of corporations within the economy. IPA's cater to the regulatory and administrative requirement for foreign corporations and thus acting as a one-stop-shop. Their role also includes changing investors' perception in investing in a "high risk" environment; this involves heavy marketing through use of events such as investment fairs. Further, IPA's are designed to generate investments, ensure that investment remains in the economy through aftercare services and policy advocacy to enhance competitiveness of a location (Wentworth, 2012).

Incentives available for FDI in South Africa

South Africa has the following incentive programmes implemented by the DTI:

- **The Critical Infrastructure Programme (CIP): "**aims to leverage investment by supporting infrastructure that is deemed to be critical, thus lowering the cost of doing business**"**

  The Mandatory requirements are the following

- "The applicant must be a registered legal entity in South Africa.
- The project must be at least a level four Broad-Based Black Economic Empowerment (B-BBEE) contributor in terms of the Codes of Good Practice for B-BBEE. This requirement takes into account the exemptions in terms of Qualifying Small Enterprises (QSEs) as set out in terms of the Codes of Good Practice.
- For FDI (i.e. foreign investors incorporated in South Africa), where it can be proven that such a foreign investor does not enter into any partnership arrangements in foreign countries, the Codes of Good Practice make a provision for the recognition of contributions in lieu of a direct sale of equity.
- For all projects, a grace period of 15 months after date of submission of the application is given for them to comply. In all cases, a B-BBEE certificate should be submitted at claim stage.
- The envisaged investment projects that may qualify for benefits under any investment incentive schemes offered by the DTI are also eligible to apply for the CIP, provided it is not for the same infrastructure activity items proposed by the project.
- Projects that have applied for the Shared Economic Infrastructure Facility (SEIF) will not be funded or co-funded for the same infrastructure activity under CIP" (Department of Trade and Industry, 2016).

The Enterprise Investment Programme: "The Enterprise Investment Programme was launched by the government in July 2008, to provide sector-specific financing in order to encourage growth in key areas" (Department of Trade and Industry, 2016).

"The scheme currently operates under two sub-programmes – the Manufacturing Investment Programme (MIP) and the Tourism Support Programme (TSP – though further sub-

programmes are expected to be added in the future to address the needs of other specific sectors" (Department of Trade and Industry, 2016).

"The EIP works through an investment grant of between 15% and 30% towards qualifying investment in plant, machinery and equipment and customized vehicles required for establishing new or expanding existing production facilities or upgrading production capability in existing clothing and textiles operations" (Department of Trade and Industry, 2016).

"The MIP is designed to stimulate investment into the manufacturing and related services sectors as part of the government's efforts to create further employment and ensure sustained growth within the industry" (Department of Trade and Industry, 2016).

"The programme aims to encourage further investment into the industry by providing a grant of up to 30% towards qualifying investment below R200m in plant, machinery and equipment and commercial vehicles required for establishing new and expansions of existing operations" (Department of Trade and Industry, 2016).

"Although the MIP can be accessed by a range of sectors in the manufacturing industry, the government is focusing on four key sectors that it has identified as having the most potential for achieving its growth objectives: Metal fabrication, Capital and Transport equipment; Automotive and components; Chemicals, plastic fabrication and pharmaceuticals; and Furniture sectors" (Department of Trade and Industry, 2016).

The Automotive Investment Scheme: "The Automotive Investment Scheme (AIS) is an incentive designed to grow and develop the automotive sector through investment in new and/ or replacement models and components that will increase plant production volumes, sustain employment and/ or strengthen the automotive value chain" (Department of Trade and Industry, 2016).

Objectives of the Automotive Investment incentive scheme

- "Strengthen and diversify the sector through investment in a new and/or replacement models and components.
- Increase plant production volumes.
- Sustain employment and/or strengthen the automotive value chain.
- The Export Marketing and Investment Scheme
- The Industrial Development Zones" (Department of Trade and Industry, 2016).

The Sector Specific Assistance Scheme

"The Sector Specific Assistance Scheme is a reimbursable cost-sharing incentive scheme whereby financial support is granted to organizations supporting the development of industry sectors and those contributing to the growth of South African exports" (Department of Trade and Industry, 2016).

"Organizations supported under SSAS include Export Councils, Joint Action Groups, Industry Associations and those involved in the aimed at the development of emerging exporters" (Department of Trade and Industry, 2016).

The Objectives of the Sector Specific Assistance Scheme

- "Developing an industry sector as a whole
- Developing new export markets
- Stimulate job creation
- Broadening the export base
- Proposing solutions to factors inhibiting export growth
- Promote broader participation of black owned and SMME's to the economy" (Department of Trade and Industry, 2016).

The Export Marketing and Investment Assistance programme: "develops export markets for South African products and services and to recruit new foreign direct investment into the country" (Department of Trade and Industry, 2016).

Objectives

- "Provide marketing assistance to develop new export markets and grow existing export markets;
- Assist with the identification of new export markets through market research;
- Assist companies to increase their competitive by supporting patent registrations, quality marks and product marks;
- Assist with facilitation to grow FDI through missions and FDI research; and
- Increase the contribution of black-owned businesses, and SMMEs to South Africa's economy" (Department of Trade and Industry, 2016).

Industrial Development Zones:

"The Programme's main focus was to attract Foreign Direct Investment and export of value-added commodities. Although there are major achievements with the IDZs there were weaknesses that led to the policy review and the new SEZ policy" (Department of Trade and Industry, 2016).

"The policy review and the new SEZ Programme, which began in 2007, was also brought about by the developments in national economic policies and strategies such as the National Industrial Policy Framework, and the New Growth Path, as well as developments in the global economic environment such as the formation of BRICS" (Department of Trade and Industry, 2016).

"The new SEZ Policy provides a clear framework for the development, operations and management of SEZs, including addressing challenges of the current IDZ Programme. The purpose of the SEZ programme therefore is to:

- Expand the strategic industrialisation focus to cover diverse regional development needs and context;
- Provide a clear, predictable and systemic planning framework for the development of a wider array of SEZs to support industrial policy objectives, the IPAP and the NGP;
- Clarify and strengthen governance arrangements, expand the range and quality of support measure beyond provision of infrastructure; and
- Provide a framework for a predictable financing framework to enable long term planning" (Department of Trade and Industry, 2016).

Capital Projects Feasibility Programme

"The Capital Projects Feasibility Programme (CPFP) is a cost-sharing grant that contributes to the cost of feasibility studies likely to lead to projects that will increase local exports and stimulate the market for South African capital goods and services" (Department of Industry, 2016).

Objectives

"The primary objectives of the programme are to facilitate feasibility studies that are likely to lead to high-impact projects which will stimulate value-adding economic activities in South Africa as this will have greater impact on the country's industrial policy objectives.

The secondary objectives of the programme include:

- Attracting high levels of domestic and foreign investments;
- Strengthening international competitiveness of South African capital goods sector and allied industries;
- Creating sustainable jobs in South Africa;
- Creating a long-term demand for South African capital goods and services;
- Stimulating project development in Africa and in particular the Southern African Development Community (SADC) countries as well as support for the objectives of the New Partnership for Africa's Development (Nepad);
- Stimulating upstream and downstream linkages with SMMEs and BEE companies" (Department of Trade and Industry, 2016).

Fiscal Incentives in South Africa

The following are the fiscal incentives available in South Africa

- "Rebate on import duties in manufacturing for home consumption or export; This includes a partial rebate or a rebate of the full duty on certain specified imported goods The aim is to stimulate local manufacture to reduce input cost of locally manufactured goods which in turn, allow local manufactures to be more competitive on the international market
- Research and Development Allowance: Increased expensing of assets and recurrent expenditure. Tax allowance for a) purchase of equipment and building deducted @ 50%, 30% and 20% b) current expenditure deducted at 150%
  The aim is to increase investment in the creation of new technologies and production techniques

  R&D credits can reduce entrepreneurial risk and encourage innovation and growth

- Learnership Allowance: is an additional deduction for training of employees. The aim is to increase the skills of workforce, reduce cost of expanded training.
  The risk of learnership allowances is that providing training via a tax system may result in tax evasion

- Strategic Industrial Policy Incentive gives a 100% deduction for equipment up to a specific threshold. The aim is to increase investment in critical areas
- Urban Development Zone includes accelerated depreciation allowed for investments in qualified zones. The aim is to increase investment in urban areas of SA" (Kransdorff, 2010)

In conclusion, the South African government depends on mining to reduce the trade balance deficit as it is the highest contributor of export revenue. However, the lack of value addition in mineral products does not assist in the reduction of the deficit as the imports are of a high value. Similarly, the sector paid out R6 billion in dividend earnings and 16.3 billion in interest to foreign investors contributing to the further deficit of the net investment income balance. An analysis of the current regulation and incentives gives an evaluation on whether government is attracting appropriate FDI and encouraging the reinvestment of income. According to regulation, there is no distinct difference between the treatment of FDI and local entities. In addition to the non-discriminatory treatment in policy, there are fiscal and financial incentives given to FDI entities by the DTI. However, these incentives and non-discriminatory policies are not yielding a positive current account balance and net investment income balance.

2.6 Conclusion of literature review

In conclusion, the determinants of the current account balance are attributed to internal factors, such as public and private savings, investment and domestic output growth and external factors such as exports, terms of trade, real exchange rate, Black Market Premium on Foreign Exchange, Output Growth Rate of Industrialised Countries, International Real Interest Rate and external indebtedness. An analysis of the South African current account balance was examined and it showed that South Africa has been operating within a deficit for the past 10 years and this is mainly attributed to poor export performance, strong investment growth, weak savings and strong capital inflows. Therefore, the need to examine the contributors of economic growth in South Africa was important to better explain the relationship between economic growth and the current account balance. Demand side policy, international capital flows, labour market efficiency, domestic financial markets, institutions, innovation and human capital were found to be major contributors to economic growth. These determinants cannot work in isolation of each other to achieve economic growth. Human capital and human developments are the basis on which each determinant exists. It is through human capital and development

that innovation and research and development contribute towards economic growth. The relationship between economic growth and the current account balance was explained; literature explains that high economic growth would result in high investment rates and the sustainability of a current account deficit as an economy will be able to service its debt. The most important aspect of managing the sustainability of the current account balance lies with the performance of the economy.

The mining sector plays an important role in achieving economic growth through its contribution towards GDP, employment, tax revenue and export revenue. However, the risks associated with the industry are volatile commodity prices and exchange rates, poor labour relations and an unstable political, regulatory and legal climate that hampers economic growth. Exchange rates and commodity prices have an impact of affecting exports that in turn, affects the current account balance. Poor labour relations and an unstable political environment have a potential to affect productivity that in turn, results in a decrease in GDP and export performance.

Foreign direct investment dominates the mining sector due to the availability of natural resources. The further exposure of FDI is demonstrated by dual listed mining companies. Different theoretical perspectives of the impact of FDI on economic growth were analysed in the two theories: the modernisation and dependency theory. Modernisation theory advocates that foreign direct investment contribute to economic growth through the neoclassical theory and the new growth theory. However, the dependency theorists tend to suggest that foreign direct investment has a negative effect on economic growth due to the unevenness in the distribution of FDI, creating market distortions due to the creation of monopolies. However, in order for FDI to have a positive impact in the economy, the need for high quality housekeeping and efficient plumbing is needed.

The impact of FDI permeates through the current account and net investment income. With mining contributing over 50% of export revenue and paying R6 billion in dividend income to foreign investors, this has resulted in a trade balance deficit and net investment income balance deficit due to a higher value of imports being brought into the economy that exceed the value of exports. This shows the need for government to attract appropriate FDI and encourage the reinvestment of income. The examination of regulation that governs the rules of conduct of FDI and the incentives given to attract FDI were analysed. The finding shows that there is no discrimination in the manner in which local and FDI is treated, three forms of incentives are

available to FDI which come in the form of fiscal, financial and rules-based incentives. In order for FDI to have positive effects on economic growth, government regulation and incentives need to be positioned in a manner that is beneficial to all stakeholders of the economy.

Chapter 3

Methodology

"We know that investment causes growth. But it is also true that growth causes investment"

Jim Stanford

3.1 Introduction

This chapter highlights the methodology used to find the impact of foreign direct investment in the mining sector on the external current account. The theoretical framework that formed part of the literature review is the basis from which the model and estimation is derived. The specification of the data and variables are used to test stationarity, co-integration error correction and diagnostic testing.

The aim of the tests is to find

- The relationship between FDI and the mining sector on the current account.
- The relationship between the economic growth, the current account and FDI.
- How the current account balance and FDI jointly relate positively to economic growth, especially upon control of other drivers of economic growth

Literature has documented the impact of FDI on the current account balance. However, there are no tests that have been conducted that determine the impact of foreign direct investment and the mining sector on the current account balance in South Africa. Which is the aim the first relationship seeks to find.

