AN ANALYSIS OF THE IMPACT OF THE EXCHANGE RATE ON EXPORT PERFOMANCE IN NAMIBIA

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ABSTRACT

The purpose of the study was to analyse the effect of the exchange rate on export performance in Namibia. Furthermore, the researcher was to investigate if there is a relationship between the exchange rate and export performance. The objectives of the study were to examine whether there is a long run relationship between real effective exchange rate and export performance in Namibia, to determine the casual relationship between real exchange rate and export performance in Namibia as well as to suggest policies for the mitigation of the impact on the domestic economy. The theories on which this paper was based are Marshal-Lerner Condition, Exchange Rate Pass-Through and The Balance of Payments theory. To investigate the existence of a long run relationship between exchange rate and export performance in Namibia, the Engle-Granger two-step estimation technique was employed. The technique entails the determination of the long-term co-integration relationship through testing for stationarity of the residuals using Augmented Dickey Fuller (ADF) test. The study revealed that the variable exchange rate negatively affects export performance and that the coefficient is statistically significant. From the regression estimation it can be concluded that the theoretical proposition of the relationship between exchange rate and export performance is confirmed in the case of Namibia. A currency depreciation results in more exports while a currency appreciation results in a reduction in exports. Therefore, policy recommendations of the study included employing strong financial tools to hedge against change in the international market, such as: Accept the risk and transfer it through pricing, Avoid or minimise costly commodities, seek natural hedges and manage the risk through contracts.

DEDICATION

First of all, I would like to dedicate this research work to the Almighty God for the gift of life, divine provision and grace to complete this thesis successfully. Secondly, I would like to dedicate this research to my father Tate Onesmus Tobias Neumbo Amadhila for words of encouragement, for believing in me and for pushing me to greater achievements. I thank my dad for putting education first, even though he was not privileged enough to receive one in his days.

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I would like to give special thanks to all the people who agreed to participate in this study, by accepting to spare their valuable time for the interviews and questionnaires which were necessary to complete the research. I would like to extend my sincere appreciation to the

interviewed participants, questionnaire participants from BON, NSA, NPC, Ministry of Finance and all entities that contributed to this study.

LIST OF APPENDICES

DEFINITION OF TERMS

Exchange rate – Is defined as the price, the currency of a country can be exchanged for another country's currency

Export Performance – A Measure of the quantity of production exported.

Interest rate – The interest rate is the percentage of principal charged by the lender for the use of the lender's money. The principal is the amount of money lent. Banks pay depositors an interest rate on deposits because they borrow that money from depositors.

Inflation – Inflation is the rising price of goods and services over time. It's an economics term that means you have to spend more to fill your gas tank, buy a gallon of milk or get a haircut. Inflation increases your cost of living.

Foreign market Accessibility –Defined as foreign market access- is seen as representing the foreign market potential of a country. In that sense, it is a broader notion than the term "market access" as used in trade negotiations.

Forward contracts -

An agreement to buy or sell an asset at a certain date at a certain price.

Spot market – A market in which an asset bought or sold is delivered immediately.

Hedging exposure – A strategy designed to reduce investment risk using call options, put options, shorts selling or future contracts. A hedge can help lock in profit. Its purpose is to reduce the volatility of a portfolio by reducing the risk of loss.

LIST OF ABBREVIATIONS

GDP – Gross Domestic Product

SME – Small-Medium Enterprises

CMA - Common Monetary Area

SACU - Southern African Customs Union

NAD – Namibian Dollar

ZAR – South African Rand

BON – Bank of Namibia

USD – United States of America

NSA – Namibia Statistical Agency

NPC – National Planning Commission

MOF – Ministry of Finance

LDC – Lower Developing Countries

RCC- Roads Contractor Company

NAMDEB- Namibia Diamond Corporation (PTY) Limited

NAMCOR – National Petroleum Corporation of Namibia

VARDL –Co-integrations vector Autoregressive Distributed Lag

SPSS - Statistical Package for Social Science

NEEF – National equitable Economic Empowerment framework

NIPA – Namibia Investment Promotion Act

NCCI – Namibia Chamber of Commerce and Industry

NDP – National Development Plan

LIST OF FIGURES

LIST OF TABLES

TABLE OF CONTENTS

DECLARATION

I, Orodesia Amadhila, hereby declares that this study is my own work and is a true reflection of my research, and that this work, or any part of it has not been submitted for a degree at any other institution.

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Orodesia Amadhila Date

CHAPTER ONE

INTRODUCTION

1.1 Background of the study

Namibia belongs to the Common Monetary Area (CMA) which is characterised as a fixed exchange rate regime. This arrangement was formalised by the accession of Namibia, Lesotho, Swaziland, Botswana and South Africa to a multilateral trade agreement in 1990. The Namibian economy depends on the extraction and processing of minerals for export. According to the National Planning Commission, (2017), mining accounts for 12.4 percent of Namibia's GDP. Namibia is the fourth-largest exporter of non-fuel minerals in Africa and the world's fifth-largest producer of uranium. Rich alluvial diamond deposits make Namibia a primary source for gem-quality diamonds. Namibia also produces large quantities of lead, zinc, tin, silver, and tungsten. About half of the population depends on agriculture (largely subsistence agriculture) for its livelihood (Nelson, 2000)

A significant portion of Namibia's GDP comes from the extraction and processing of minerals for export, in particular diamonds and uranium. Mining accounted for 8.8 per cent of nominal GDP in 2010 and provided 40.6 per cent foreign exchange earnings. Rich alluvial diamond deposits make Namibia a primary source for gem-quality diamonds, and in 2010 approximately 1.5 million carats were recovered from Namibian mines.

Namibia is the world's fourth-largest producer of uranium, with almost 6,000 tons of ore containing uranium mined in 2010. Namibia also produces large quantities of zinc and smaller amounts of gold and other minerals such as copper and lead. Namibia's other principal economic sectors include fishing, manufacturing and agriculture. The country's principal exports include metal ores, diamonds, fish and manufactured products while its principal imports include machinery and equipment, transport equipment, food and beverages and chemical rubber and plastic products. As at the 1st of September 2011, Namibia's public debt was approximately N$16.8 billion, or 17.1 per cent of GDP. About a fifth of the debt is owed to bilateral and multilateral foreign creditors, while the rest is domestic debt.

Foreign Exchange Rate Fluctuation

This study employed exchange rate measured in real effective exchange rate (N$/US$). According to (Thomas, 2006) ever since the early 1970s, foreign rate exchange system had been a floating one in most countries. His findings revealed that, such nations permitted exchange rates to change in the market place from day to day as per market forces. Before this eventuality central banks of nations intervened in determinations of the exchange rate. This meant that international transactions were never subjected to exchange rate fluctuations risk and as such international transactions were less dynamic. He further stated that since the collapse of this exchange rate system it is markets forces that determine the exchange rate of a nation's currency. Thus such rates keep on fluctuating as per market forces and therefore exposing international transactions to exchange fluctuation risks.

Foreign currency exposures occur whenever a company has an income or expenditure or an asset or liability in a currency other than that of the balance-sheet currency. The exposures can arise even for companies with no income, expenditure, asset or liability in a currency different from the balance-sheet currency. When there is a condition prevalent where the exchange rates become extremely volatile the exchange rate movements destabilize the cash flows of a business significantly.

Export performance

Export performance is of paramount importance because it contributes to the economic development of nations by influencing the amount of foreign exchange reserves as well as the level of imports a country can afford. It enhances societal prosperity and helps national industries to develop, improve productivity and create new jobs. Lages and Montgomery (2014) found that exporting provides an opportunity for firms to become less dependent on the domestic market. By reaching new customers overseas, the firm may also explore economies of scale and achieve lower production costs while producing more efficiently. By export it means goods produced domestically and sold abroad.

1.2 Statement of the Problem

The Namibian economy is highly dependent on trade. Exports of minerals remain the main foreign exchange earner, followed by the agricultural products such as raw meat, processed meat products and fisheries. Manufacturers are considered as being the major sources of employment because of their earnings on exported products (National Planning

Commission, 2007). Any shock to the exports sector, affects both employment and foreign exchange earnings. Hence, it is important to investigate the impact of exchange rate on exports.

In 2014, the price of crude oil dropped significantly, directly affecting oil producing countries and indirectly affecting non-oil producing countries, in which category Namibia falls. The cause of the downturn, was the declining price of a barrel of oil caused by the appreciation of the U.S. dollar. The U.S. dollar has been the main driver for the price of crude oil, leading to appreciation in the U.S. dollar index and a reduction in oil prices. This has put the market under a lot of pressure, because when the value of the dollar is strong, the value of commodities falls. Global commodity prices are usually in dollars and fall when the U.S. dollar is strong. Namibia Heavily depends on exporting mineral products and any changes in the global market, affects the prices of national commodities and in turn reduces the country's foreign exchange earnings. This study will briefly analyse the impact of the downturn of crude oil on export earnings on commodities since 2014.

The research question driving this paper is to examine the relationship between exchange rate and export performance in Namibia. According to (Shipanga, 2009) "Exchange rate is known to create two effects, i.e. deficiency in domestic markets and the riskiness, which exporters encounter due to such fluctuation. These finally, are transmitted into the economy by means of trade imbalances which could affect the economic growth of the country".

1.3 Research objectives

The main objective of this study is to examine the impact of real exchange rate on export performance in Namibia. The following are the specific objectives of the study:

- To examine whether there is a long run relationship between real effective exchange rate and export performance in Namibia.
- To determine the casual relationship between real effective exchange rate and export performance in Namibia.
- To suggest policies for the mitigation of the impact on the domestic economy.

1.4 Significance of the study

This study intends to make four contributions to the following:

Namibian Government institutions and private entities

This work is expected to give an in-depth knowledge on the effects of the exchange rate on exports and the Namibian economic growth. This will assist in the designing of an exchange rate policy framework that would ensure a reduction in uncertainties in the exchange rate market to enhance the flow of trade and investment in order to facilitate economic growth. In addition, this work lays a foundation for further research into the effect of exchange rate on other macroeconomic variables. Finally, the research will come in handy in supporting the Government in their quest to streamline policies governing export mechanisms, considering that the economy as a whole, hinges on how the mining sector performs.

The Namibia Business School:

This study will be part of the library archives on economic factors which have an impact on the Namibian economy. To fellow researchers, this paper will indicate a gap for further research.

1.5 Limitations of the study

The availability of exchange rate data is relatively scarce. For that reason, the study covered the period of 1990-2017. Furthermore, the researcher encountered reluctance from respondents due to the nature and sensitivity of the study. This was because of company policy or politically motivated interests.

1.6 Delimitation of the study

Geographically, the study was conducted in the capital city Windhoek, with respondents representing Government Ministries, Agencies and Parastatals in Namibia. The respondents for the questionnaire and interviews were selected from the Bank of Namibia, Namibia Statistics Agency, the Ministry of Finance, National Planning Commission and the Namibia Petroleum Corporation. These were the entities responsible for managing national currency as well Export performance. National account Annual Reports, National Budget reports, Mid-year budget review reports, Growth at home ML pamphlets, and Investment plan reports were used as secondary data sources.

Conceptually, the study focused on the relationship between the exchange rate and the exports performance of Namibia during the period 1990-2017. The exchange rate and

exports performance theories that were discussed included, The Marshall-Lerner condition, The Exchange rate Pass-Through and The Balance of Payments Theory.

1.7 Outline of the thesis

Chapter one laid a foundation for the study. This thesis is structured in the following manner: Chapter two discusses the literature review both theoretical and empirical for studies done in Namibia and other countries and also the conceptual framework. Chapter three discusses the research methodology which includes data analysis, model specification and econometric techniques (Unit root, Co-integration, and Granger-causality tests) employed to estimate the impact of real exchange rate on export performance in Namibia. Chapter four presents and interprets the results of the thesis. The study used E-views 9 software for estimation of data purposes. Chapter five summarized the key findings, conclusion, policy recommendations and future direction on how to manage exchange rate fluctuations on export performance in Namibia.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter outlines existing literature together with prior empirical studies on the exchange change rate and export performance. Three theoretical perspectives, namely: Marshall-Lerner condition, Exchange rate Pass-Through and Balance of payment theory were discussed in context with the exchange rate. This allowed contextualisation of literature and for the researcher to establish a gap. A conceptual framework was built based on the relationship between the exchange rate and export performance.

2.2 Theoretical Review

2.2.1 Marshal-Lerner Condition

The Marshall-Lerner condition (also called the Marshall-Lerner-Robinson, hereafter, MLR, condition) is at the heart of elasticities approach to the balance of payments. It is name after the three economists who discovered it independently: Alfred Marshall (1842-1924), Abba Lerner (1903-82) and Joan Robinson (1903-83). The condition seeks to answer the following question: when does a real devaluation (in fixed exchange rates) or a real depreciation (in floating exchange rates) of the currency improve the current-account balance of a country? For simplicity assume that trade services, investment-income flows, and unilateral transfers are equal to zero, so that the trade account is equal to the current account.

Further, the MLR condition states that a real devaluation (or a real depreciation) of the currency will improve the trade balance if the sum of the elasticities (in absolute values) of the demand for imports and exports with respect to the real exchange rate is greater than one, $(\varepsilon + \varepsilon^* > 1)$. [Note: the real exchange rate is the relative price of foreign goods in terms of domestic goods. A real depreciation is equal to a nominal depreciation if the domestic price and foreign price levels remain unchanged].

As a theory the MLR condition lacks general equilibrium foundations. In particular, it considers the two markets (for importable and exportable) to be independent of each other. In a budget constraint, not all markets can be independent. So there must be at least one other market not accounted for by the MLR condition. In addition, from the absorption approach, we know that a country that has a current account surplus produces more than it spends.

2.2.2 Exchange Rate Pass-Through

Exchange-rate pass through (ERPT) is a measure of how responsive international prices are to changes in exchange rates. In other words, the degree of pass-through from the exchange rate to export prices can be defined as the percentage by which export prices, as measured by the home currency, rise when the home currency depreciates.

The degree of pass-through from the nominal exchange rate to export prices, which is measured by the foreign currency, might be different whether the home country's currency appreciates or deprecates Han and Suh (1996).

The pass-through from depreciation to domestic prices may be less than complete, which implies that the increase in the domestic price of the imported commodity may be smaller than the depreciation. This means that for example ten per cent depreciation in the domestic currency account may result in an increase in the domestic price of the imported commodity that is less than ten per cent. The reason behind this is that foreign firms are very cautious about their market share in a country and are not willing to lose it by raising their export prices by too much. The start-up costs are very high: it is very costly to plan and build or dismantle production facilities or to enter or leave a market. The firms absorb the price increase, to a certain extent, by lowering their profits. This is called the beachhead effect and is a sunk-cost model. The exporting firms might also believe that the depreciation is temporary and are therefore reluctant to increase the price by the full amount (Salvatore, 2004).

Sunk-cost models are models that explain why it might be optimal for a firm to not pass through an exchange rate movement to its domestic currency export price. It also explains why firms continue to supply markets even if the exchange rate movement is unfavourable. These models predict a slow adjustment of both trade quantity and prices which is referred to as trade inertia. Trade inertia is an exogenous variable and can be seen

as a "memory". There are several forces that may contribute to trade inertia such as: the time it takes for the market to clear, the time it takes for tastes to change and the time it takes for the trade contracts to resolve (Vesala, 1992). The sunk-cost models are based upon the observation that sunk costs are crucial for the decision making in a firm and it yields hysteretic results i.e. temporary shocks leave permanent effects. One of the implications in the sunk-cost models is that the firm can use a "wait and see" strategy: they remain in the current state and as time passes they receive more information so that they can make a more accurate decision. If the exchange rate changes to a large extent, firms will enter or exit the market depending on the direction of movement.

2.2.2 The Balance of Payments Theory

The balance of payments theory of exchange rate is also named as 'General equilibrium theory of exchange rate. According to this theory, the exchange rate of the currency of a country depends upon the demand for and supply of foreign exchange. If the demand for foreign exchange is higher than its supply, the price of foreign currency will go up. In case, the demand of foreign exchange is less than its supply, the price of foreign exchange will decline (Kanamori & Zhao, 2006). The demand for foreign exchange and supply of foreign exchange arises from the debit and credit items respectively in the balance of payments.

The demand for foreign exchange comes from the debit side of the balance of payments. The debit items in the balance of payments are (1) import of goods and services (2) Loans

and investments made abroad (Kanamori & Zhao, 2006). The supply of foreign exchange arises from the credit side of the balance of payments. It is made up of the exports of goods and services and capital receipts. If the balance of payments of a country is unfavourable, the rate of foreign exchange declines. On the other hand, if the balance of payments is favourable, the rate of exchange will go up, the domestic currency can purchase larger amounts of foreign currencies (Kanamori & Zhao, 2006).

2.3 Empirical Review Bronner *et al.,* (1997), provided estimates of positive long-run relationships between net foreign assets and the real exchange rate, using a variety of data. He showed that the relation between external wealth and the trade balance within and across countries is related to rates of return on external assets and liabilities and the rates of output growth. By controlling other determinants, they established a negative long run association between the trade balance and the real exchange rate. Moreover, they found that the trade balance coefficient is increasing in country size and they provided direct evidence that the relative price of non-tradeable stocks moves with the trade balance even when controlling for relative sectorial productivity.

(Herman, 1998)Tested the short-run and the long-run exchange rate effects on trade balance, the case of Columbia. He found that the exchange rate does play a role in determining the short and the long-term equilibrium behaviour of the Columbia trade balance. The estimation reported that there is one co integrating relationship between trade balance, exchange rate, money, and income. That is a long-run equilibrium relationship

between those variables exists. Moreover, the positive effect of exchange rate evaluation of the trade balance, seemed accompanied by reduction of stock of money and increase in income with respect to the short-run estimates, estimations revealed a significant positive short-run relationship between the trade balance and the exchange rate.