The first relationship can be written in the following general form:

$CA_t = f(FDI_t, MC_t)$ ……..…… (3.1)

Explanation of Variables:

CA/GDP_t = Current Account in year t,

MC_t = Mining Consumption in year t

FDI_t = Foreign Direct Investment in year t

GDPt = Gross Domestic Product in year t

The model to be estimated is expressed in logarithms as follows:

$CA/GDP_t = Log (\beta 0 + \beta 1 FDI_t + \beta 2 MC_t + \varepsilon_t)$ …….. (3.2)

The current account balance may reflect deficits which are negative and cannot be expressed in logarithm form. A ratio of the current account to gross domestic product was used to avoid large specification of errors as the log form of other variables are expressed in percentage form and the use of the current account balance (specified in millions) will produce unintelligible results.

The second relationship seeks to find the relationship between the current account balance and foreign direct investment on gross domestic product. With the expectation set in the literature review that the current account deficits are associated with periods of high economic growth and that foreign direct investment facilitates economic growth. The second relationship seeks to investigate these claims in the context of South Africa.

The second relationship test can be written in the following general form:

$GDP_t = f(CA, FDI_t)$ …..……. (3.3)

Where:

CAt = Current Account in year t

GDPt = Gross Domestic Product in year t

The model to be estimated is expressed in logarithms as follows:

$LogGDPt = Log\ \beta 0 + \beta 1 CA/GDPt + Log\ \beta 2 FDI_t + \varepsilon t$…...…… (3.4)

The current account balance may reflect deficits which are negative and cannot be expressed in logarithm form. A ratio of the current account to gross domestic product was used to avoid

large specification of errors as the log form of other variables are in percentages and the use of the current account balance (specified in millions) will produce unintelligible results.

The final model is modified by employing economic growth as the dependent variable. From the literature review the impact of mining sector on economic growth is deemed to be positive contributing one fifth of economic growth. However, the consumption of mining products is heavily influenced by commodity prices and exchange rates. Therefore, the final model can be expressed as the gross domestic product being a function of, mining consumption and FDI inflow in South Africa, commodity prices and the rand/dollar exchange rate.

This relationship can be written in the following general form:

$GDP_t = f (MC_t, FDI_t, EXR_t, COMM_t)$ …… (3.5)

Where:

GDPt = Gross Domestic Product in year t

MC_t = Mining Income in year t

FDI_t = Foreign Direct Investment in year t

EXR_t= Exchange rate in year t

$COMM_t$= Commodity Prices in year t

The model to be estimated is expressed in logarithms as follows:

$LogGDPt = Log (\beta0+ \beta1MC\ t + \beta2FDIt + \beta3EXRt+ \beta4COMMt + \varepsilon t)$ ……..… (3.6)

Where β0, β1, β2, β3 and β4 are the coefficients to be estimated and εt is the error term. The omitted variables in the construction of the data is represented by the error term

3.2 Definition and Analysis of Variables

This section provides the variables used in estimating the effect of FDI in the mining sector on the current account balance. The proxies used are obtained from literature in determining the effect of FDI in the mining sector on economic growth in South Africa. The tests to be

conducted specify the Current Account Balance, Gross Domestic Product, Mining Consumption and FDI inflow as variables that form the basis of the models derived.

The current account denoted as CA is an important indicator of economic health through the assessment of competitiveness and the level of imports and exports. It is defined as the sum of the balance of trade (goods and services exports less imports), net income from abroad and net current transfers.

The gross domestic product denoted as GDP is a standard macro-economic tool used to measure economic growth. Economic growth is an increase in production and consumption of goods and services.

Mining Consumption denoted as MC is the measure of sales income for all minerals in the mining sector in South Africa. It includes the sale of all mineral groups. This measure will assist in determining the effect of the mining sector on the current account balance. Mining consumption is affected by volatile commodity prices and exchange rates. Exchange rate is a determinant of foreign direct investment in South Africa. These are therefore factored into the model.

FDI inflow is the value of inward direct investment made by non-resident investors in the reporting economy. This measure assists in determining the effect of foreign direct investment on economic growth.

3.3 Data Sources

The study employs annual data from the period 1994-2014. The period was selected as this is a representation of South Africa since it acquired independence. The time series was acquired from SARB, World Bank Economic Indicators and Statistics South Africa. Mining income was derived from StatsSA, FDI inflow and Current Account was obtained from SARB and the World Bank Economic Indicators, Real exchange rate was derived from the SARB and commodity metal prices was obtained from Index Mundi.

3.4 Estimation Techniques

A VECM provides an interpretation of long run and short run effects of the models estimated.

The process involved in conducting a VECM model is as follows:

- Testing for stationarity
- Determining if a co-integrating relationship/s exists

- Determining the long run and short run effects of the equations estimated
- Conducting diagnostic tests

3.4.1 Stationarity / Unit root tests

Brooks (2014) defines a stationary series as one with a constant mean, constant variance and constant autocovariances for each given lag. The need to check characteristics and behaviour of the data is needed as a preliminary step in regression analysis. The Augmented Dickey Fuller (ADF) and the Phillips and Perron tests will examine the time series properties of the data.

Augmented Dickey Fuller is an extension of the Dickey Fuller test and it removes structural effects (autocorrelation) in a time series (Kleiber & Zeileis, 2008). The Phillips and Perron test give the same conclusion as the ADF. However, it provides a comprehensive theory of unit root non-stationarity which yields an automatic correction of the DF procedure.

Phillips and Perron have developed a more comprehensive theory of unit root nonstationarity. The tests are similar to ADF tests, but they incorporate an automatic correction to the DF procedure to allow for autocorrelated residuals (Brooks, 2014).

Both tests have similar limitations.

Null Hypothesis of the ADF and the PP Test is as follows

H_0: there is a unit root

H_1: there is no unit root test

3.4.2 Co-integration Test

The study uses data from 1994-2014 from the National Treasury and the World Bank Development Indicators. Linear combination of two or more non stationary time series data may be integrated at the same order. If such time series exists at the same order, the series is cointergrated with long run relationships. These co-integration properties will allow the Vector-correction model to test the Granger causality of the series.

According to Brooks (2014), two variables with a linear combination of I(1) will be stationary at I(0), if the variables are cointergrated. A cointergrating relationship allows for the analysis and interpretation of a regression involving non-stationary variables.

When the data is non-stationary and possibly integrated, three methods can be used as a modelling strategy to test for co-integration. The three methods are the Engle-Granger, Engle-Yoo and Johansen.

The Engle-Granger 2-step method is a single equation technique whose drawbacks include the lack of power in unit roots, the simultaneous equation bias and the inability to perform hypothesis about the actual co-integrating relationship (Brooks, 2014). The Engle-Yoo is a variation of the Engle-Granger test; the two measures have the same drawbacks.

The Johasen test provides the remedy for the testability of the hypothesis of co-integration (Brooks, 2014) and will be used to test the co-intergrating relationship.

3.4.3 Vector-Error Correction Model

A vector correction model is used when the time series is not stationary in their levels but is stationary in their differences and can only be appropriately estimated when the relevant variables are co-integrated. A VECM can test the Granger causality of the series and this is done by adopting the causality between CA, FDI inflow, mineral resource consumption, commodity prices and the rand dollar exchange rate.

3.5 Diagnostic Tests

Diagnostic test validates the parameter evaluation of the outcome achieved by the model. If there is presence of serial correlation, heteroscedasticity and there is no normality, this would deem the model inefficient and the estimated parameters will be biased. The impulse response analysis and variance decomposition seek further to explain the results against the time variable.

3.5.1 Heteroscedasticity

There are several statistical tests for heteroscedasticity, namely the Goldfeld-Quandt (1965) test known as the GQ test and the White test (1980). However, the White (1980) general test is a popular test for heteroscedasticity and makes several assumptions about the likely form of heteroscedasticity. The test assumes that the regression model is linear. Under the White test, acceptance of the null hypothesis means the presence of homoscedasticity and rejection of the null test indicate heteroscedasticity exists (Brooks, 2014).

Null Hypothesis of the GQ test and the White test is as follows:

H0: there is homoscedasticity

H1: there is heteroscedasticity

3.5.2 Residual Normality Test

The Bera-Jarque test is used to test for normality and uses the property of a normal distribution random variable that the distribution is characterised by the mean and the variance as the first two moments. The third and fourth moment relates to skewness and kurtosis. The null hypothesis represents normality and this will be rejected if the residuals from the model are significantly skewed or leptokurtic (Brooks, 2014).

Null Hypothesis of the Bera-Jarque test is as follows:

H_0: normal distribution, skewness is zero and excess kurtosis is zero;

$H_{1:}$ non-normal distribution.

3.5.3 Autocorrelation Langrage Multiplier (LM) Test

The Langrage Multiplier (LM) test surrounds the R^2 of the auxiliary regression. If one of the coefficients of the auxiliary regression is statistically significant, the value of R^2 will be high while if the coefficients are not significant, R^2 will be low (Brooks, 2014). The test will operate by obtaining the product of R^2 from the regression and the number of observations, T (Brooks, 2014).

Null Hypothesis of the Langrage Multiplier is as follows:

H_0: no serial correlation

$H_{1:}$ presence of serial correlation

3.5.4 Impulse Response Analysis

The responsiveness of dependent variables to VAR to shocks to each of the variables are traced by impulse responses. Each variable from each equation, a unit shock is applied to the error, and the effects to the VAR system are noted over time (Brooks, 2014). The shocks will gradually die when the system is stable.

3.5.5 Variance Decomposition Analysis

Variance decomposition analysis is a method of examining VAR system dynamics. It gives proportion of movements between dependent variables that are due to their own shocks versus shocks to the other variables (Brooks, 2014).

3.5.6 Conclusion

The aim of the chapter was to discuss the methodology used to find the effects of the mining sector and FDI on the current account balance in South Africa. The objectives of the tests were to test the relationship between FDI in the mining sector and the current account, the relationship between the current account balance and economic growth and how the current account balance and FDI jointly relate positively to economic growth, especially upon control of other drivers of economic growth. The VECM model was utilised to find the long run and short run relationships that best explain the objectives of the study. The process involves the test for stationarity using the augmented Dickey Fuller test and the Phillips Perron unit root test, establishing the existence of a co-integrating relationship using the Johansen test of co-integration. The Granger causality of the series is employed in determining the long run and short run relationship of the tests to be conducted. In order to test the reliability of the results obtained from the VECM, diagnostic tests are conducted to test for normal distribution, the presence of heteroscedasticity and serial correlation. This is then followed by impulse and variance decomposition analysis.

Chapter 4 follows the methodology illustrated to derive conclusive results on the impactions of FDI and the mining sector on the current account balance.

Chapter 4

Estimations and Analysis of Results

"Intelligent policies will be largely self-regulating in the sense that the system of incentives and standards make it absolutely ludicrous to not move towards clean, internalized systems of cost and production"

Paul Hawken

4.1 Introduction

The aim of this chapter is to provide the results from an analysis of empirical findings on the implications of FDI and the mining sector on the current account balance. The chapter comprises results pertaining to unit root tests of stationarity, co-integration and long run and short run effects of the Vector Error Correction model. Diagnostic test results in the form of tests for normality, serial correlation, heteroscedasticity and variance composition analysis are analysed to test the reliability of the model derived and the necessary conclusions are derived.

The aim of the tests is to find:

- The relationship between FDI and the mining sector on the current account balance
- How the current account balance and FDI jointly relate positively to economic growth, especially upon control of other drivers of economic growth
- The impact of FDI and the mining sector on economic growth.

4.2 Unit Root/Stationarity Tests

To use the VECM, there is need for the variables to be stationary in their differences. Therefore, the preliminary step to the VECM is to test for stationarity of the relevant variables (refer to Appendix 1). The first analysis is the graphical method of determining stationarity, the rationale being to check for the properties of the time series data. Refer to Figure 16, which is a presentation of all the variables used in the analysis. From Figure 16, LNFDI, LNCOMMP, LGDP and LNMC seem to be trending upwards and the ratio of CA/GDP and LNEXCHR

exhibit a downward slopping trend. The time series illustrated in figure 16 shows a time varying mean and variance meaning that they exhibit non-stationarity in its levels.

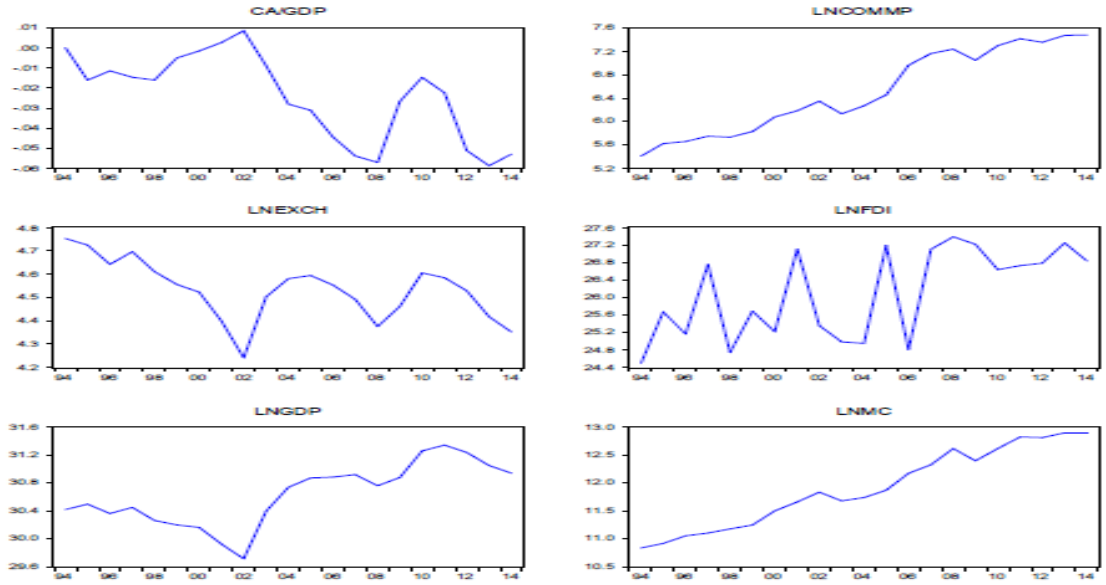

Figure 16: Plots of Variables at Level (1990-1994)

The Augmented Dickey- Fuller (ADF) and Phillips Perron (PP) tests are statistical tests used to test for stationarity. Tests for stationarity are the preliminary tests to determine a co-integrating relationship. Table 1 shows the statistical results obtained from the Augmented Dickey- Fuller (ADF) and Phillips Perron (PP) tests.