(Siegar & Rajan, 2002) in their study on Indonesia's trade performance in the 1990s had estimated the following export demand function:

$$X_t = f(Y_t^{foreign}, P_t, V_t) \quad \text{.....(1)}$$

Where (X_t) export volume, (foreign Yt) is foreign or world GDP, (Pt) is terms of trade, and (Vt) is a measure of exchange rate volatility. They acknowledged that exchange rate volatility indeed has adversely effects on exports. Todani, & Munyama, (2005) in line with Arize, et al., (2000) and de Vita and Abbott (2004) among others estimated the following export demand equation:

$$X = f(RP, INC, VOL) \quad \text{.....(2)}$$

Where (X) is real export, (RP) is relative price, (INC) is income in trading partner as indicator of potential demand and (VOL) is a measure of exchange rate volatility. This equation leads them to conclude that either exchange rate volatility does not have significant impact or it has a positive impact on aggregate and goods exports.

Hondroyiannis, et al., (2005) had estimated the following export demand function:

$$X = (Y, RP, OP, V) \quad \text{.....(3)}$$

Where; (X) is volume of export, (Y) is real GDP of trading partner, (RP) is relative price, (OP) is real export earnings and (V) is measure of exchange rate volatility. Their result presented a negative impact of exchange rate volatility on exports.

Kasimans, & Kasimans, (2005), in line with Asseery and Peel, (1991); Chowdhury, (1993); Arize, (1995, 1997) estimated the following equation:

$$X = f(Y, P, V) \quad \text{.....(4)}$$

Where, (X) is the desired volume of export, (Y) is real foreign income, (P) is relative price and (V) is a measure of exchange rate volatility. This equation led them to conclude that exchange rate volatility have a positive impact on exports.

Bravo-Ortega, & Giovanni, (2005) explored the Remoteness and real exchange rate volatility by estimating the following equation:

$$X = (Y, P, FDI, VOL) \quad \text{.....(5)}$$

Where, (X) is real exports, (Y) is real income, (P) is relative price, (FDI) is foreign direct investment and (VOL) is a measure of exchange rate volatility. They concluded that the effect of exchange rate volatility to exports is unambiguous.

Chit; et al., (2008) had revealed that early theoretical partial equilibrium models of riskaverse firms that are constrained to decide trade volumes before exchange rate uncertainty is resolved have suggested a negative effect of volatility on trade if hedging is not possible or is costly (Clark et al,, 1978). They estimated the following equation:

$$X = f(Y, Y^*, RP, Dist, Vol, CB, AFTA) \quad \text{.....(5)}$$

Where (X) is real exports, (Y, Y) are domestic and importing country's real GDP, (RP) is relative price, (Dist) is a set of gravity variables – the distance between two countries, (Vol) is a measure of exchange rate volatility, (CB) represent the sharing of common boarders and (AFTA) refers to membership to ASEAN Free Trade Area.

In a comprehensive survey of the literature on the impact of exchange rate volatility on trade flows, (McKenzie, 1999) concludes that the recent empirical studies have had "greater success in deriving a statistically significant relationship between volatility and trade". Calvo, & Reinhart, (2000) reviewed a more limited set of such studies and reached a similar conclusion. While a large number of these empirical studies have shown negative impacts of exchange rate volatility on total trade, exports and imports, some have also reported positive and insignificant consequences Siregar, & Rajan, (2002).

Exchange rates across the world have fluctuated widely particularly after the collapse of the Bretton Woods system of fixed exchange rates. Since then, there has been extensive debate about the impact of exchange rate volatility on international trade. The most commonly held belief is that greater exchange rate volatility generates uncertainty thereby

increasing the level of riskiness of trading activity and this will eventually depress trade. On other hand, theoretical models show that higher risk present greater opportunity for profits and, thus exchange rate volatility, to the extent that it increases risk, should increase trade Todani, & Munyama, (2005). However, the results by Todani, & Munyama, (2005) have shown the sensitivity of the models to the variable definitions used, which have led to their conclusion that, depending on the measure of volatility used, exchange rate volatility either does not have a significant impact on South Africa's exports flows or it has a positive impact on aggregate and goods exports.

Baum, et al., (2001) used to use foreign income uncertainty to address the potentially omitted variable bias in similar studies to investigate the impact of exchange rate uncertainty and also to consider the entry/exit costs as well as evaluating producer's real options to participate in international trade on trade performance. In particular, they argue that higher volatility of foreign income may signal greater opportunities, and thus may have important implications for exporters' behaviour. Therefore, including income volatility as well as the interaction term of foreign income volatility and exchange rate volatility helps them to capture any possible nonlinearities and/or indirect effects in the relationship between exchange rate uncertainty and bilateral trade. Furthermore, Baum et al., (2001) revealed that the relationship between exchange rate volatility and bilateral trade appears to be more complicated as the data support the concept that the link between exchange rate volatility and volume of exports is clearly not linear. In particular, for some country pairs considered, exchange rate volatility has a meaningful indirect effect on bilateral trade through the interaction with income volatility. They further demonstrate

that uncertainty in foreign income may itself play an important role in the determination of trade flows. Although the magnitude and sign of the effect of income volatility on trade varies across the bilateral relationships, it clearly differs from zero in many of those relations, implying that its effect must be considered.

According to Bahmani-Oskooee, et al (2006) in an effort to boost employment, a country could stimulate its exports and discourage its imports and thereby improve its trade balance. One policy that has received a great deal of attention in the literature is currency devaluation. By making exports cheaper and imports expensive, devaluation is said to improve the trade balance. The only condition required is that the sum of import and export demand price elasticities exceeds a unity, fulfilling the Marshall-Lerner condition, which is derived under the assumption of perfectly elastic supply of trade. Most previous studies that attempted to assess the Marshall-Lerner condition relied on price elasticities that were obtained by estimating aggregate import and export demand functions. These studies provided mixed conclusions as far as the effectiveness of devaluation or depreciation is concerned (Bahmani-Oskooee, et al., 2006. The mixed conclusion could be related to aggregation bias. When aggregate trade data are employed in import and export demand functions, significant price elasticity with one trading partner could be more than offset by insignificant price elasticity with another trading partner, yielding insignificant price elasticity.

Wang, & Barrett, (2006) had examined and explored the impact of the conditional mean and conditional variance of real exchange rates on Taiwan's exports by estimating an

innovative rational expectations-based multivariate GARCH-M model using sector- and destination-specific monthly data. By using more disaggregated data and attending to a variety of econometric issues that bedevil much of the existing literature on this high profile issue, they offered a new look at this longstanding question. Their main contribution was viewed as an improved econometric approach to investigating the link between exchange rate risk and export volumes. The most striking empirical finding was that they could not find any significant relationship between expected exchange rate volatility and trade volumes outside of the agricultural sector, where export variability were great and exchange rate volatility had a strong trade-dampening effect. Agriculture appeared far more responsive to both expected exchange rates and to the expected volatility in the exchange rate than do other sectors in Taiwan's economy. Even in the agricultural sector, however, their results showed that failure to attend to issues of nonmorality in the regression residuals seems to lead to substantial overstatement of the negative effect of exchange rate risk on trade flows and that the effects of expected exchange rate levels on export volumes were a complex mix of negative and positive effects over months.

Summary of the Empirical Literature

Several empirical studies such as Ethier, (1973); Clark, (1973); Baron, (1976); Cushman, (1986); Peree, & Steinherr (1989) have shown that an increase in exchange rate volatility will have adverse effects on the volume of international trade. Other studies have

demonstrated that increased volatility can have ambiguous or positive effects on trade volume: for instance, Viaene, & de Vries, (1992), Franke, (1991) and Sercu, & Vanhulle, (1992). But numerous studies have been conducted to investigate whether trade is influenced by exchange rate volatility. It is widely believed that increased exchange rate volatility inhibits the growth of foreign trade. Negative effects of exchange rate uncertainty on trade flows are reported by many authors. They have all found that exchange-rate risk depresses trade flows. However, studies by Hooper, & Kohlhagen, (1978); Gotur, (1985); Bailey et al., (1986, 1987); McKenzie, (1998); Aristotelous, (2001); Bailey, & Tavlas, (1988); Bahmani et al., (1993); and Gagnon, (1993); among others, did not find any significant relationship between exchange-rate volatility and trade. On the other hand, McKenzie, & Brooks (1997); Klein (1990); Franke (1991); Giovannini (1988); Brada and Mendez (1988); Asseery and Peel (1991); Kasman, & Kasman, (2005); Sercu, & Vanhulle, (1992); Doyle, (2001) and Bredin et al., (2003) have found positive effects of exchange rate volatility on trade.

Imalwa & Sheefeni (2017) investigated the impact of exchange rate on exports in Namibia for the period 1991: Q1 to 2014: Q4. The authors used the time series approach which included techniques such as unit root test, co-integration and Autoregressive Distributed Lag (ARDL). The study concludes that there is a positive relationship between exchange rate and exports in Namibia.