	Test Statistic							
	Level	Critical Value	1st Diff	Critical Value	Level	Critical Value	1st Diff	Critical
CA/GDP	-0.882371	-1.960171	-3.428631	-1.961409	-0.190069	-1.959071	-3.165475	-1.960171
LNMC	3.383873	-1.959071	-3.269579	-1.960171	4.932789	-1.959071	-3.293039	-1.960171
LNFDI	1.071585	-1.962813	-8.702137	-1.960171	0.677865	-1.959071	-11.66950	-1.960171
LNEXCH	-0.935674	-1.959071	-3.674572	-1.960171	-1.051653	-1.959071	-3.612055	-1.960171
LNCOMMP	1.011389	-1.959071	-3.443947	-1.960171	1.011389	-1.959071	-3.470032	-1.960171
LNGDP	0.489853	-1.959071	-3.258791	-1.960171	1.506656	-1.959071	-2.806683	-1.960171

Table 1: Unit Root Test

Source: Own Table from data used from Eviews

Table 1 shows the results from the test of stationarity. It shows that all variables are not stationary at level using the Augmented Dickey-Fuller (ADF) and Phillips Perron (PP). However, when the variables were differenced at order one, all the variables were found to be stationary.

Figure 17, further proves the stationarity of the variables at order one obtained by the Augmented Dickey-Fuller (ADF) and Phillips Perron (PP) test with a graphical illustration of the variables fluctuating around a zero mean and integrated at order one I (1). This implies that all variables are stationary if integrated at order one.

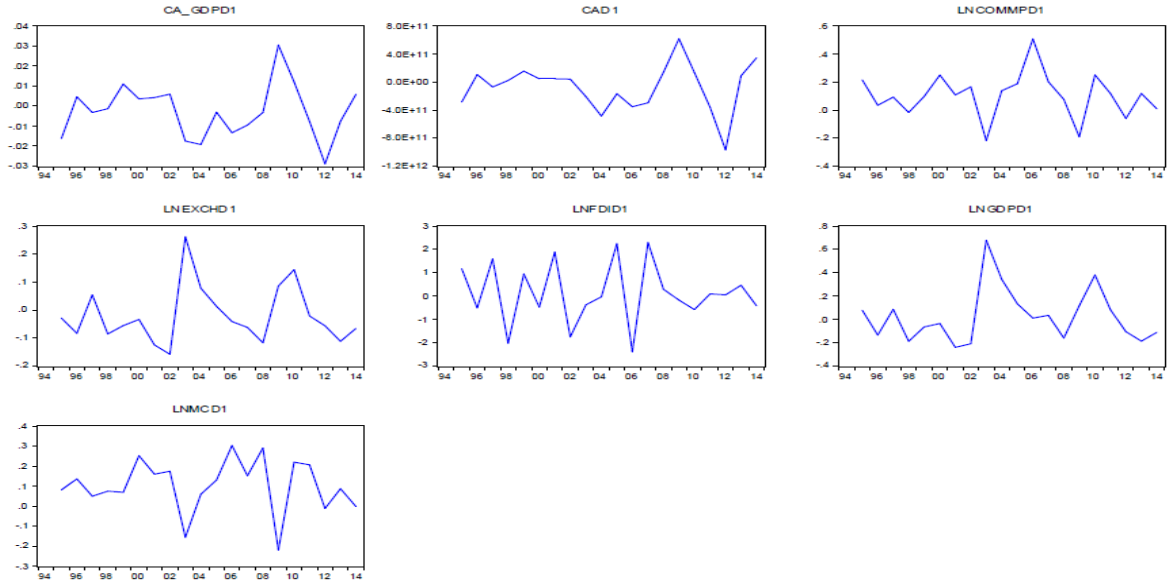

Figure 17 Plots of First Differenced Variables (1994-2014)

Whilst all variables are integrated at order 1, three tests are conducted. The first being to find the effect of FDI and mining consumption on the current account balance. The second test is to find how the current account balance and FDI jointly relate positively to economic growth, especially upon control of other drivers of economic growth. The third relationship is to find the impact of FDI and the mining sector on economic growth. The determination of the co-integrating relationship is important for the three tests in order to conduct a vector error correction model.

4.3 Co-integration Analysis

The Johansen test for co-integration is tested using two methods, the trace or the eigenvalue test. The null hypotheses of the Johansen tests are that of no co-integration, whilst the alternative is that of co-integration. Testing co-integration can be difficult when there are many

variables in the model used. This could result in too many co-integrating equations that can prove difficult to reach a conclusive interpretation. The solution would be to estimate with fewer variables, however this would result in an omitted variable bias. A pairwise correlation matrix can be used for variable selection. Table 2 shows a pair-wise correlation matrix to determine the exact relationship between the five variables.

Correlation

	LNMC	LNGDP	LNFDI	LNEXCH	LNCOMMP	CA
LNMC	1.000000	0.885500	0.678861	-0.569785	0.882116	-0.818981
LNGDP	0.885500	1.000000	0.569594	-0.151518	0.966890	-0.849035
LNFDI	0.678861	0.569594	1.000000	-0.467949	0.596476	-0.586600
LNEXCH	-0.569785	-0.151518	-0.467949	1.000000	-0.180925	0.333664
LNCOMMP	0.882116	0.966890	0.596476	-0.180925	1.000000	-0.847952
CA	-0.818981	-0.849035	-0.586600	0.333664	-0.847952	1.000000

Table 2 Pair-wise Correlation Results

From the pair-wise correlation results shown above, there is a negative correlation between the CA and the LNCOMMP, LNFDI, LNMC. This correlates with the finding of literature, which states that the current account balance is a function of savings less investment. Therefore, an increase in FDI will result in a decrease in the current account balance. COMMP and MC are positively correlated as COMMP determines mining revenue. An increase in commodity prices will result in a decrease in mining consumption which in turn, will reduce the exports derived from mining considerably which in turn, diminish the current account balance

LNEXCH is only positively correlated with the dependent variable, CA. This confirms theoretical suggestions, which propose that the depreciation in the exchange rate discourages inward FDI and mining consumption. This is shown by the negative correlation LNEXCH has to inward LNFDI and LNMC. This decrease in investment would result in an increase in the current account balance.

From analysing the pair wise correlation, no variable is correlated to all variables which implies there is unlikely to be a multi-collinearity problem.

From the pair-wise correlation results shown above, FDI, MC and COMMP are positively correlated with the dependent variable GDP. This corresponds with the finding in literature which suggests that an increase in foreign direct investment, commodity prices and mining consumption will result in an increase in economic growth. This emanates from an increase in

capital outlay as a result of inward foreign direct investment and the capital intensive nature of the mining sector, allowing for the creation of employment and is a source of revenue for the government which increases public and private consumption.

REXCH is negatively correlated with RGDP. This confirms theoretical suggestions, which propose that the depreciation in the exchange rate discourages inward FDI and mining consumption. This is shown by the negative correlation REXCH has to inward FDI and MC. This decrease in investment and consumption would result in a decrease in economic growth.

When applying the Johansen test, to eliminate serial correlation in the residuals there is need to determine the optimal lag length and the deterministic trend assumption of the VAR model, this is done by the information criteria approach

In using the Johansen test, there is need to determine optimal lag length which eliminates serial -correlation in the residuals as well as determining the deterministic trend assumptions for the VAR model, this is done by the information criteria approach. To select the lag order for the VAR, the information criteria approach is applied as a method of selecting the lag order. The study used a maximum of 2 lags as illustrated by table 3, 4 and 5.

The lag structure for the first test to be conducted is as follows:

Test 1:

CA/GDPt = f (FDIt, MCt) ……..…… (4.1)

VAR Lag Order Selection Criteria
Endogenous variables: CA_GDPD1 LNFDID1 LNMCD1
Exogenous variables: C
Date: 08/29/17 Time: 00:10
Sample: 1994 2014
Included observations: 18

Lag	LogL	LR	FPE	AIC	SC	HQ
0	32.35355	NA	7.70e-06	-3.261505	-3.113110	-3.241044
1	45.68730	20.74139*	4.86e-06*	-3.743034*	-3.149452*	-3.661187*
2	52.75673	8.640413	6.71e-06	-3.528526	-2.489759	-3.385294

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

Table 3 Lag order selection Relationship 1

The lag structure for the second test to be conducted as follows:

Test 2 Variables are as follows

$GDP_t = f(CA/GDP_t, FDI_t)$ ..... (4.2)

VAR Lag Order Selection Criteria
Endogenous variables: LNGDPD1 CA_GDPD1 LNFDID1
Exogenous variables: C
Date: 08/29/17 Time: 00:13
Sample: 1994 2014
Included observations: 18

Lag	LogL	LR	FPE	AIC	SC	HQ
0	22.78590	NA	2.23e-05	-2.198434	-2.050038	-2.177972
1	37.98529	23.64349*	1.14e-05*	-2.887254*	-2.293673*	-2.805407*
2	46.83032	10.81059	1.30e-05	-2.870035	-1.831268	-2.726803

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

Table 4 Lag Order selection criteria Relationship 2

The lag structure for the third test to be conducted as follows:

$GDP_t = f(MCt, FDI_t, EXR_t, COMM_t)$ ..... (4.3)

VAR Lag Order Selection Criteria
Endogenous variables: LNGDP LNMC LNFDI LNEXCH LNCOMMP
Exogenous variables: C
Date: 01/21/17 Time: 21:11
Sample: 1994 2014
Included observations: 19

Lag	LogL	LR	FPE	AIC	SC	HQ
0	10.74650	NA	3.76e-07	-0.604894	-0.356358	-0.562832
1	89.80700	108.1881	1.42e-09	-6.295473	-4.804254	-6.043100
2	135.3250	38.33098*	3.32e-10*	-8.455267*	-5.721365*	-7.992582*

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

Table 5 Lag Order Selection Criteria Relationship 3

Table 3, 4 and 5 selects either lag 1 or lag 2 from the different criteria. However, after running the Johansen co-integration test, Eviews only permitted for the test to be conducted using lag 1 and by default that is the criteria that was used.

The Johansen co-integration tests for co-integration using trace test and the maximum eigenvalue test. The null hypotheses of both tests are that of no co-integrating relationship and the alternative is that of a co-integrating relationship. Under the trace test of co-integration, you fail to reject the null hypothesis when the trace test statistics is smaller than the critical value of 5% significance level. Under the maximum eigenvalue, you fail to reject the null hypothesis when the test statistic is less than the critical value of 5% significance level

4.3.1 The Trace Test

According to Eviews, the trace test shows that there is one co-integrating relationship for the first and second relationship and two co-integrating relationships for the third relationship at the 5% level of significance.

The first relationship in Table 6 shows one co-integrating relationship under both the trace test and the maximum eigenvalue test. The null hypothesis of no co-integration is rejected when the trace test statistic of 33.08975 is greater than the 5% critical value 29.79707 under the trace test.

Included observations: 19 after adjustments
Trend assumption: Linear deterministic trend
Series: CA_GDP LNFDI LNMC
Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.657758	33.08975	29.79707	0.0201
At most 1	0.480142	12.71727	15.49471	0.1256
At most 2	0.015015	0.287456	3.841466	0.5919

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None	0.657758	20.37248	21.13162	0.0636
At most 1	0.480142	12.42981	14.26460	0.0955
At most 2	0.015015	0.287456	3.841466	0.5919

Max-eigenvalue test indicates no cointegration at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Table 6 Johansen test of co-integration Relationship 1

The second relationship in Table 7 shows one co-integrating relationship under the trace test. The null hypothesis of no co-integration is rejected when the maximum eigenvalue test statistic of 32.80129 is greater than the 5% critical value of 29.79707 under the trace test.

Included observations: 19 after adjustments
Trend assumption: Linear deterministic trend
Series: CA_GDP LNGDP LNFDI
Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.644580	32.80129	29.79707	0.0219
At most 1	0.486821	13.14662	15.49471	0.1095
At most 2	0.024492	0.471134	3.841466	0.4925

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None	0.644580	19.65466	21.13162	0.0794
At most 1	0.486821	12.67549	14.26460	0.0878
At most 2	0.024492	0.471134	3.841466	0.4925

Max-eigenvalue test indicates no cointegration at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Table 7 Johansen test of co-integration Relationship 2

The third relationship in Table 8 shows two co-integrating relationship under both the trace test and the maximum eigenvalue test. The null hypothesis of no co-integration is rejected when the maximum eigenvalue test statistic of 111.5569 is greater than the 5% critical value 69.81889 under the trace test. The null hypothesis of no co-integration is rejected when the maximum eigenvalue test statistic of 63.22773 is greater than the 5% critical value 47.85613 under the maximum eigenvalue.

Included observations: 19 after adjustments

Trend assumption: Linear deterministic trend

Series: LNCOMMP LNEXCH LNFDI LNGDP LNMC

Lags interval (in first differences): 1 to 1

Unrestricted Co-integration Rank Test (Trace)

Hypothesised No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.921420	111.5569	69.81889	0.0000
At most 1 *	0.837592	63.22773	47.85613	0.0010
At most 2	0.605131	28.69245	29.79707	0.0666
At most 3	0.412983	11.03764	15.49471	0.2092
At most 4	0.047082	0.916299	3.841466	0.3384

Trace test indicates 2 co-integrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Co-integration Rank Test (Maximum Eigenvalue)

Hypothesised No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.921420	48.32922	33.87687	0.0005
At most 1 *	0.837592	34.53528	27.58434	0.0054
At most 2	0.605131	17.65481	21.13162	0.1433
At most 3	0.412983	10.12134	14.26460	0.2041
At most 4	0.047082	0.916299	3.841466	0.3384

Max-eigenvalue test indicates 2 co-integrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Table 8 Johansen test of co-integration Relationship 3

4.4 Vector Error Correction Model

The Johansen Co-integration trace test has yielded at least one co-integration equation under all three relationships. This enables the analysis of the long run and short run effects of the impact of FDI and mining consumption on the current account balance in South Africa.

The use of an intercept and no trend was used as an assumption in the model. The long and short run effects are analysed and the results interpreted in the sections below.

4.4.1 VECM relationship 1

Relationship 1

Results of Long Run Co-Integration Equation			
Variable	Coefficient	Standard Error	t-statistic
Constant	-2.529593	-	-
CA/GDP	1	-	-
LNMC	-0.118817	0.03112	[-3.81764]
LNFDI	0.151818	-0.02844	[5.33744]

Table 9 Long run effects in a VECM model: Relationship 1

CA/GDP= -2.53 – 0.118817MC + 0.151818FDI……4.1

Equation 4.1 shows the long run impact of the explanatory variables on CA shown in table 9. Appendix 2 shows the results from Eviews of the long run effects of relationship 1.

Equation 4.1 shows that MC has a negative relationship with the ratio of CA/GDP. FDI has a positive impact on the ratio of CA/GDP. All explanatory variables are not statistically significant in explaining CA since the speed of adjustment towards long run equilibrium represented by the C (1) is neither negative nor significant (refer to Appendix 3).

A unit increase in MC will increase the CA balance. This is compatible with literature which indicates that the sector positively contributes to the current account through its significant contribution to exports. However due to the negative impact MC has on GDP (Refer to VECM Relationship 3), the impact of MC on CA/GDP becomes negative.

A unit increase in FDI contributes negatively to the CA balance deficit. This is compatible with theoretical considerations which state that FDI will result in a current account balance deficit. The CA function of savings less investment will be decreasing because of an increase in investment. This contradicts the findings of Samsu, Derus and Ooi (2008) who found the net effects of FDI on the current account balance to be positive because of the long-term relationship of FDI and exports. However due to the negative impact of FDI on GDP (Refer to VECM Relationship 3), the impact on FDI on CA/GDP becomes positive.

Vector Error Correction Results Speed of Adjustment and Short Run Terms			
Variable	Coefficient	Standard Error	t-statistic
CA/GDP C (1)	0.055791	0.064342	0.4005
LNFDI C (4)	-0.002928	0.005465	-0.535703
LNMC C (3)	0.005319	0.024632	0.215950

Table 10 Short run effects of variables in a VECM. Relationship 1

Table 10, shows the short run effects of the relationship between FDI and the mining sector on the current account balance as a ratio of GDP. C (1) is the speed of adjustment towards equilibrium. If C (1) is negative in sign and is significant, then there is long run causality. In the case of the effect of FDI and the mining sector on the current account, C (1) is neither negative nor significant. Therefore, there is no long run causality between the independent variables to the dependent variables. Based on the probability for the variables MC's and FDI's, 0there is no short run causality between FDI and MC to the CA as the probability yielded was not significant.

Therefore, based on the VECM model there is no long run and no short run causality between MC and FDI to CA/GDP.

To determine the reliability of the model, the test for normality, heteroscedasticity and serial correlation was determined. Table 11 and Appendix 4 shows the results from the diagnostic results

Diagnostic Test Results	Null Hypothesis	Test - statistic	Probability
Breusch-Pagan-Godfrey test	No conditional heteroscedasticity	0.973316	0.4830
Jarque-Bera	There is normal distribution	0.099014	0.951698
Langrage Multiplier	No serial correlation	4.128341	0.0631

Table 11: Diagnostic Tests-Relationship 1

4.5.1 Heteroscedasticity

The test for heteroscedasticity was conducted using the Breusch-Pagan-Godfrey test. The null hypothesis is that of homoscedasticity (no heteroscedasticity) whilst the alternative is that of no homoscedasticity. The probability produced of 0.973316 is not significant therefore we fail to reject the hypothesis, meaning there is no conditional heteroscedasticity in the model. Therefore, the model can be relied on since there is no misspecification.

4.5.2 Residual Normality Test

The Jarque-Bera (J_B) test was used to test for normality of the model, it follows a chi-squared distribution with 2 d.f. The null hypothesis is that of normal distribution at 5% significant level. The probability indicated in Table 12 is 0.951698 which is greater than 5% making it insignificant. Therefore, we fail to reject the null hypothesis of normality

4.5.3 Autocorrelation Langrage Multiplier (LM) Tests

The LM tests for serial correlation. The null hypothesis is that of no serial correlation. The probability indicated in Table 12 of 0.0631 is greater than 0.05. This means we fail to reject the null hypothesis, indicating there is no serial correlation in the model.

The diagnostic tests for the suitability of the model, Table 12 shows that the residuals of the model are normally distributed, they do not exhibit conditional heteroscedasticity and serial correlation. Therefore, the effect of the mining consumption and foreign direct investment as indicated by the vecm are suitable to explain their effects on the current account balance.

4.6 Variance Decomposition Analysis

Variance decomposition gives the proportion of the movements of the dependent variables due to their own shocks vs versus shocks to other variables. It shows the forecast error variance of each variable attributable to its innovations and innovations in other variables in the system. The results of the variance decomposition analysis are presented in Table 13 and these show the proportion of the forecast error variance in the current account explained by its own innovations and innovations in explanatory variables.

Variance Decomposition of CA_GDP:				
Period	S.E.	CA_GDP	LNMC	LNFDI
1	0.013917	100.0000	0.000000	0.000000
2	0.023007	97.74427	0.020904	2.234828
3	0.030435	96.97140	0.247942	2.780657
4	0.036515	97.07217	0.356521	2.571306
5	0.041654	97.18207	0.375081	2.442846
6	0.046261	97.17202	0.383891	2.444091
7	0.050464	97.16087	0.399760	2.439366
8	0.054344	97.16855	0.410563	2.420887
9	0.057956	97.17619	0.417094	2.406720
10	0.061360	97.17755	0.422083	2.400368

Table 12: Variance Decomposition Relationship 1

Table 12 is an illustration of the variance decomposition analysis over a period of 10 years. This allows the effects of other variables on CA to be analysed over a relatively longer time period.

In the first year of the variance decomposition analysis, CA/GDP explains its own innovations or shocks. This is reiterated by Brooks (2002, p.342).

In the 5th year, CA explains 97% of its innovation. Explanatory Variables explain 3% of the error variance, which is disintegrated in the following way. FDI explains 2% and MC explains 1%.

After a 10-year period, GDP explains 97% of its own variation, whilst the explanatory variables explain 3%. The influence of MC explains 1% and FDI explains 2%.

Relationship 2

Results of Long Run Co-Integration Equation			
Variable	Coefficient	Standard Error	t-statistic
Constant	-23.69618	-	-
GDP	1	-	-
CA	15.55300	3.48312	[4.46525]
LNFDI	-0.250898	0.09284	[-2.70240]

Table 13: Long run causality - Relationship 2

GDP= -23.69618 + 15.55300CA/GDP–0.250898FDI …….4.2

Equation 4.2 is derived from Table 13 which is an illustration of the long run effect of the VECM model. Refer to Appendix 5 which shows the result obtained from Eviews on the long run causality of relationship 2. Equation 4.2 shows that CA has a positive long run relationship with GDP. FDI has a negative impact on the GDP. All explanatory variables are statistically significant in explaining CA since the speed of adjustment towards long run equilibrium represented by C (1) is significant and negative (refer to Appendix 6).

A unit increase of the current account deficit to GDP will increase GDP by 15.53%. This is compatible with literature which indicates current account deficits are sustainable with high economic growth as investment rates increase as a result of high GDP. High growth rates will result in high expectations of future income, which in turn, lead to low private savings. High growth rates are an indication of the ability of a country to service its external debt which will lead to a smaller increase of foreign debt to GDP ratio (Roubini & Wachtel, 1999).

A unit increase in FDI will cause GDP to decrease by 0.250898%. This is not compatible with theoretical considerations that advocate for a positive relationship between FDI and economic growth. However, this is in line with the views of dependency theorists who are critical of the role of FDI on economic growth of host developing countries. It argues that the benefits of FDI are distributed unequally and they trigger market distortions on the local economy by crowding

out enterprises with the creation of monopolies and the employment of inappropriate technologies that contribute towards the rise in unemployment.

Vector Error Correction Results Speed of Adjustment and Short Run Terms			
Variable	Co-efficient	Standard Error	t-statistic
GDP (C1)	-0.410421	0.172243	-2.382798
CA/GDP (C3)	5.838931	3.104253	1.880945
LNFDI (C4)	-0.131687	0..037679	-3.494994

Table 14: Short run causality- Relationship 2

Appendix 6 shows the short run relationship. C (1) is the speed of adjustment towards equilibrium. If C (1) is negative in sign and is significant, then there is long run causality. In the case of the effect of FDI and CA/GDP on the GDP, C (1) is negative and significant. Therefore, there is long run causality between the independent variables to the dependent variables.

To determine short run causality, the Wald test is used with a null hypothesis of no short run causality and an alternative hypothesis of short run causality. The Wald test for CA is as follows:

H0: C (3) =0

H1: there is short run causality

Based on the Wald test, there is short run causality between CA/GDP and GDP as the probability yielded was significant. Refer to the Wald test results shown in Table 15 below:

Wald Test:
Equation: Untitled

Test Statistic	Value	df	Probability
t-statistic	1.880945	14	0.00809
F-statistic	3.537955	(1, 14)	0.00809
Chi-square	3.537955	1	0.00600

Null Hypothesis: C (3) =0.
Null Hypothesis Summary:

Normalized Restriction (= 0)	Value	Std. Err.
C (3)	5.838931	3.104253

Restrictions are linear in coefficients.

Table 15 The short run causality between CA/GDP to GDP

The Wald test for FDI is as follows:

H0: C (4) =0

H1: there is short run causality

Based on the Wald test, there is short run causality between FDI and GDP as the probability yielded was significant. Refer to the Wald test results in Table 16 below:

Wald Test:
Equation: Untitled

Test Statistic	Value	df	Probability
t-statistic	-3.494994	14	0.0036
F-statistic	12.21499	(1, 14)	0.0036
Chi-square	12.21499	1	0.0005

Null Hypothesis: C (4) =0
Null Hypothesis Summary:

Normalized Restriction (= 0)	Value	Std. Err.
C (4)	-0.131687	0.037679

Restrictions are linear in coefficients.

Table 16 The short run causality between FDI and GDP

Therefore, based on the VECM model there is long run and short run causality between CA/GDP and FDI to GDP.

To determine the reliability of the model, the test for normality, heteroscedasticity and serial correlation was determined. Table 17 and Appendix 7 shows the results

Diagnostic Test Results	Null Hypothesis	Test - statistic	Probability
Breusch-Pagan-Godfrey test	No conditional heteroscedasticity	2.439150	0.0890
Jarque-Bera	There is normal distribution	4.242397	0.119888
Langrage Multiplier	No serial correlation	0.022548	0.8829

Table 17 Diagnostic tests - Relationship 2

4.5.1 Heteroscedasticity

The test for heteroscedasticity was conducted using the Breusch-Pagan-Godfrey test. The null hypothesis is that of homoscedasticity (no heteroscedasticity) whilst the alternative is that of no homoscedasticity. The probability produced of 0.0.0890 is not significant, therefore we fail to reject the hypothesis, meaning there is no conditional heteroscedasticity in the model. Therefore, the model can be relied on since there is no misspecification.