Hondroyiannis, Swamy, Tavlas & Ulan (2005), further presented an alternative scenario for possibilities of increasing trade through exchange volatility:

(i) Firstly, exporters may gain knowledge through trade that might help them anticipate future exchange rate movements better than can the average participant in the foreign exchange market. If this holds, then profitability of this knowledge could be used to offset the risk of exchange rate volatility. If exporters wish to hedge long-term investment or other transactions, rather than use the forward exchange market, they can borrow and lend in local currency to offset their other commitments. For example, a plant in a foreign country can be financed mainly with local capital, so that investors limit their exchange risk in the basic investment.

(ii) Secondly a counter-argument of a special greater weight is that one must specify the alternative to exchange-rate volatility. If the volatility is attributable to fundamental factors influencing the exchange rate, intervention by the authorities to reduce it would be unsustainable and eventually disruptive. To achieve a reduction of apparent, observed volatility, authorities would have to intervene with exchange controls or other restrictions on trade and payments. That intervention could be more harmful to trade, and reduce it more, than would unrestrained movement of the exchange rate.

(iii) Thirdly, variability of an exchange rate does not measure the effect that added amounts of foreign currency have on the overall riskiness on the firm's asset portfolio. The latter risk effect depends on the covariance of an exchange rate on the prices of the firm's other assets as well as the own variance of the exchange rate. In particular, the firm may hold a portfolio of several foreign currencies, thereby diversifying the risk. If variations in one currency's exchange rate against the home currency are negatively

correlated with the variations in others, its variability reduces portfolio risk, rather than increasing it when that currency is added to the portfolio. In general, variance by itself does not measure the exchange risk.

(iv) Finally, if firms can adjust factor inputs in response to movements in the exchange rate, increased variability may create opportunities to raise profits. That is, movements in exchange rates represent not only risk, but also potential reward. If a firm adjusts inputs to both high and low prices in order to take advantage of profit opportunities when prices are relatively high, it's expected (or average) profits will be higher, the higher the exchange rate volatility is, because the firm can sell more when the price is high and less when the price is low. If risk aversion is relatively low, the positive effect of greater price volatility on expected profits may outweigh the negative impact of higher profits, and the firm will produce and export more (Clark, Tamirisa, Wei, Sdikov, and Zeng & Rajan 2004).

As pointed out by Garwe, (2005), exporting goods can be viewed as an option, whereby the value of the option, rises when the volatility of the underlying asset increases. When the exchange-rate becomes more favourable, the firm exercises its option to export. According to Dehdashti, (2007) considering the importance of the issue, different studies in various countries in the field of identification of effective factors on exports performance in various industries have been done. In each of these studies, variables were under consideration that in the researcher's point of view have an effect on exports performance directly or indirectly. Deal, Menguch & Myers, (2000) considered firm

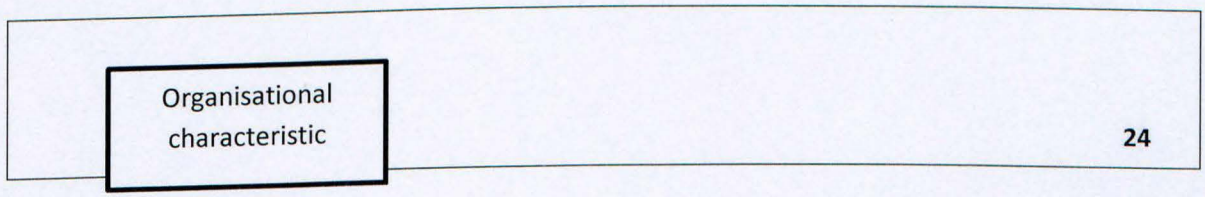
characteristics (size, perceived entrance barriers and the firm's background in business), firm competency (exports experiment) and exports market experiments (focus on market against variety and being active instead of being passive) on exports performance of the company.

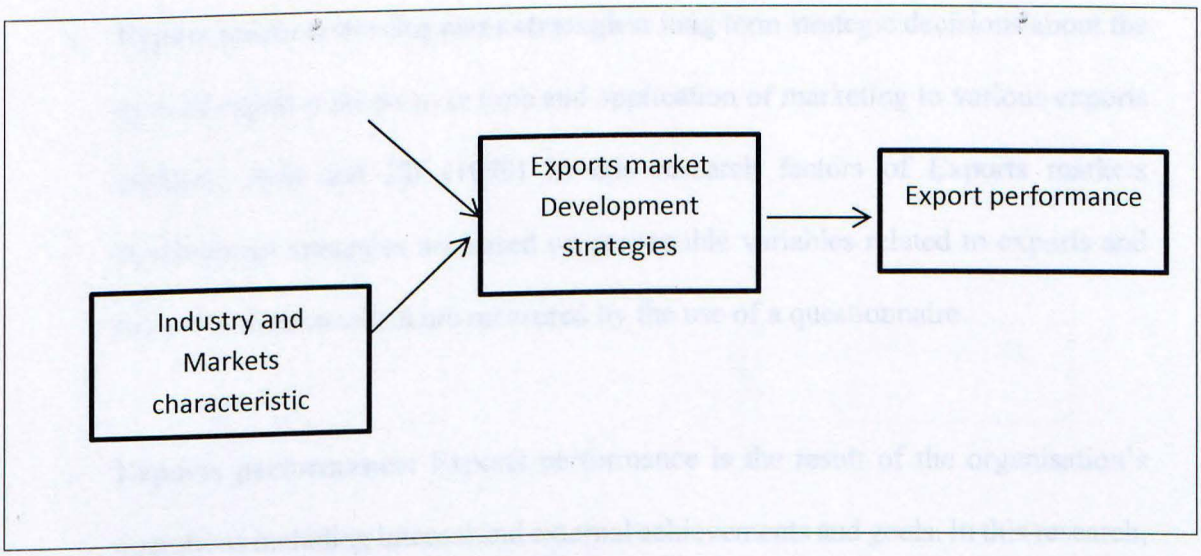
Baldauf, Cravens& Wagner, (2004) by developing a model, considered the relationship between the environment's characteristics (social, cultural and political), firm's characteristics (demographics and management motivations) and business strategies (diversification with low cost) with exports performance. Deal, (2000), Shoham, Evangelista & Albaum, (2002) classified firms into 3 categories of defenders, analysts and seekers (enthusiasts) and then identified various variables effective on each of the firm's exports performance. In this study, they found out that in an analysis of firms, there is a relationship between production of new products, production management, market orientation and control strategies on one hand and exports performance on the other hand considered the effect of having market orientation on sales and profit, Shoham, (2002). In Katsikea, Leonidou & Morgan, (2002) Introduce a model introduced 3 variables as effective variables on exports performance and that have an indirect effect by influencing management support, (Katsikea, 2002). Leonidou, Katsikea & Samiee, (2000), after further analysis of previous works, proposed a model in which factors are classified into five categories (management characteristics, organisational factors, environmental pressure, exports goal setting and components of export marketing strategies).

The three first factors influence the last two and the last two have a direct effect on export performance. In this step a product prototype, (or a limited number of it) is produced. In cases in which technical knowledge about product is augmented, this step may not be necessary and by technology transfer, its production will be possible. However, for the products which are produced for the first time and technology transfer is not possible, this step is necessary. The key factor in this step is having effective factors of product development, such as related technologies (software, hardware, mindware) and appropriate capital. If it is possible, it is better to have customer feedback, (Leonidou, 2002). The key success factors are expert knowledge, adequate capital, having related technologies in labs and continuity in the customer/market feedback relationship.

Product development is considerable change in current product or production of new but related product that can be distributed by existing distribution channels. Product development strategy is often applied in order to use the firm's brand and attract customers who have good experiences from using the firm's former products. The product development strategy is the firm's plan to produce its own product and has various aspects which are active simultaneously to generate a new strategy for developing new products. Although in many cases, firms produce new products only because of their innovation and profitability and without any specific strategy but in the long term, production without strategy will cause wasting resources (Bazargan, (2004).

Figure 1:Other factors which affect the performance of exports





Research Model adapted from Cooper and Kleinschmidt, 1985

- Organisational **characteristics:** Factors that are related to the organisation and where the organisation has direct control on them, Aker, (2010). Factors of organisational characteristics in this research are management commitment, exports policies, knowledge about export markets and educated exports staff that are measured by questionnaires.

- **Industry and markets characteristics:** Trends and events that are out of the organisation's control (Aker, 2010). In this research, factors of industry and market characteristics are applied technology, fiscal policies, understanding of foreign trade trends and intense competition in foreign markets which are measured by questionnaire.