4.5.2 Residual Normality Test

The Jarque-Bera (J_B) test was used to test for normality of the model, it follows a chi-squared distribution with 2 d.f. The null hypothesis is that of normal distribution at 5% significant level. The probability indicated in table 8 is 0.119888 which is greater than 5% making it insignificant. Therefore, we fail to reject the null hypothesis of normality

4.5.3 Autocorrelation Langrage Multiplier (LM) Tests

The LM tests for serial correlation. The null hypothesis is that of no serial correlation. The probability indicated in Table 17 of 0.8829 is greater than 0.05. This means we fail to reject the null hypothesis, indicating there is no serial correlation in the model.

The diagnostic tests for the suitability of the model, Table 17 shows that the residuals of the model are normally distributed, they do not exhibit conditional heteroscedasticity and serial correlation. Therefore, the effect of the mining consumption and foreign direct investment as indicated by the VECM are suitable to explain their effects on the current account balance.

4.6 Variance Decomposition Analysis

The results of the variance decomposition analysis are presented in Table 19 and these show the proportion of the forecast error variance in the GDP explained by its own innovations and innovations in explanatory variables.

Variance Decomposition of LNGDP: Period	S.E.	LNGDP	CA_GDP	LNFDI
1	0.175240	100.0000	0.000000	0.000000
2	0.295664	98.97415	0.226619	0.799235
3	0.359318	93.37305	1.186848	5.440101
4	0.418767	81.84948	7.752442	10.39808
5	0.471841	74.49014	12.90246	12.60740
6	0.519086	74.52123	14.43424	11.04453
7	0.563111	76.97393	13.44372	9.582350
8	0.602452	78.54112	12.63373	8.825151
9	0.637372	78.02644	12.73462	9.238933
10	0.671362	76.55805	13.64816	9.793783

Table 18: Variance decomposition relationship 2

Table 18 is an illustration of the variance decomposition analysis over a period of 10 years. This allows the effects of other variables on CA to be analysed over a relatively longer time period.

In the first year of the variance decomposition analysis, GDP explains its own innovations or shocks. This is reiterated by Brooks (2002, p.342).

In the 5th year, GDP explains 74% of its innovation. Explanatory Variables explain 26% of the error variance, which is disintegrated in the following way. FDI explains 13%, and CA/GDP explains 13%.

After a 10 year period, GDP explains 77% of its own variation, whilst the explanatory variables explains 23%. The influence of FDI explains 10% and CA/GDP explains 13%.

Relationship 3

Results of Long Run Co-Integration Equation			
Variable	Co-efficient	Standard Error	t-statistic
Constant	-11.5217	-	-
GDP	1	-	-
LNMC	-0.201983	(0.08112)	[-2.49003]
LNFDI	-0.322699	(0.04635)	[-6.96258]
LNEXCH	0.931522	(0.29027)	-3.20916
LNCOMMP	-0.209371	(0.10190)	-2.05471

Table 19: Long Run Co-Integration Equation Relationship 3

Equation 4.3 is the long run impact of the explanatory variables on GDP shown in table 19

GDP= -11.52717- 0.201983MC– 0.322699FDI – 0.931522EXCH – 0.209371COMMP …… (4.3)

Appendix 8 shows the results obtained in Eviews pertaining to the long run relationship of Relationship 3.

Equation 4.3 shows that MC, FDI, COMMP and REXCH have a negative long run relationship with GDP. MC has a negative impact on GDP. All explanatory variables are statistically significant in explaining RGDP since the speed of adjustment towards long run equilibrium represented by the C (1) is significant and negative.

A unit increase in MC will cause GDP to decrease by 20%. This is not compatible with literature which states mining is capital and labour intensive and a major contributor to economic growth in South Africa through employment creation, tax and export revenue and the increase in output productivity

A unit increase in FDI will cause GDP to decrease by 32.26%. This is not compatible with modernisations theories that state that FDI will result in an increase in economic growth. However, the dependency theories are critical of the role of FDI on economic growth of host developing countries. It argues that the benefits of FDI are distributed unequally and they

trigger market distortions on the local economy by crowding out enterprises with the creation of monopolies and the employment of inappropriate technologies that contribute towards the rise in unemployment.

A unit increase in COMMP will cause GDP to decrease by 21%. Commodity metal prices are linked to mining consumption and exports. An increase in commodity prices will result in mining consumption and exports decreasing which in turn, will result in a decrease in economic growth. Industries that depend on mining products will have to resort to decreasing consumption or using alternative products to substitute or improvise their production inputs.

A unit increase in REXCH has a negative long run relationship with GDP which decreases by 0.9315%. According to literature, an overvaluation of exchange rates is associated with current account deficits, balance of payment crises, shortages in foreign currency and a stop-go macro-economic cycle which is detrimental to economic growth, similarly high growth periods are associated with undervaluation of currencies (Rodrik, 2007). Therefore, the result obtained is highly correlated to the findings in the literature.

4.4.2 Speed of Adjustment and Short Run Terms

The co-efficients of the error correction model are a representation of the speed of adjustment. Table 20 show the results obtained from the error correction model.

Vector Error Correction Results Speed of Adjustment and Short Run Terms				
Variable	Co-efficient	Standard Error	t-statistic	Probability
GDP	-0.575099	0.145802	-3.9443730.0019	0.0019
LNMC	-0.902508	0.304941	-2.959618	0.0119
LNFDI	-0.147225	0.026931	-5.466754	0.0001
LNCOMMP	0.195721	0.226743	0.863185	0.4050
LNEXCH	-2.088252	0.553691	3.771511	0.0027

Table 20: Vector Error Correction Results of Short Run Speed of Adjustment Relationship 3

Table 20 reports the co-efficient of the GDP as -0.575099. This means that the speed of adjustment is 57.51%. The implication of this result shows that if there is deviation in equilibrium of only 58%, this will be corrected within a year as the variable moves towards

restoring equilibrium. There is strong pressure for the variable GDP to restore long run equilibrium whenever there is a disturbance as the speed of adjustment is statistically significant with a t-value of -3.944373 (Refer to Appendix 9).

MC is found to have a negative effect on GDP in the short run. However, the t-statistic of -2.959618 is significant, as shown by the probability of 0.0119. Therefore, there is short run causality between the variable MC and GDP.

The lag of FDI is found to have a negative effect on GDP in the short-run. The t- value of -0.147225 is significant. The coefficient shows that GDP decrease as a result of an increase in FDI. This shows that the exogenous component of FDI exerts a negative impact on GDP.

The lag of COMMP is found to have a positive effect on GDP in the short-run. However, the t- value of 0.863185 is insignificant as shown by the probability of 0.4050. Therefore, there is no short run causality between COMMP and GDP.

The lag of EXCH is found to have a negative effect on GDP in the short-run. However, the t-value of -3.771511 is significant as shown by the probability of 0.0027. Therefore, there is short run causality between EXCH and GDP.

4.5 Diagnostic Testing

The diagnostic test validates the parameter evaluation of the outcome achieved by the model. If there is presence of serial correlation, heteroscedasticity and there is no normality, this would deem the model inefficient and the estimated parameters will be biased. Therefore, the reliability of the model is tested in three main ways, the Breusch-Pagan-Godfrey test for heteroscedasticity, the Jarque-Bera test for normality and the Langrage Multiplier (LM) test for serial correlation. Table 21 shows the summary of results of the diagnostic tests (Refer to Appendix 10 for the results obtained in Eviews).

Diagnostic Test Results	Null Hypothesis	Test - statistic	Probability
Breusch-Pagan-Godfrey test	No conditional heteroscedasticity	1.541374	0.9218
Jarque-Bera	There is normal distribution	0.100836	0.950832
Langrage Multiplier	No serial correlation	0.434974	0.3952

Table 21 Diagnostic tests of the VECM model

4.5.1 Heteroscedasticity

The test for heteroscedasticity was conducted using the Breusch-Pagan-Godfrey test. The null hypothesis is that of homoscedasticity (no heteroscedasticity) whilst the alternative is that of no homoscedasticity. The probability produced of 0.9218 is not significant therefore we fail to reject the hypothesis meaning there is no conditional heteroscedasticity in the model. Therefore, the model can be relied on since there is no misspecification.

4.5.2 Residual Normality Test

The Jarque-Bera (J_B) test was used to test for normality of the model, it follows a chi-squared distribution with 2 d.f. The null hypothesis is that of normal distribution at 5% significant level. The probability indicated in Table 22 is 0.9508 which is greater than 5% making it insignificant. Therefore, we fail to reject the null hypothesis of normality

4.5.3 Autocorrelation Langrage Multiplier (LM) Tests

The LM tests for serial correlation. The null hypothesis is that of no serial correlation. The probability indicated in Table 21 of 0.3952 is greater than 0.05. This means we fail to reject the null hypothesis, indicating there is no serial correlation in the model.

The diagnostic tests for the suitability of the model, Table 21 shows that the residuals of the model are normally distributed, they do not exhibit conditional heteroscedasticity and serial correlation. Therefore, the effect of the mining consumption, foreign direct investment, commodity prices and the real exchange rate are suitable to explain their effects on GDP.

4.6 Variance Decomposition Analysis

Variance decomposition examines VAR system dynamics slightly different from the impulse response analysis. Variance decomposition gives the proportion of the movements of the dependent variables due to their own shocks vs versus shocks to other variables. It shows the forecast error variance of each variable attributable to its innovations and innovations in other variables in the system. The results of the variance decomposition analysis are presented in Table 22 and these show the proportion of the forecast error variance in C explained by its own innovations and innovations in explanatory variables.

Period	S.E.	LNGDP	LNMC	LNFDI	LNCOMMP	LNEXCH
1	0.079960	100.0000	0.000000	0.000000	0.000000	0.000000
2	0.148255	80.41282	0.244087	0.126986	7.042502	12.17361
3	0.228371	55.43787	2.624690	16.49160	9.889645	15.55619
4	0.291829	43.38205	6.805347	26.45694	9.357904	13.99776
5	0.331432	40.29097	8.564143	30.30032	8.811970	12.03259
6	0.351585	41.38943	8.703627	30.18739	8.494314	11.22524
7	0.370962	43.05770	8.292094	29.31771	8.412608	10.91988
8	0.393535	43.76823	7.971369	28.72472	8.473154	11.06253
9	0.419973	43.32868	7.964006	29.05599	8.556950	11.09437
10	0.444324	42.77893	8.163270	29.59799	8.532149	10.92766

Table 22: Variance Decomposition- Relationship 3

Table 22 is an illustration of the variance decomposition analysis over a period of 10 years. This allows the effects of other variables on CA to be analysed over a relatively longer time period.

In the first year of the variance decomposition analysis, GDP explains its own innovations or shocks. This is reiterated by Brooks (2002, p. 342).

In the 5th year, GDP explains 40% of its innovation. Explanatory Variables explain 60% of the error variance, which is disintegrated in the following way. MC explains 9%, LNFDI explains 30%, LNCOMMP explains 9% and LNEXCH explains 12%

After a 10-year period, GDP explains 42% of its own variation, whilst the explanatory variables explain 58%. The influence of MC explains 8%, FDI explains 30%, COMMP explains 9% and LNEXCH explains 11%

4.7 Concluding Remarks

In conclusion, the chapter highlighted the effect of the mining sector and FDI on the current account in South Africa. Three models were estimated with the aim of determining the relationship between FDI, and the mining sector to the current account, the relationship between economic growth, mining consumption and FDI, and how the current account balance and FDI jointly relate positively to economic growth, especially upon control of other drivers

of economic growth. The chapter comprised six sections which assisted in deriving models that helps explain the aim of the study.

The preliminary step used in deriving these models was to test for stationarity of the time series data. This was done by applying graphical analysis and the use of unit root tests through the application of the Augmented Dickey Fuller (ADF) and the Phillips Perron (PP) test of unit root. Both methods found the variables to be not stationary at level. However, variables were found to be stationary at first difference. Therefore, the series was integrated at order I (1).

Co-integration tests were applied after the time series were deemed to be stationary. The pairwise correlation matrix was used to detect the problem of multicollinearity and the results indicated that there was no one variable correlated to all the variables, confirming that the multicollinearity problem does not exist amongst all variables.

Using the lag order information criteria approach, lag 1 was adopted for VAR for all models derived. Using Lag 1, The Johansen co-integration tests were applied using the trace and maximum eigenvalue test. The trace test and the maximum eigenvalue test reflected the existence of at least 1 co-integrating equations. Therefore, it was concluded that there was one significant long run relationship and one co-integrating vector after normalisation under both models.

When the presence of co-integrating relationships were found, a vector error correction model was applied. The variables could explain the long run and short run effects on the models derived.

Diagnostic tests were conducted to test the efficiency and bias of the parameters. The Breusch-Pagan-Godfrey tests for heteroscedasticity, the Jarque-Bera tests for normality and the Langrage Multiplier (LM) tests for serial correlation were applied to the model. The outcome of the diagnostic test showed that the models were normally distributed; there was no presence of serial correlation and heteroscedasticity. Therefore, results of the model can be reliably used to reach conclusions on the effects of the mining sector and foreign direct investment on the current account balance.

Chapter 5

Summary, Recommendations and Conclusion

"Change is inevitable. Growth is Optional"

John Maxwell

5.1 Introduction

The aim of this chapter is to provide the summary of the findings from each chapter and make the necessary policy recommendations. This chapter contains three sections which compromise the summary of each chapter, policy implications and recommendations and limitations of the study and areas of further research respectively.

5.2 Summary

The aim of this study is to explore the effect of FDI and the mining sector on South Africa's the current account balance.

Chapter 2 provided the empirical evidence and theoretical foundation of the study based on literature. From the findings of literature, the determinants of the current account balance are attributed to internal factors such as public and private savings, investment and domestic output growth and external factors such as exports, terms of trade, real exchange rate, Black Market Premium on Foreign Exchange, Output Growth Rate of Industrialised Countries, International Real Interest Rate and external indebtedness. An analysis of the South African current account balance was examined and it showed that South Africa has been operating within a deficit for the past 10 years and this is mainly attributed to poor export performance, strong investment growth, a weakening savings and strong capital inflows. Therefore, the need to examine the contributors of economic growth in South Africa was important to better explain the relationship between economic growth and the current account balance. Demand side policy, international capital flows, labour market efficiency, domestic financial markets, institutions and innovation and human capital were found to be major contributors to economic growth. These determinants cannot work in isolation of each other to achieve economic growth. Human capital and human development is the basis on which each determinant exists. It is through human capital and development that innovation and research and development contribute towards economic growth. The relationship between economic growth and the current account balance was explained, literature explains that high economic growth would result in high

investment rates and the sustainability of a current account deficit as an economy will be able to service its debt. The most important aspect of managing the sustainability of the current account balance lies with the performance of the economy.

The mining sector plays an important role in achieving economic growth through its contribution towards GDP, employment, tax revenue and export revenue. However, the risks associated with the industry are volatile commodity prices and exchange rates, poor labour relations and an unstable political, regulatory and legal climate that hampers economic growth. Exchange rates and commodity prices have an impact of affecting exports that in turn, affects the current account balance. Poor labour relations and an unstable political environment have a potential to affect productivity that in turn, results in a decrease in GDP and export performance.

Foreign direct investment dominates the mining sector due to the availability of natural resources. The further exposure of FDI is demonstrated by dual listed mining companies. Different theoretical perspectives of the impact of FDI on economic growth were analysed in the two theories, the modernisation and dependency theory. Modernisation theory advocates that foreign direct investment contributes to economic growth through the neoclassical theory and the new growth theory. However, the dependency theorists tend to suggest that foreign direct investment has a negative effect on economic growth due to the unevenness in the distribution of FDI creating market distortions due to the creation of monopolies. However, in order for FDI to have a positive impact in the economy, the need for high quality housekeeping and efficient plumbing is needed.

The impact of FDI permeates through the current account through the investment component of the current account function of savings less investment. However, it contributes positively to the current account balance through the generation of export revenue and it contributes negatively through the repatriation of investment income.

The usefulness of the policy that governs and incentivises FDI was analysed after examining the components of the national current account. The examination of regulation that governs the rules of conduct of FDI and the incentives given to attract FDI were analysed. The finding shows that there is no discrimination in the way local and FDI entities are treated, three forms of incentives are available to FDI which come in the form of fiscal, financial and rule-based incentives. The current incentives made by the DTI were analysed together with their intended objectives. In order for FDI to have positive effects on economic growth, government

regulation and incentives need to be positioned in a manner that is beneficial to all stakeholders of the economy.

Chapter 3 highlights how the model was specified and estimated. The models were developed with the aim of addressing the following issues to find:

- The relationship between FDI in the mining sector to the current account
- The relationship between the economic growth, the current account and FDI.
- How the current account balance and FDI jointly relate positively to economic growth, especially upon control of other drivers of economic growth

The VECM was applied after testing for stationarity using Augmented Dickey Fuller and Phillips Perron and co-integration using the Johansen test. Diagnostic tests of normality, heteroscedasticity and autocorrelation are conducted to test the reliability of the model. Impulse and variance decomposition were conducted to analyse the responsiveness of shocks to the dependent variable

Chapter 4 analysed the results of the three models identified in chapter 3 which were to find the relationship between FDI and the mining sector on the current account balance, how the current account balance and FDI jointly relate positively to economic growth, especially upon control of other drivers of economic growth, and to find the impact of FDI and the mining sector on economic growth.

The first model conducted was to find the relationship between FDI and the mining sector on the current account balance. The results show that MC has a positive relationship with CA. FDI has a negative impact on the CA. All explanatory variables are not statistically significant in explaining CA since the speed of adjustment towards long run equilibrium represented by C (1) is insignificant and negative (refer to Appendix 3).

A unit increase in MC will increase the CA balance. This is compatible with literature which indicates that the sector positively contributes to the current account through its significant contribution to exports.

A unit increase in FDI contributes negatively to the CA balance deficit. This is compatible with theoretical considerations which state that FDI will result in a current account balance deficit. The CA function of savings less investment will be decreasing as a result of an increase in

investment. This contradicts the findings of Samsu, Derus and Ooi (2008) who found the net effects of FDI on the current account balance to be positive because of the long-term relationship of FDI and exports.

Table 10 showed the short run effects of the relationship between FDI and the mining sector on the current account. C (1) is the speed of adjustment towards equilibrium. If C (1) is negative in sign and is significant, then there is long run causality. In the case of the effect of FDI and the mining sector on the current account, C (1) is negative but not significant. Therefore, there was no long run causality between the independent variables to the dependent variables. Based on the probability for the variables MC's and FDI's, there is no short run causality between FDI and MC to the CA as the probability yielded was not significant. Therefore, based on the VECM model, there is no long run and no short run causality between MC and FDI to CA.

Table 13 shows an illustration of the long run effect of the CA and FDI on the GDP. The results show that CA has a positive long run relationship with GDP. FDI has a negative impact on the GDP. All explanatory variables are statistically significant in explaining CA since the speed of adjustment towards long run equilibrium represented by C (1) is significant and negative (refer to Appendix 6).

A unit increase in CA deficit will increase GDP. This is compatible with literature which indicates that current account deficits are sustainable with high economic growth as investment rates increase because of high GDP. High growth rates will result in high expectations of future income, which in turn, lead to low private savings. High growth rates are an indication of the ability of a country to services its external debt which will lead to a smaller increase of foreign debt to GDP ratio (Roubini & Wachtel, 1999).

A unit increase in FDI will cause GDP to decrease. This is not compatible with theoretical considerations that advocate for a positive relationship between FDI and economic growth. However, this is in line with the views of dependency theorists who are critical of the role of FDI on the economic growth of host developing countries. It argues that the benefits of FDI are distributed unequally and they trigger market distortions on the local economy by crowding out enterprises with the creation of monopolies and the employment of inappropriate technologies that contribute towards the rise in unemployment.

Appendix 6 shows the short run relationship of the relationship between CA/GDP and FDI on GDP. C (1) is the speed of adjustment towards equilibrium. If C (1) is negative in sign and is significant, then there is long run causality. In the case of the effect of FDI and CA on the GDP, C (1) is negative and significant. Therefore, there is long run causality between the independent variables to the dependent variables.

To determine short run causality, the Wald test was conducted and the results showed there is a short run relationship between CA and FDI toward GDP.

The third model conducted was to show the results obtained from the relationship between FDI, MC, EXCH and COMMP on GDP. Appendix 8 shows the results obtained in Eviews pertaining to the long run relationship of Relationship 3. The results MC, FDI, COMMP and REXCH have a negative long run relationship with GDP. MC has a negative impact on GDP. All explanatory variables are statistically significant in explaining RGDP since the speed of adjustment towards long run equilibrium represented by the C (1) is significant and negative.

A unit increase in MC will cause GDP to decrease by 20%. This is not compatible with literature which states mining is capital and labour intensive and a major contributor to economic growth in South Africa through employment creation, tax and export revenue and the increase in output productivity

A unit increase in FDI will cause GDP to decrease by 32.26%. This is not compatible with modernisations theories that state that FDI will result in an increase in economic growth. However, the dependency theories are critical of the role of FDI on economic growth of host developing countries. It argues that the benefits of FDI are distributed unequally and they trigger market distortions on the local economy by crowding out enterprises with the creation of monopolies and the employment of inappropriate technologies that contribute towards the rise in unemployment.

A unit increase in COMMP will cause GDP to decrease by 21%. Commodity metal prices are linked to mining consumption and exports. An increase in commodity prices will result in mining consumption and exports decreasing which in turn, will result in a decrease in economic growth. Industries that depend on mining products will have to resort to decreasing consumption or using alternative products to substitute or improvise their production inputs.

A unit increase in REXCH has a negative long run relationship with GDP which decreases by 0.9315%. According to literature, an overvaluation of exchange rates is associated with current

account deficits, balance of payment crises, shortages in foreign currency and a stop-go macro-economic cycle which is detrimental to economic growth, similarly high growth periods are associated with undervaluation of currencies (Rodrik, 2007). Therefore, the result obtained is highly correlated to the finding of literature.

The co-efficients of the error correction model are a representation of the speed of adjustment. Table 20 shows the results obtained from the error correction model. Table 20 reports the co-efficient of the GDP as -0.575099. This means that the speed of adjustment is 57.51%. The implication of this result shows that if there is deviation in equilibrium of only 58% this will be corrected within a year as the variable moves towards restoring equilibrium. There is strong pressure for the variable GDP to restore long run equilibrium whenever there is a disturbance as the speed of adjustment is statistically significant with a t-value of -3.944373 (Refer to Appendix 9).

MC is found to have a negative effect on GDP in the short run. However, the t-statistic of -2.959618 is significant as shown by the probability of 0.0119. Therefore, there is short run causality between the variable MC and GDP.

The lag of FDI is found to have a negative effect on GDP in the short run. The t- value of -0.147225 is significant. The co-efficient shows that GDP decreases as a result of an increase in FDI. This shows that the exogenous component of FDI exerts a negative impact on GDP.

The lag of COMMP is found to have a positive effect on GDP in the short run. However, the t- value of 0.863185 is insignificant as shown by the probability of 0.4050. Therefore, there is no short run causality between COMMP and GDP.

The lag of EXCH is found to have a negative effect on GDP in the short run. However, the t-value of -3.771511 is significant as shown by the probability of 0.0027. Therefore, there is short run causality between EXCH and GDP. Therefore, FDI, MC, COMMP and EXCH have long run and short run relationships with GDP.

5.3 Policy Implications and Recommendations

The findings imply that foreign direct investment and mining consumption do not exert a significant and reliable impact on the current account. This conclusion was reached through the long run and short run effects of the VECM in Chapter 4.

This implies that the incentives and policies used to attract foreign direct investment are not useful in promoting economic growth. This evidence is highlighted in the national current account, which shows a trade balance deficit for the past 10 years and a net investment income deficit. With mining accounting for over 50% of the export revenue, this is an indication that the value of imports are greater than the value of exports due to value added goods being imported. Approximately R12 billion in dividends is declared to shareholders in the mining sector and half of the dividends go to foreign shareholders (Chamber of Mines, 2014).

Recommendations on how to create a positive current account balance

It is necessary for government to create policy that ensures that net investment income is not repatriated to foreign investors and that FDI economic activities are diversified through reinvesting income into brownfield investment or mergers and acquisition of enterprises along the value chain that, in turn, will create a positive Trade Balance

In order to combat the outflow of capital flows from the economy the need for the creation of policies that encourage the reinvestment of investment income and the creation of forward linkages should be created in order to facilitate the creation of value added exports and the growth of value adding industries.

This would support the modernisation theory that highlights the benefits of FDI to economic growth through the new endogenous growth model which highlights the importance of technology, efficiency and productivity to economic growth.

The creation of value added industries and exports would facilitate the determinants of economic growth in South Africa through encouraging international capital flows through the market of value added exports and the investments in value added industries. This in turn, will add to the efficiency of the domestic financial market through credit extension and the development of equity markets which will facilitate the growth of value added industries. In addition, this would facilitate skill development of the local human capital and the innovation of technologies that creates an improvement in production efficiencies.

Such policies would act as risk management tools to mitigate the risks associated with the mining industry and foreign direct investment.

5.4 Areas of Further Research

1. What is the value added linkages created from the mining sector? The study assumes that mining is not yielding a positive impact on the current account balance, given incentives that promote industrialisation, the need for further research on whether these incentives are being utilised is necessary.
2. What risk management tools can be used in the mining sector to counter risks that hamper economic growth?
3. To what extent does South Africa's investability impact the current account balance?
4. To what extent are the incentives provided by the DTI being utilised and marketed into attracting FDI?