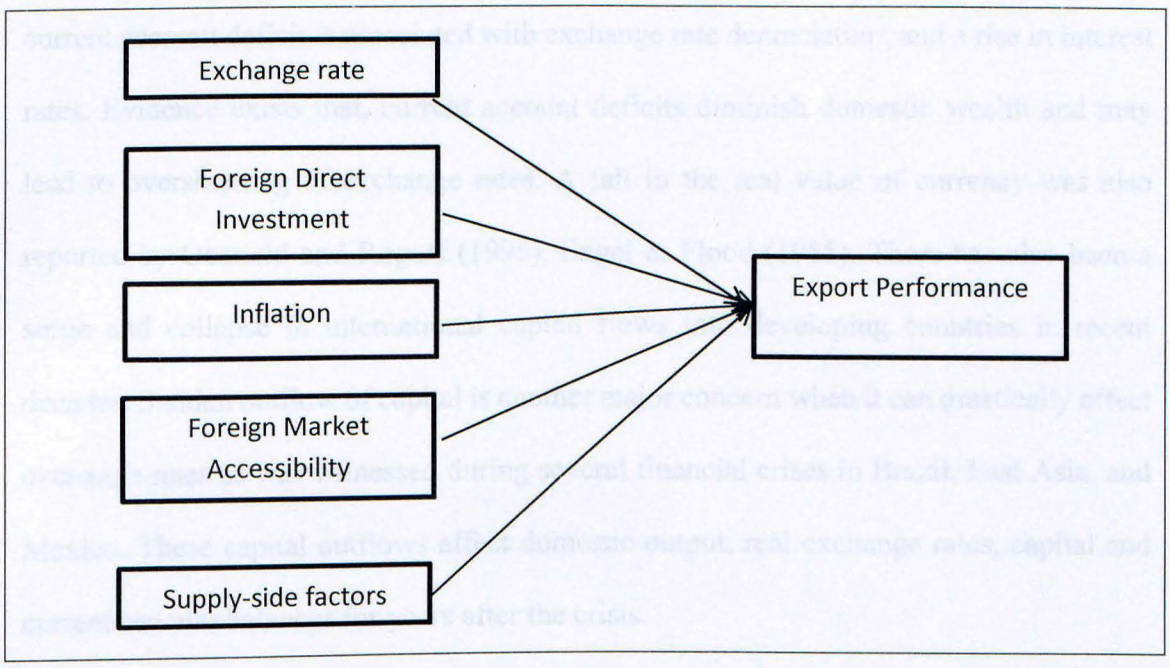
- **Export markets development strategies:** long term strategic decisions about the span of export markets over time and application of marketing to various exports markets. Ayal and Zif (1979) In this research factors of Exports markets development strategies are based on perceptible variables related to exports and market condition which are measured by the use of a questionnaire

- **Exports performance:** Exports performance is the result of the organisation's operations including internal and external achievements and goals. In this research, exports performance is defined as the achievement of the organisation goals and product and market developments which are the cause of the firm's profitability. Exports performance, is measured in two formats: exports level and exports growth. They are measured by the use of a questionnaire.

The literature further showed that a similar study was conducted by Imalwa and Sheefeni (2017). However, this study differs from that in the sense that this study used the real effective exchange rate as opposed to the real exchange rate value used in that paper. The reason is that the real effective exchange rate index takes into account trade. More so, the study period differs completely and the additional explanatory variables are also completely different from the ones used in the above-mentioned study.

2.4 Conceptual framework

Figure 2: Other variables which affect Namibia's exports performance



Interest Rates

Interest rates, inflation and exchange rates are all highly correlated. In manipulating interest rates, central banks exert influence over both inflation and exchange rates and changing interest rates impacts inflation and currency values. Higher interest rates offer lenders in an economy a higher return relative to other countries. Therefore, higher interest rates attract foreign capital and cause the exchange rate to rise. The impact of higher interest rates is mitigated, however, if inflation in the country is much higher than in others, or if additional factors serve to drive the currency down. The opposite relationship exists for decreasing interest rates - that is, lower interest rates tend to decrease exchange rates (Bergen, 2010).

Karfakis and Kim, (1995), using Australian exchange rate data found that unexpected current account deficit is associated with exchange rate depreciation, and a rise in interest rates. Evidence exists that, current account deficits diminish domestic wealth and may lead to overshooting of exchange rates. A fall in the real value of currency was also reported by Obstfeld and Rogoff (1995), Engel & Flood (1985), There has also been a surge and collapse in international capital flows into developing countries in recent decades. Sudden outflow of capital is another major concern when it can drastically affect exchange rates as was witnessed during several financial crises in Brazil, East Asia, and Mexico. These capital outflows affect domestic output, real exchange rates, capital and current account balances for years after the crisis.

Inflation Rates

As a general rule, a country with a consistently lower inflation rate exhibits a rising currency value, as its purchasing power increases relative to other currencies. During the last half of the twentieth century, the countries with low inflation included Japan, Germany and Switzerland, while the U.S. and Canada achieved low inflation only later. Those countries with higher inflation, typically see depreciation in their currency in relation to the currencies of their trading partners. This is also usually accompanied by higher interest rates Bergen (2010).

Foreign Market Accessibility

Access to foreign markets is a critical determinant of export performance. Here, the term "foreign market access" is seen as representing the foreign market potential of a country. In that sense, it is a broader notion than the term "market access" as used in trade negotiations. It relates directly to the characteristics of the trading partner countries, such as the size of their market and transport facilities, and inversely to their own internal transport costs. It also depends positively on the size of the export basket and the number of differentiated items and their prices, which in turn are affected by market entry conditions. Trans-border costs, which also include tariff and non-tariff barriers, have the expected negative impact on foreign market access. Therefore, Enhanced market access can induce a supply response.

An important step in improving market access, requires the further lowering of trade barriers for developing countries at all stages of development. Actions include tackling high tariffs, and tariff peaks and escalation facing items of export interest to developing countries' agricultural and non-agricultural exports; undertaking commercially meaningful reform in agriculture, including substantial improvement in market access for developing countries, phasing out of export subsidies and substantial reduction in trade-distorting domestic support; liberalizing of service sectors and modes of supply of export interest to developing countries, particularly Mode 4 of the GATS; providing adequate and operational special and differential treatment. These are issues that need to be addressed in the WTO Doha Work Programme if it is to fulfil its development goals, but progress so far has been slow.

Supply-side factors

According to Fugazza, (2004), supply-side constraints are receiving increasing attention as a constraint on lifting the trade performance of many developing countries. This is one of the reasons why developing countries, especially the LDCs, are often unable to take up opportunities for trade under preferential trading regimes, such as the generalised system of preferences (GSP.9). The main components of supply capacity are internal transport costs and factors affecting cost of production. The latter are strongly related to domestic market structure and the institutional framework.

The macroeconomic environment also has an important role in shaping supply capacity. The relative evolution of supply capacity is slightly more differentiated than that of foreign market access (figure 2.3). Asian economies show the largest relative increase in their supply capacity in the 1980s and the lowest relative fall at the beginning of the 1990s. The best performers over the two decades were Taiwan Province of China and Singapore. Figures reported in table 2.2 indicate that the bulk of the growth in supply capacity occurred in the 1980s. The Chinese and the Philippines' supply capacities grew outstandingly in the period 1992-99. Asian countries were also the best performers in relative terms over the two decades.

The impact of Currency fluctuation in small to medium business/companies

Small to medium businesses, especially those that deal with importation or exportation, always have low capital, which needs to be well managed and utilized in order to produce a reasonable profit. Poor management will disturb profitability, to the extent of the company collapsing if the currency fluctuation is very high and appears frequently in the economy. Small to medium businesses with low capital, utilise low technology and are not capable of hiring expert or skilled personnel who are able to advise and implement proper techniques to control currency fluctuation in the economy. SMEs are highly exposed to risk due to currency fluctuations, simply because exchange rates tend to vary on a daily basis, depending on business environment in the economy. Inflation also plays a great role in disturbing and creating a non-conducive environment to the business Vick, (2009).

The Impact of Currency fluctuations in large companies

For Large entities, exchange rate fluctuation also tends to disturb their business, but not to the large extent, due to the fact that, they are capable of hedging exchange rate fluctuations so as to reduce the impact expected to be experienced by the export and import oriented business. Big organisations have got huge capital and investment funds of which they can spend on reducing and eliminating the risk through hedging of currency in forward markets and market derivatives. Accordingly, McDonalds saw sales in Europe increase in 2011 but the yearly profits were usually down as a result of marketing using the Euro Calvo and Mishkin (2003).

How to reduce the impact of currency fluctuation to an import/export-oriented business/country.

Most businesses prefer to control currency fluctuation by hedging their currency against their neighbour or foreign currency for the purpose of reducing risk and investment cost, especially for international investment and business. The following technique, effectively utilized by a large company that deals with export and import business can successfully reduce the risk of exchange rate on export and as the same time increasing return on earning on exchange rate Allayannis and Ofek (2000).

- **Forward contract**

  In a forward contract, the company prefers to enter into agreement with a foreign company by setting exchange rates which are to be applied in future transactions in advance, in the sense that, current exchange rate is fixed for the purpose of exchange in the future. For this situation if the exchange is fixed, then the company benefits by escaping from risk expected to occur due to currency fluctuations resulting from various reasons, such as inflation or political instability.

- **Spot market;**

  Some importers/exporters prefer and agree the exchange rates to be a spot rate, in the sense determined at the time the transaction is being conducted or concluded, but it is very risky because, sometimes one company could agree to transact by using the currency of another company's country. For this case the company paid

by his own currency will always benefit in this trade, compared to his partner (Banking and financial institution Act 2006).