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Appendix

Appendix 1: Data used in the Regression Analysis

Year	GDP	CA	FDI	MC	COMMP	EXCH	CA/GDP
1994	16 199 071 465 433.10	3 433 393 613.65	43 398 915 667.66	50713.9	222.285	115.913	0.00021
1995	17 515 310 736 426.20	-280 907 920 220.25	140 656 873 790.70	54998	275.652	112.667	-0.01604
1996	15 309 507 663 139.70	-174 057 351 593.16	84 673 686 758.94	63012.7	285.242	103.717	-0.01137
1997	16 711 852 803 849.30	-243 949 346 036.92	417 346 518 407.42	66214.1	312.728	109.524	-0.0146
1998	13 855 568 289 307.50	-221 159 147 336.27	55 345 823 675.30	71341.6	307.285	100.567	-0.01596
1999	13 000 402 888 241.30	-64 249 114 212.81	143 040 755 839.98	76485.7	338.538	95.1491	-0.00494
2000	12 552 896 232 532.40	-17 541 846 914.19	89 186 563 103.62	98433.8	434.838	92.0558	-0.0014
2001	9 878 507 572 176.95	27 854 493 169.07	591 035 163 145.82	115498	484.089	81.294	0.00282
2002	8 020 119 126 386.79	70 100 607 352.10	102 770 802 570.99	137585	571.248	69.4489	0.00874
2003	15 812 823 604 097.80	-139 090 993 553.65	70 659 673 205.75	117729	459.221	90.2266	-0.0088
2004	22 301 073 527 703.70	-625 710 373 925.32	68 429 110 220.46	124927	526.984	97.5577	-0.02806
2005	25 491 096 495 536.60	-792 643 049 954.79	644 968 963 798.56	142385	636.18	98.8898	-0.03109
2006	25 790 155 473 992.20	-1 146 491 803 917.47	59 177 116 986.92	192862	1057	94.9429	-0.04445
2007	26 726 070 932 334.50	-1 443 458 617 364.68	587 942 706 893.44	224413	1293.15	89.2609	-0.05401
2008	22 777 972 538 531.40	-1 303 504 940 444.35	785 160 252 436.66	300083	1394.65	79.4295	-0.05723
2009	25 622 411 838 122.20	-684 578 586 961.14	660 134 323 207.62	240931	1151.92	86.5808	-0.02672
2010	37 534 939 627 383.50	-549 224 001 061.13	369 327 171 548.14	300141	1481.42	100	-0.01463
2011	40 774 361 293 696.30	-912 469 069 652.44	405 305 536 146.31	369010	1666.18	97.9167	-0.02238
2012	36 702 856 170 256.90	-1 881 243 853 639.99	428 388 532 552.52	364650	1568.36	92.6039	-0.05126
2013	30 452 135 833 789.40	-1 792 569 781 741.58	681 997 126 505.89	397737	1765.05	82.8419	-0.05887
2014	27 260 891 646 393.90	-1 445 891 083 003.76	449 426 626 525.68	397068	1779.95	77.5989	-0.05304

Appendix 2: Long Run Effects of the VECM Model - Relationship 1

Vector Error Correction Estimates

Vector Error Correction Estimates
Date: 08/29/17 Time: 09:19
Sample (adjusted): 1996 2014
Included observations: 19 after adjustments
Standard errors in ( ) & t-statistics in [ ]

Cointegrating Eq:	CointEq1
CA_GDP(-1)	1.000000
LNMC(-1)	-0.118817 (0.03112) [-3.81764]
LNFDI(-1)	0.151818 (0.02844) [5.33744]
C	-2.529593

Error Correction:	D(CA_GDP)	D(LNMC)	D(LNFDI)
CointEq1	0.055791 (0.06434) [0.86710]	-1.286915 (0.53216) [-2.41829]	-12.53320 (3.36017) [-3.72993]
D(CA_GDP(-1))	0.088930 (0.33872) [0.26255]	6.391561 (2.80144) [2.28153]	19.39434 (17.6890) [1.09641]
D(LNMC(-1))	0.005319 (0.02463) [0.21595]	-0.147675 (0.20372) [-0.72488]	1.491255 (1.28636) [1.15929]
D(LNFDI(-1))	-0.002928 (0.00547) [-0.53570]	0.137776 (0.04520) [3.04794]	0.301179 (0.28542) [1.05520]
C	-0.001823 (0.00423) [-0.43096]	0.119949 (0.03499) [3.42842]	-0.083873 (0.22091) [-0.37966]
R-squared	0.147155	0.449219	0.765827
Adj. R-squared	-0.096515	0.291853	0.698921
Sum sq. resids	0.002711	0.185478	7.394945
S.E. equation	0.013917	0.115102	0.726781
F-statistic	0.603910	2.854616	11.44624
Log likelihood	57.15979	17.01810	-17.99523
Akaike AIC	-5.490504	-1.265063	2.420551
Schwarz SC	-5.241968	-1.016526	2.669087
Mean dependent	-0.001947	0.104043	0.061139
S.D. dependent	0.013290	0.136780	1.324534
Determinant resid covariance (dof adj.)		9.69E-07	
Determinant resid covariance		3.88E-07	
Log likelihood		59.36867	
Akaike information criterion		-4.354596	
Schwarz criterion		-3.459865	

Appendix 3: Short Run Effects of the VECM Model - Relationship 1

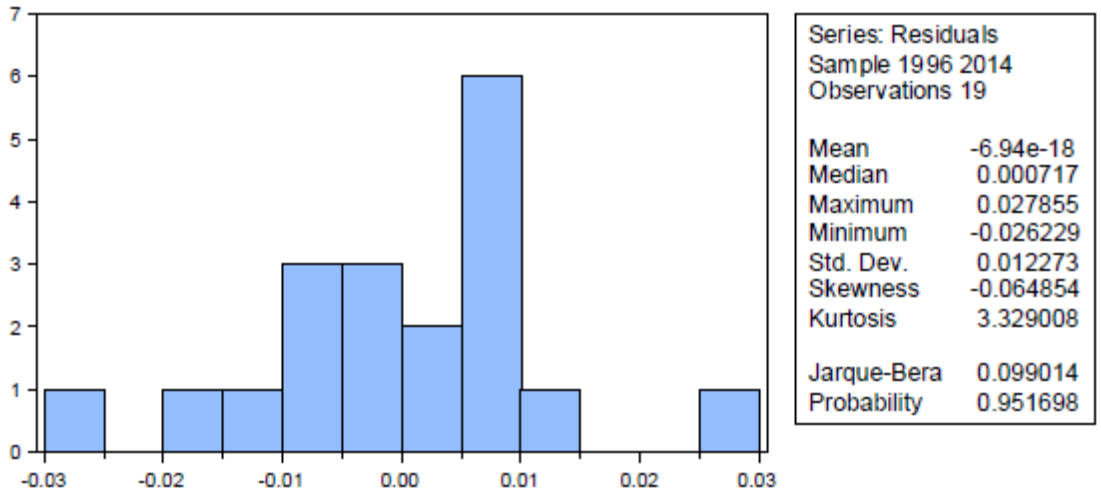
Dependent Variable: D(CA_GDP)
Method: Least Squares
Date: 08/29/17 Time: 09:20
Sample (adjusted): 1996 2014
Included observations: 19 after adjustments
D(CA_GDP) = C(1)*(CA_GDP(-1) - 0.11881653145*LNMC(-1) + 0.1518177659*LNFDI(-1) - 2.52959300684) + C(2)*D(CA_GDP(-1)) + C(3)*D(LNMC(-1)) + C(4)*D(LNFDI(-1)) + C(5)

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	0.055791	0.064342	0.867100	0.4005
C(2)	0.088930	0.338718	0.262547	0.7967
C(3)	0.005319	0.024632	0.215950	0.8321
C(4)	-0.002928	0.005465	-0.535703	0.6006
C(5)	-0.001823	0.004230	-0.430961	0.6731

R-squared	0.147155	Mean dependent var	-0.001947
Adjusted R-squared	-0.096515	S.D. dependent var	0.013290
S.E. of regression	0.013917	Akaike info criterion	-5.490504
Sum squared resid	0.002711	Schwarz criterion	-5.241968
Log likelihood	57.15979	Hannan-Quinn criter.	-5.448442
F-statistic	0.603910	Durbin-Watson stat	1.654368
Prob(F-statistic)	0.666201		

Appendix 4 Diagnostic Test – Relationship 1

Jarque-Bera test for Normality



Breush-Godfrey Serial Correlation LM Test

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	4.128341	Prob. F(1,13)	0.0631
Obs*R-squared	4.579455	Prob. Chi-Square(1)	0.0324

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 08/29/17 Time: 09:31
Sample: 1996 2014
Included observations: 19
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	0.038609	0.061196	0.630918	0.5390
C(2)	-1.466162	0.783886	-1.870378	0.0841
C(3)	-0.004343	0.022372	-0.194122	0.8491
C(4)	-0.007512	0.006171	-1.217307	0.2451
C(5)	-0.002289	0.003987	-0.574127	0.5757
RESID(-1)	1.622457	0.798519	2.031832	0.0631

R-squared	0.241024	Mean dependent var	-6.94E-18
Adjusted R-squared	-0.050890	S.D. dependent var	0.012273
S.E. of regression	0.012582	Akaike info criterion	-5.661026
Sum squared resid	0.002058	Schwarz criterion	-5.362782
Log likelihood	59.77975	Hannan-Quinn criter.	-5.610552
F-statistic	0.825668	Durbin-Watson stat	1.652856
Prob(F-statistic)	0.553352		

Breusch-Pagan-Godfrey Heteroskedasticity Test

Vector Error Correction Estimates
Date: 08/29/17 Time: 10:05
Sample (adjusted): 1996 2014
Included observations: 19 after adjustments
Standard errors in ( ) & t-statistics in [ ]

Cointegrating Eq:	CointEq1
LNGDP(-1)	1.000000
CA_GDP(-1)	15.55300 (3.48312) [4.46525]
LNFDI(-1)	-0.250898 (0.09284) [-2.70240]
C	-23.69618

Error Correction:	D(LNGDP)	D(CA_GDP)	D(LNFDI)
CointEq1	-0.410421 (0.17224) [-2.38280]	-0.023498 (0.01128) [-2.08408]	0.937073 (0.99732) [0.93959]
D(LNGDP(-1))	0.690547 (0.23707) [2.91286]	-0.000570 (0.01552) [-0.03671]	-0.690697 (1.37268) [-0.50318]
D(CA_GDP(-1))	5.838931 (3.10425) [1.88095]	0.209364 (0.20321) [1.03030]	-26.52899 (17.9743) [-1.47594]
D(LNFDI(-1))	-0.131687 (0.03768) [-3.49499]	-0.001648 (0.00247) [-0.66817]	-0.548082 (0.21817) [-2.51220]
C	0.037589 (0.04177) [0.89986]	-0.001039 (0.00273) [-0.37982]	0.081058 (0.24187) [0.33513]
R-squared	0.572344	0.420546	0.543561
Adj. R-squared	0.450157	0.254987	0.413150
Sum sq. resids	0.429925	0.001842	14.41391
S.E. equation	0.175240	0.011471	1.014675
F-statistic	4.684151	2.540164	4.168054
Log likelihood	9.031707	60.83146	-24.33550
Akaike AIC	-0.424390	-5.876995	3.087947
Schwarz SC	-0.175854	-5.628459	3.336484
Mean dependent	0.023283	-0.001947	0.061139
S.D. dependent	0.236327	0.013290	1.324534

Determinant resid covariance (dof adj.)	2.36E-06
Determinant resid covariance	9.43E-07
Log likelihood	50.92992
Akaike information criterion	-3.466307
Schwarz criterion	-2.571576

Appendix 5: Long Run Effects of the VECM Model – Relationship 2

Appendix 6: Short Run Effects of the VECM Model – Relationship 2

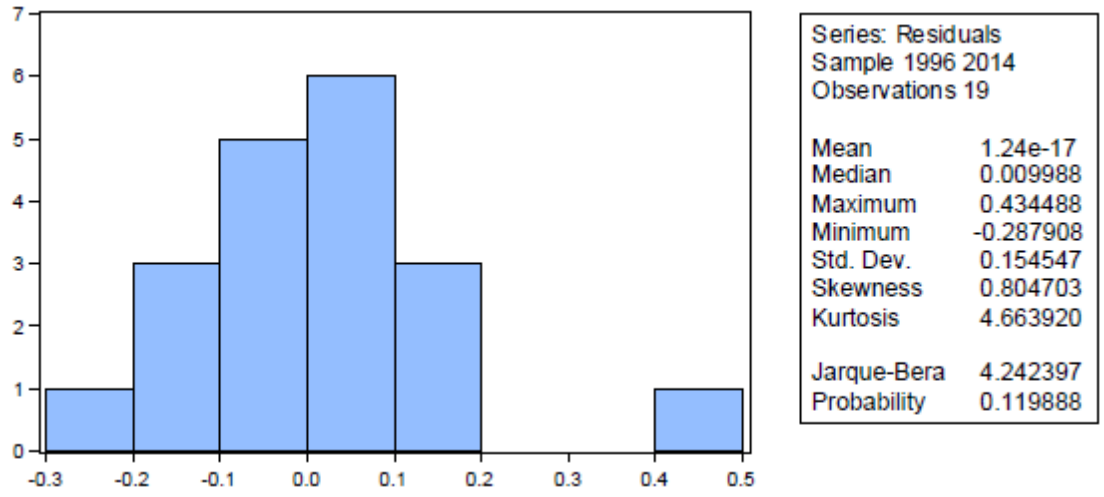
Dependent Variable: D(LNGDP)
Method: Least Squares
Date: 08/29/17 Time: 10:48
Sample (adjusted): 1996 2014
Included observations: 19 after adjustments
D(LNGDP) = C(1)*(LNGDP(-1) + 15.5529957171*CA_GDP(-1) - 0.250897631069*LNFDI(-1) - 23.6961835706) + C(2)*D(LNGDP(-1)) C(3)*D(CA_GDP(-1)) + C(4)*D(LNFDI(-1)) + C(5)

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	-0.410421	0.172243	-2.382798	0.0319
C(2)	0.690547	0.237069	2.912858	0.0113
C(3)	5.838931	3.104253	1.880945	0.0809
C(4)	-0.131687	0.037679	-3.494994	0.0036
C(5)	0.037589	0.041772	0.899856	0.3834

R-squared	0.572344	Mean dependent var	0.023283
Adjusted R-squared	0.450157	S.D. dependent var	0.236327
S.E. of regression	0.175240	Akaike info criterion	-0.424390
Sum squared resid	0.429925	Schwarz criterion	-0.175854
Log likelihood	9.031707	Hannan-Quinn criter.	-0.382328
F-statistic	4.684151	Durbin-Watson stat	2.026668
Prob(F-statistic)	0.013097		

Appendix 7 Diagnostic Test- Relationship 2

Jarque-Bera test for Normality



Breush-Godfrey Serial Correlation LM Test

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	0.022548	Prob. F(1,13)	0.8829
Obs*R-squared	0.032898	Prob. Chi-Square(1)	0.8561

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 08/29/17 Time: 10:55
Sample: 1996 2014
Included observations: 19
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	-0.009171	0.188746	-0.048591	0.9620
C(2)	0.034610	0.336963	0.102711	0.9198
C(3)	-0.241357	3.597665	-0.067087	0.9475
C(4)	-0.002999	0.043876	-0.068347	0.9465
C(5)	-0.001189	0.044030	-0.027010	0.9789
RESID(-1)	-0.067024	0.446348	-0.150160	0.8829

R-squared	0.001731	Mean dependent var	1.24E-17
Adjusted R-squared	-0.382218	S.D. dependent var	0.154547
S.E. of regression	0.181697	Akaike info criterion	-0.320860
Sum squared resid	0.429181	Schwarz criterion	-0.022616
Log likelihood	9.048170	Hannan-Quinn criter.	-0.270385
F-statistic	0.004510	Durbin-Watson stat	2.020432
Prob(F-statistic)	0.999995		

Breusch-Pagan-Godfrey Heteroskedasticity Test

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	2.439150	Prob. F(6,12)	0.0890
Obs*R-squared	10.43980	Prob. Chi-Square(6)	0.1073
Scaled explained SS	10.38382	Prob. Chi-Square(6)	0.1094

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 08/29/17 Time: 10:51
Sample: 1996 2014
Included observations: 19

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.954019	0.997194	0.956703	0.3576
LNGDP(-1)	-0.067519	0.038803	-1.740037	0.1074
CA_GDP(-1)	-0.038722	0.875196	-0.044244	0.9654
LNFDI(-1)	0.001147	0.012364	0.092769	0.9276
LNGDP(-2)	0.017359	0.049825	0.348406	0.7336
CA_GDP(-2)	0.777039	0.897646	0.865641	0.4037
LNFDI(-2)	0.022708	0.010839	2.095117	0.0580

R-squared	0.549463	Mean dependent var	0.022628
Adjusted R-squared	0.324195	S.D. dependent var	0.044499
S.E. of regression	0.036582	Akaike info criterion	-3.501229
Sum squared resid	0.016059	Schwarz criterion	-3.153278
Log likelihood	40.26168	Hannan-Quinn criter.	-3.442342
F-statistic	2.439150	Durbin-Watson stat	3.135524
Prob(F-statistic)	0.088960		

Appendix 8 Long Run Effects of the VECM Model – Relationship 3 Co-integrating equation

Vector Error Correction Estimates

Vector Error Correction Estimates
Date: 02/19/17 Time: 22:13
Sample (adjusted): 1996 2014
Included observations: 19 after adjustments
Standard errors in ( ) & t-statistics in [ ]

Cointegrating Eq:	CointEq1
LNGDP(-1)	1.000000
LNMC(-1)	-0.201983 (0.08112) [-2.49003]
LNFDI(-1)	-0.322699 (0.04635) [-6.96258]
LNCOMMP(-1)	-0.209371 (0.10190) [-2.05471]
LNEXCH(-1)	-0.931522 (0.29027) [-3.20916]
C	-11.52717

Error Correction:	D(LNGDP)	D(LNMC)	D(LNFDI)	D(LNCOMMP)	D(LNEXCH)
CointEq1	-0.575099 (0.14580) [-3.94437]	0.227416 (0.18297) [1.24293]	5.509169 (1.42414) [3.86842]	-0.141804 (0.33581) [-0.42227]	-0.359698 (0.14075) [-2.55561]
D(LNGDP(-1))	1.812725 (0.44467) [4.07659]	-1.558843 (0.55801) [-2.79357]	-4.501747 (4.34333) [-1.03647]	0.062480 (1.02416) [0.06101]	1.361821 (0.42925) [3.17254]
D(LNMC(-1))	-0.902508 (0.30494) [-2.95962]	-0.532927 (0.38267) [-1.39266]	4.842485 (2.97854) [1.62579]	-1.185957 (0.70234) [-1.68858]	-0.352971 (0.29437) [-1.19907]
D(LNFDI(-1))	-0.147225 (0.02693) [-5.46675]	0.077730 (0.03380) [2.29999]	0.237493 (0.26305) [0.90284]	-0.051149 (0.06203) [-0.82461]	-0.095786 (0.02600) [-3.68442]
D(LNCOMMP(-1))	0.195721 (0.22674) [0.86319]	0.727962 (0.28454) [2.55839]	-1.737466 (2.21473) [-0.78450]	0.617899 (0.52223) [1.18319]	-0.160136 (0.21888) [-0.73161]
D(LNEXCH(-1))	-2.088252 (0.55369) [-3.77151]	1.204342 (0.69483) [1.73330]	4.692678 (5.40824) [0.86769]	-0.312512 (1.27526) [-0.24506]	-1.352384 (0.53450) [-2.53019]
C	0.024459 (0.03587) [0.68183]	0.208739 (0.04502) [4.63692]	-0.072669 (0.35039) [-0.20739]	0.133838 (0.08262) [1.61988]	-0.049976 (0.03463) [-1.44316]
R-squared	0.778728	0.641215	0.768894	0.412363	0.636156
Adj. R-squared	0.668092	0.461823	0.653341	0.118544	0.454234
Sum sq. resids	0.076724	0.120823	7.319951	0.407001	0.071497
S.E. equation	0.079960	0.100342	0.781022	0.184165	0.077189
F-statistic	7.038657	3.574370	6.654040	1.403459	3.496863

Appendix 9: Short Run Effects of the VECM Model – Relationship 3

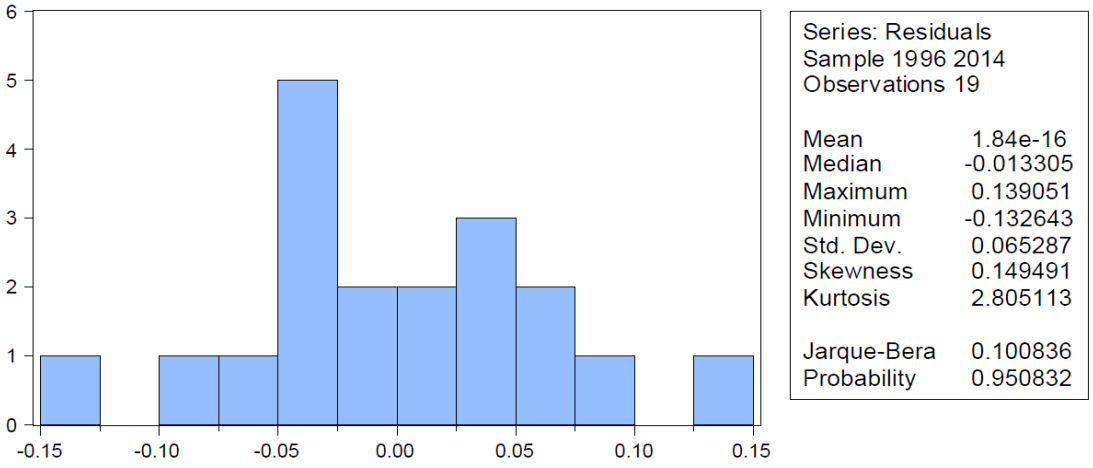
Dependent Variable: D(LNGDP)
Method: Least Squares
Date: 02/19/17 Time: 22:16
Sample (adjusted): 1996 2014
Included observations: 19 after adjustments
D(LNGDP) = C(1)*(LNGDP(-1) - 0.20198305267*LNMC(-1) - 0.322698825732*LNFDI(-1) - 0.209371432637*LNCOMMP(-1) - 0.931521749942*LNEXCH(-1) - 11.5271716477) + C(2)*D(LNGDP(-1)) + C(3)*D(LNMC(-1)) + C(4)*D(LNFDI(-1)) + C(5)*D(LNCOMMP(-1 + C(6)*D(LNEXCH(-1)) + C(7)

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	-0.575099	0.145802	-3.944373	0.0019
C(2)	1.812725	0.444667	4.076588	0.0015
C(3)	-0.902508	0.304941	-2.959618	0.0119
C(4)	-0.147225	0.026931	-5.466754	0.0001
C(5)	0.195721	0.226743	0.863185	0.4050
C(6)	-2.088252	0.553691	-3.771511	0.0027
C(7)	0.024459	0.035873	0.681833	0.5083

R-squared	0.778728	Mean dependent var	0.042909
Adjusted R-squared	0.668092	S.D. dependent var	0.138793
S.E. of regression	0.079960	Akaike info criterion	-1.937258
Sum squared resid	0.076724	Schwarz criterion	-1.589307
Log likelihood	25.40396	Hannan-Quinn criter.	-1.878371
F-statistic	7.038657	Durbin-Watson stat	1.969823
Prob(F-statistic)	0.002160		

Appendix 10 Diagnostic Tests – Relationship 3

Jarque-Bera test for Normality



Breush-Godfrey Serial Correlation LM Test

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.434974	Prob. F(1,11)	0.5231
Obs*R-squared	0.722739	Prob. Chi-Square(1)	0.3952

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 02/19/17 Time: 22:21
Sample: 1996 2014
Included observations: 19
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	-0.053917	0.170270	-0.316655	0.7574
C(2)	-0.085829	0.473746	-0.181171	0.8595
C(3)	-0.043763	0.319353	-0.137037	0.8935
C(4)	-0.008571	0.030496	-0.281052	0.7839
C(5)	0.128562	0.303234	0.423969	0.6798
C(6)	0.122157	0.596681	0.204727	0.8415
C(7)	0.006091	0.037891	0.160762	0.8752
RESID(-1)	-0.351123	0.532387	-0.659525	0.5231

R-squared	0.038039	Mean dependent var	1.84E-16
Adjusted R-squared	-0.574118	S.D. dependent var	0.065287
S.E. of regression	0.081912	Akaike info criterion	-1.870777
Sum squared resid	0.073806	Schwarz criterion	-1.473118
Log likelihood	25.77238	Hannan-Quinn criter.	-1.803477
F-statistic	0.062139	Durbin-Watson stat	1.694211
Prob(F-statistic)	0.999379		

Breusch-Pagan-Godfrey Heteroskedasticity Test

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	1.541374	Prob. F(10,8)	0.2760
Obs*R-squared	12.50808	Prob. Chi-Square(10)	0.2525
Scaled explained SS	4.503192	Prob. Chi-Square(10)	0.9218

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 02/19/17 Time: 22:23
Sample: 1996 2014
Included observations: 19

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.803646	0.380166	-2.113936	0.0675
LNGDP(-1)	0.095240	0.037321	2.551932	0.0341
LNMC(-1)	-0.026386	0.019581	-1.347522	0.2147
LNFDI(-1)	0.005654	0.002481	2.279102	0.0521
LNCOMMP(-1)	-0.011900	0.017364	-0.685349	0.5125
LNEXCH(-1)	-0.085294	0.038820	-2.197151	0.0593
LNGDP(-2)	-0.071739	0.038152	-1.880350	0.0969
LNMC(-2)	0.015798	0.021213	0.744721	0.4777
LNFDI(-2)	0.005285	0.002755	1.918296	0.0914
LNCOMMP(-2)	-0.008574	0.014321	-0.598716	0.5659
LNEXCH(-2)	0.123878	0.053367	2.321260	0.0488

R-squared	0.658320	Mean dependent var	0.004038
Adjusted R-squared	0.231221	S.D. dependent var	0.005574
S.E. of regression	0.004887	Akaike info criterion	-7.511442
Sum squared resid	0.000191	Schwarz criterion	-6.964661
Log likelihood	82.35870	Hannan-Quinn criter.	-7.418905
F-statistic	1.541374	Durbin-Watson stat	2.531262
Prob(F-statistic)	0.275956		