Speculation: For this case, the businessman tends to forecast the future business environment regarding exchange rate fluctuations to the extent of being in a position of either to buy much of the currency of the country which is expected to appreciate in the future against another foreign currency for the purpose of attaining profit, forecasting of the future business environment requires sufficient knowledge of understanding the determinants of the exchange rate and other factors influencing currency fluctuation. (Foreign exchange Act 1992)

- **Hedging exposure**

  Most companies seek at least to maintain their market position Porter, (1980) which means, in order to at last stay in business, must keep and create customers, this is the primary purpose of the business profit follow. Drucker, (1983) emphasize the customer ultimately pay for satisfaction and not for product parse. Lorenz, 1984.

Summary

The discussion in this chapter revealed that in a perfectly competitive world, exchange rates play a crucial role in determining the competitiveness of exports. Countries with weaker currencies, enjoy a competitive advantage relative to those with stronger currencies. Stronger currencies are, however, not necessarily responsible for poor export performance. The literature, further demonstrates that the foreign exchange market is stable if the sum of the price elasticity of demand for imports and exports is greater than

one, in absolute terms. The following chapter introduces the methodology used in the research.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter introduces the methodology techniques employed in the study to analyse the relationship between the exchange rate and export performance in Namibia. The chapter further discusses the data sources, the expected signs of the variables and a clear justification of the variables as well as model specification. The rest of the chapter is organised as follows: Section 3.2 Research design, Section 3.3, introduced model used to measure relevant variables, together with the tools used in data collection.

3.2 Research Design

The research used both qualitative and quantitative approaches: Quantitative method was used through the econometrics analysis to assess the relationship between exchange rate and exports performance. The Engle-Granger two-step estimation technique was employed. The technique entails the determination of the long-term co-integration relationship through testing for stationarity of the residuals using Augmented Dickey Fuller (ADF) test. Any non-stationarity is then corrected by means of a short-term error correction model (ECM). To determine the causal relationship between real exchange rate and export performance in Namibia, Granger Causality is tested. Qualitative method was used by considering the application of available data to give a descriptive analysis on the trend in exports performance in Namibia. It will also look at existing literature and harness the results of the econometric work for policy direction.

3.2 Model Specification and Econometric Framework

Following various literature review this study adopt the model by Hondroyiannis, et al., (2005), though modified to suit the Namibian situation as follows:

$$X_t = \beta_0 + \beta_1 \ln REER_t + \beta_2 \ln INF_t + \beta_3 INT_t + \beta_4 \ln GDP_t + \varepsilon_t \quad \ldots\ldots(7)$$

Where:

- X_t is the natural logarithm value of Namibia's total exports to the rest of the world in real terms at time t
- $REER_t$ refers to the real effective exchange rate at time t,
- INF_t represents the natural inflation rate at time t,
- INT_t represents the real interest rate at time t. In the study real interest rate was computed by subtracting the inflation rate (NCPI) from the deposit rate which is the nominal interest rate used. In addition, variable INT_t is not logged because it contains negative values.
- $\ln GDP_t$ refers to the natural logarithm of Gross Domestic Product at time t which is measured at market prices and
- ε_t Is the random error term which is introduced to accommodate the effect of other factors that affect real effective exchange rate and export performance in Namibia and are not included in the model.
- β_0 Refers to the intercept (constant term), β_1, β_2, β_3 and β_4 are the slope coefficients for REER, INF, INT and GDP while t shows the time trend. Below are expectation signs of the variables:

$$\beta_1 < or > 0, \beta_2 > 0, \beta_3 > 0, \beta_4 > 0$$

Where all the coefficients are accepted to be positively signed except the coefficient of

real effective exchange rate, which is expected to be either negative or positive. For example, if a country exports more than it imports, there is a high demand for its goods, and thus, for its currency. The economics of supply and demand dictate that when demand is high, prices rise and the currency appreciates in value. In contrast, if a country imports more than it exports, there is relatively less demand for its currency, so prices should decline. In the case of currency, it depreciates or loses value. As discussed earlier, a stronger domestic currency can have an adverse effect on exports and on the trade balance. Higher inflation can affect exports by having a direct impact on input costs such as materials and labour. In other words, a higher inflation in domestic country compared to the rest of the world means domestically produced goods are more than expensive than foreign goods so domestic country experiencing higher inflation ends up buying more of foreign goods. An increase in interest rates can lead to an appreciation of the currency as demand for the currency increases, the government increases interest rates to bring down inflation rates, this makes export price competitive, as a result exports increase. A high Gross Domestic Product is by no doubt expected to have a positive impact on Export performance of a country. When a country exports more this brings money into the country, which increases the exporting nation's GDP.

3.3 Estimation Techniques

3.3.1 Unit Root Test

A test of stationarity (or non-stationarity) that has become widely popular over the past several years is the unit root test. This is the first step in examining the long run

relationship between the variables to test whether the variables are stationary or non-stationary. Therefore, in order to avoid the problem of spurious regression the variables EXPORT, REER, INF, INT and GDP should be tested for unit root. The ADF test is used because it can handle more complex models than the Dickey-Fuller test, and it is more powerful. In addition, the ADF test adjusts the DF test to take care of possible serial correlation in the error terms by adding the lagged difference terms of the regressed. The ADF test here consists of estimating the following regression:

$$\Delta Y_t = \beta_1 + \beta_2 t + \delta Y_{t-i} + \sum_{i=1}^{m} \alpha_i \Delta Y_{t-i} + \varepsilon_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(8)$$

Where Y_t, represents the series of the time trend

t; time trend

Δ is the first-difference operator;

β slope coefficients and

δ Are the parameters to be estimated and

ε_t Is the pure white-noise disturbance term.

i

Equation 8 is a random walk with drift around a stochastic trend. In other words, it is a model which has an intercept and trend. Simultaneously, the ADF tests evaluate the unit root under the following hypothesis:

$H_0 : \delta = 0$ Series contain unit root (non-stationary), against,

$H_1 : \delta < 0$ Series contain no unit root (stationary)

In each case, the *null hypothesis* is that $\delta = 0$; that is, there is a unit root and that the time series is nonstationary. The alternative hypothesis is that δ is less than zero; that is, the time series is stationary. If the null hypothesis is rejected, it means that Y_t is a stationary time series with zero mean, that Y_t is stationary with a nonzero mean $[= \beta 1/(1 - \rho)]$, and that Y_t is stationary around a deterministic trend in (8).

3.2.2 Johansen Co-integration Test

After testing for unit root, the Johansen test for co-integration is the next step, employed. for estimating a long-run relationship between time series macroeconomic variables, as most of the macroeconomic variables, are nonstationary in their levels, trend over time and seem to follow random walk. Co-integration technique provides a means of identifying and hence avoiding spurious regressions generated by the nonstationary time series. In other words, it gives an indication as to whether the variables will converge in the long-run to some sort of equilibrium (Gujarati, 2004). The Johansen test takes its starting point in the vector auto regression (VAR) of order ρ given by:

$$y_t = \mu + A_1 y_{t-1} + ... + A_p y_{t-p} + \varepsilon_t \quad \text{.....(9)}$$

Where y_t is $n \times 1$ vector of variables that are integrated of order one-commonly denoted as I(1)-and ε_t is an $n \times 1$ vector of innovations. This VAR can be re-written as

$$\Delta y_t = \mu + \prod y_{t-i} + \sum_{i=1}^{\rho-1} \Gamma_i \Delta y_{t-i} + \varepsilon_t \quad \text{.....(10)}$$

Where; $\prod = \sum_{i=1}^{\rho} A_i - I$ and $\Gamma_i = -\sum_{j=i+1}^{\rho} A_j$. Both equations 3 and 4 are adopted form of equations from (Hjalmarsson & Osterholm, 2007). Further, they explained that, if the coefficient matrix $\prod$ has reduced rank $r \times n$, then there exist $n \times r$ matrices α and β each with rank r such that $\prod = \alpha\beta'$ and βy_t is stationary, r is the number of co-integration relationship, the elements of α are known as the adjustment parameters in the vector error correction model and each column of β is a co-integrating vector. It can be shown that for a given r, the maximum likelihood estimator of β defines the combination of y_{t-1} that yields the r largest canonical correlations of Δy_t and Δy_{t-1} after correcting for lagged differences and deterministic variables when present. Johansen (1988) proposed two different likelihood ratio tests for estimating the long-run relationships between variables. The trace test and maximum Eigen value test which are shown in equation 5 and 6 respectively:

$$J_{trace} = -T \sum_{i=r+1}^{n} \ln(1 - \lambda`_i) \quad \text{.....(11)}$$

$$J_{\max} = -T \ln(1 - \lambda`_{r+1}) \quad \text{.....(12)}$$

Where T the sample is size and $\lambda`$ is the $i:th$ largest canonical correlation. The trace test, tests the null hypothesis of r co-integrating vectors against the alternative hypothesis

of r co-integrating vectors. While, the maximum eigenvalue test, tests the null hypothesis of r co-integrating vectors against the alternative $r+1$ co-integrating vectors. Neither of these test statistics follows a chi square distribution in general; asymptotic critical values can be found in Johansen and (Juselius, 1990) and are also given by most econometric software packages. Since the critical values used for the maximum eigenvalue and trace test statistics are based on a pure unit-root assumption, they will no longer be correct when the variables in the system are near-unit-root processes (Johansen, 1995).

Despite the fact that, Johansen's methodology is typically used in a situation where all variables in the system are I (1), having stationary variables in the system is theoretically not an issue and Johansen (1995) states that there is little need to pre-test the variables in the system to establish their order of integration. If a single variable is I (0) instead of I (1), this will reveal itself through a co-integrating vector whose space is spanned by only stationary variables in the model. For instance, if the system in equation (3) describes a model in which $y_t = (y_{1,t}\ y_{2t})'$ where y_{1t} is I (1) and y_{2t} is I (0), one should expect to find that there is one co-integrating vector in the system which is given by $\beta = (0\ 1)'$. In the case where $\prod$ has full rank, all n variables in the system are stationary. Below is the null hypothesis for the two tests:

H_0 : time series not co-integrated

H_1 : time series co-integrated

2.2.3 Error Correction Model

The error correction model (ECM) combines the short run and the long run relationship of the variables in one equation. It confirms the existence of the long run relationship among the variables. The error term from the co-integration equation (8) corresponds to the deviation from the long run equilibrium relationship and can be used as the error correction terms in describing the short run dynamic specification. Consider the following model:

$$\Delta y_t = \beta_0 + \beta_2 \Delta \rho_t - \beta_2 [y_{t-1} - y_1 - y_2 \rho_{t-1}] + \varepsilon_t \quad \text{.....(13)}$$

A constant term is the short run elasticity, and it measures the impact of changes in Pt on Y_1If $\beta_1 = 0$, then t y is not responding to a deviation from the long run equilibrium in the previous periods. $[Y_{t-1} - Y_1 - Y_2 P_{t-1}]$ is the disequilibrium error in the previous periods, and it shows the adjustment toward the long run equilibrium. Hence, the VECM can be useful when dealing with integrated and stationary data.

2.2.4 Granger Causality Test

Finally, one of the specific objective of the thesis is to determine the causal relationship between real exchange rate and export performance in Namibia. The Granger Causality test is a statistical hypothesis test for determining whether one-time series is useful in forecasting another. As its name implies, Granger causality is not necessarily true

causality. In fact, the Granger-causality tests full fill only the Humean definition of causality that identifies the cause-effect relations with constant conjunctions. If both X and Y are driven by a common third process with different lags, one might still fail to reject the alternative hypothesis of Granger causality. Yet, manipulation of one of the variables would not change the other. Indeed, the Granger-causality tests are designed to handle pairs of variables, and may produce misleading results when the true relationship involves three or more variables.

The Granger-causality equations are specified as follows:

$$X_t = \sum_{i=1}^{k} \alpha_i REER_{t-i} + \sum_{j=1}^{k} \beta_j X_{t-j} + \varepsilon_{1t} \ldots\ldots\ldots\ldots\ldots\ldots (14)$$

$$REER_t = \sum_{i=1}^{k} \varphi i X_{t-i} + \sum_{i=1}^{k} \delta_j REER_{t-j} + \varepsilon_{2t} \ldots\ldots\ldots\ldots (15)$$

Where k is the optimal number of lags of real effective exchange rate and export performance, respectively, subscript t is the time period; i and j are the ith and jth year respectively, and the disturbances ε_{1t} and ε_{2t} are assumed uncorrelated. Equation (14) proposes that export performance is related to past values of itself as well as that of real effective exchange rate, and equation (15) assumes a similar behaviour for real effective exchange rate.

3.4 Data analysis

In what follows, the study describes these data. The dependent variables in the estimated equations are the Namibia's total exports to the rest of the world. There are problems involved in devising proxies for the independent variables. Theory tells us that income in trading-partner nations should affect a country's export. Due to fact that Namibia's economy is very small, the factor of income effect could not be established in this study since imports from Namibia to the rest of the world is believed to be very minimal compared to their total imports. Therefore, in this study the independent variable is the exchange rate volatility, considering Namibia real effective exchange rate. To construct an exchange rate volatility variable for this study, the proceeding is as follows. The independent variables used in the study are real effective exchange rate, price, GDP and world income. The construction of the exchange rate fluctuation is presented below.

3.4 Construction of Variable

As alluded before, exchange rate volatility is a measure that intends to capture the uncertainty faced by exporters due to unpredictable fluctuations in the exchange rates. Clearly, this is an unobservable variable and thus its measure is a matter of contention. Consequently, the literature is not unanimous as to which measure of volatility is most appropriate. This study presents three types of exchange rate volatility measures following methods appearing in the existing literatures.

3.7 Research ethics

Informed consent was first sought from all participants to ensure principles of transparency, honesty and respect for the other people's rights throughout the research.

Confidentiality was taken into account as emphasis that information would not be released to third parties without their consent was given to respondents. Yet again, the identity of the participants remained anonymous. Clearance to conduct this research was sought and given by the Namibia Business School of the University of Namibia. The clearance letter was shown to all participants.

The Table below summarises the ethical principle and reason for adoption

Table 1 Ethical Principles and Reasons for their Adoption Preece (1994)

Principles	**Reason for adoption**
1. Confidentiality	Needed to protect personal information.
2. Informed Consent	For identification and management of potential risks.

3. Anonymity	To protect respondents from being prejudiced and victimised.
4. Ethical approval	To protect research and participant rights and welfare

Summary

The chapter presented the methodology used in this study for estimation. Explained in details the data and illustrated how the data was constructed. It also presented the estimation techniques employed to address the data natures of stationarity and explain the techniques in details. Finally, it presented the data sources. The chapter to follow will present the findings and results of the study.

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1 Introduction

The previous chapter introduced the research methodology techniques of the study. Hence, this chapter presents the analysis of the estimation results, conducted using E-

Views 9 software package. Starting with the Augmented Dickey Fuller test for stationarity as shown by Table 1. Table 2 and 3 shows the results of the Johansen co-integration test using the Trace and Maximum Eigenvalue test. While, tables 4 and 5 shows the results of the Vector Error Correction Mechanism and Granger Causality results respectively.

4.2. Stationarity Analysis

Table 2 Augmented Dickey Fuller Unit Root Test

@ Levels					
Variable	**Test Statistic**	**5% Critical value**	**Probability**	**Order of integration**	**Remarks**
LEXPORT	-3.752**	-3.612	0.037	I(0)	Stationary
LREER	-2.732	-3.603	0.233	I(0)	Non Stationary
LINF	-3.784**	-3.612	0.035	I(0)	Stationary
INT	-5.078**	-3.644	0.002		Stationary
LGDP	-2.242	-3.595	0.448	I(0)	Non Stationary
@ First Difference					
D(LREER)	-3.489	-3.612	0.063	I(1)	Non Stationary

D(LGDP)	-4.539**	-3.603	0.007	I(1)	Stationary
@ Second Difference					
D(LREER,2)	-4.718**	-3.622	0.005	I(2)	Stationary

*Source: Author's compilation from E-views (version 9.0) Note: ** denotes rejection of the null hypothesis at 5% level of significance respectively.*

Table 2 shows the results of the unit root test which was conducted using the Augmented Dickey-Fuller test. The null hypothesis is that the series contains unit root, implying that it is non-stationary. The alternative is that the series does not contain unit root, meaning it is stationary. The null hypothesis can be rejected if the calculated value or test statistic is greater than the critical value at a particular level of significance, where in this case it is at 5% significance level. The results revealed that variables LEXPORT, LINF and INT have a combination order of integration zero I (0) and variables LREER and LGDP are integrated of order one I (1), with the exception of real effective exchange rate whose order of integration was strictly two meaning it was only found stationary at second difference. This affirmed that the ARDL approach is appropriate as it requires such. In the presence of variables that are integrated of order one, it might be possible that a linear combination of them might have some long run equilibrium. Therefore, the test for co-integration is necessary.

4.3.2 Co-integration Analysis

Following unit root test is the co-integration test. According to Gujarati (2004) Co-integration means that despite being individually nonstationary, a linear combination of

two/more time series can be stationary. In other words, Co-integration of two (or more) time series suggests that there is a long-run, or equilibrium, relationship between them. The use of co-integration technique allows the study to capture the equilibrium relationship between non-stationary series within a stationary model (Adam, 1998). For that reason, the Trace and Maximum Eigenvalue ratio tests were used to prove the existence of co-integration.

Table 3 Trace Test Results

Hypothesized No. of CE(s)	Eigenvalues	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None*	0.838	90.723	69.818	0.000
At most 1	0.651	45.147	47.856	0.087
At most 2	0.401	18.821	29.797	0.505
At most 3	0.208	5.986	15.494	0.697
At most 4	0.005	0.149	3.841	0.699

NB: Trace test indicates 1 co-integrating egn(s) at the 0.05 level
*denotes rejection of the null hypothesis at the 0.05 level
**Mackinnon-Haug-Michelis (1999) p-values

Table 4: Maximum Eigenvalue Test Results

Hypothesized No. of CE(s)	Eigenvalues	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None*	0.838	45.576	33.876	0.001

At most 1	0.651	26.325	27.584	0.071
At most 2	0.401	12.835	21.131	0.467
At most 3	0.208	5.837	14.264	0.634
At most 4	0.005	0.149	3.8414	0.699
NB: Max –eigenvalue test indicates 1 co-integrating egn(s) at the 0.05 level *denotes rejection of the null hypothesis at 0.05 level ** Mackinnon-Haug-Michelis (1999) p-values				

Source: E-views output

Table 3 and 4 shows the results for the Johansen co-integration tests (Trace and Max-Eigen) respectively. The null hypothesis is that there is no co-integration among the variables, simply translating into an absence of long run relationship. The alternative is that there is existence of a long run relationship. The results indicate that there's one co-integrated equation at 5% level using the Trace test and one co-integrating equation using the Maximum Eigenvalue test at 5% level, which denotes the rejection of the null hypothesis of no co-integrated equations and accept the alternative hypothesis, that there is at least one co-integration equation. Thus, by observing the Trace static value (90.72) which is greater than its critical value (69.81) or by observing that the p-value (0.000) for Trace test which is less than 5%. The same applies for the Maximum Eigenvalue test. In conclusion, this means that the variables have a long-run relationship association ship, where; EXPORT, REER, INF, INT and GDP are co-integrated. The results also answer one of the specific objectives of the study which aimed to find out whether there is a long run relationship between export and exchange rate and warrants for an estimation of the error correction model.

4.4 Vector Error Correction Model Analysis

Table 5: Error correction model results

	Coefficient	Standard Error	t-statistic	Probability
C(1)	0.050	0.208	0.244	0.811
C(2)	-0.217	0.405	-0.536	0.601
C(3)	0.433	0.442	0.980	0.346
C(4)	0.808	0.695	1.162	0.265
C(5)	0.185	0.847	0.218	0.830
C(6)	0.020	0.176	0.117	0.908
C(7)	-0.017	0.169	-0.102	0.920
C(8)	0.001	0.016	0.094	0.926
C(9)	0.003	0.016	0.185	0.855
C(10)	0.616	1.165	0.529	0.606
C(11)	0.502	0.982	1.529	0.152
C(12)	0.008	0.125	-0.065	0.948

$R^2 = 0.530, DW = 1.761, F - statistic = 1.232$

Upon establishing the existence of Co-integration, the error correction model was estimated as the results show in table 5. The results show the short-run coefficients from the VECM estimation. The coefficient (0.050) indicates that the model adjusts only 5% towards the equilibrium, this does not show a good model as the model adjusts by a very

small percentage. In other words, 5.96% implies that the model is adjusting slowly towards the long run equilibrium. Adding to that, the R-squared (0.530) of the model indicates a good model. Econometricians believe that the bigger the R-squared, the better the model.

The results in Table 5 reveal that the variable exchange rate negatively affects export performance and the coefficient is statistically significant. This is in line with the economic theory which suggests that currency depreciations lead to more exports due to the fact that domestic goods become cheaper in the international market. On the contrary, inflation positively affects exports. It can be attributed to the fact that inflation in Namibia has been very moderate over time. Hence, it posed no danger or harm to exports performance in the economy. However, when the variable inflation is lagged by two periods, then the effect remains positive and statistically significant. Similarly, the variable interest rate also positively affects exports performance, though statistically insignificant. This can also be attributed to the fact that interest rates in Namibia were not necessarily high to harm export performance.

The error correction term is positive and statistically insignificant. It shows that it takes about 14 quarters for the variables to converge to the long run equilibrium, taking into account the short run dynamics. Furthermore, the findings reveal that about 53% total variation in exports performance is due to the repressors. The Durbin-Watson value of 1.76 shows that there is no problem of serial or auto-correlation in the model.

From the regression estimation, it can be concluded that the theoretical proposition of the relationship between the exchange rate and exports performance is confirmed in the case

of Namibia. A currency depreciation results in more exports while a currency appreciation results in a reduction in exports.

4.5 VEC Granger Causality/Block Exogeneity Wald Test

Table 6: VEC Granger Causality/Block Exogeneity Wald Test

Dependent Variable: D(LEXPORT)			
Excluded	**Chi-square**	**Degrees of Freedom**	**Probability**
D(LREER)	0.370	2	0.831
All	0.370	2	0.831
Dependent Variable: D(LREER)			
D(LEXPORT)	0.011	2	0.994
All	0.011	2	0.994

Source: E-views Output

The VEC Granger Causality results shows that real effective exchange rate does not Granger causes export since the p-value (0.831) is greater than 5%. The results also revealed that export does not Granger causes real effective exchange rate as the p-value (0.994) is greater than 5% significance level. Therefore, the study failed to reject the null hypothesis that real effective exchange rate does not cause gross export in Namibia, leading to a conclusion that there is no causality between real effective exchange rate and export in Namibia and that the two variables are independent of each other. In addition, this answers one of the specific objectives of the study which is to determine whether there is causality between the two variables real effective exchange rate and export in Namibia.

CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

5.0 Introduction

This chapter concludes the investigation of the impact of the exchange rate on the export performance of Namibia. A summary of the whole study, which outlines each chapter, will be given. Thereafter, a summary based on key findings of each of the four objectives

of the study will be outlined. Lastly, recommendations for all objectives as well as recommendations for further studies will be given.

5.1 Summary of the Study

Chapter 1: Introduction - The first chapter laid the foundation for the study. The problem statement was presented together with objectives, limitations, and relevant key issues. The justification for the study was also presented as well as the expected contribution of the project to the researcher and Namibia at large. The chapter was concluded by giving the general layout of the study.

Chapter 2: Literature Review – The chapter presented dissenting views based on empirical studies done by past scholars on the relationship between the exchange rate and export performance. Four theories, namely; Marshall-Lerner condition, Exchange rate Pass-Through, Co-integrations vector Autoregressive Distributed Lag (VARDL) models and The Balance of Payments Theory, were used to analyse the impact of the exchange rate (independent variable) and exports performance (dependent variable). A gap from the literature was established. Thus, a conceptual framework was built.

Chapter 3: Research Methods - This chapter outlined the research design, population, sampling techniques, sources of data, data collection methods, data collection procedures, procedures to ensure validity and reliability as well as ethical considerations. The adopted methodology revealed the relationship between the exchange rate and export performance. The chapter to follow will present the findings and results of the study.

Chapter 4: Data Presentation, Analysis and Discussion - In this chapter data of findings on the relationship between exchange rate and export performance of Namibia was presented, analysed and discussed. The results of this research were categorized into two sections, namely; Section A - based on demographic data of respondents and Section B which outlined the findings on the objectives of the study.

5.2 Summary of Findings based on objectives of the study

Objective: To examine whether there is a long run relationship between real effective exchange rate and exports performance in Namibia.

Unit root test which was conducted using the Augmented Dickey-Fuller test. The results of the unit root test which was conducted using the Augmented Dickey-Fuller test. The null hypothesis is that the series contains unit root, implying that it is non-stationary. The alternative is that the series does not contain unit root, meaning it is stationary. The null hypothesis can be rejected if the calculated value or test statistic is greater than the critical value at a particular level of significance, where in this case it is at 5% significance level. The results revealed that variables LEXPORT, LINF and INT have a combination order of integration zero I (0) and variables LREER and LGDP are integrated of order one I (1), with the exception of real effective exchange rate whose order of integration was strictly two meaning it was only found stationary at second difference. This affirmed that the ARDL approach is appropriate as it requires such. necessary.

Co-integration test, indicated that the results for the Johansen co-integration tests (Trace and Max-Eigen) respectively. The null hypothesis is that there is no co-integration among the variables, simply translating into an absence of long run relationship. The alternative is that there is existence of a long run relationship. The results indicate that there's one co-integrated equation at 5% level using the Trace test and one co-integrating equation using the Maximum Eigenvalue test at 5% level, which denotes the rejection of the null hypothesis of no co-integrated equations and accept the alternative hypothesis, that there is at least one co-integration equation. Thus, by observing the Trace static value (90.72) which is greater than its critical value (69.81) or by observing that the p-value (0.000) for Trace test which is less than 5%. The same applies for the Maximum Eigenvalue test. In conclusion, this means that the variables have a long-run relationship association ship, where; EXPORT, REER, INF, INT and GDP are co-integrated. The results also answer one of the specific objectives of the study which aimed to find out whether there is a long run relationship between export and exchange rate and warrants for an estimation of the error correction model.

Upon establishing the existence of Co-integration, the error correction model estimated as indicated by table 5. The results show the short-run coefficients from the VECM estimation. The coefficient (0.050) indicates that the model adjusts only 5% towards the equilibrium, this does not show a good model as the model adjusts by a very small percentage. In other words, 5.96% implies that the model is adjusting slowly towards the long run equilibrium. Adding to that, the R-squared (0.530) of the model indicates a good model. Econometricians believe that the bigger the R-squared, the better the model.

Table 5 reveal that the variable exchange rate negatively affects export performance and the coefficient is statistically significant. This is in line with the economic theory which suggests that currency depreciations lead to more exports due to the fact that domestic goods become cheaper in the international market.

The error correction term is positive and statistically insignificant. It shows that it takes about 14 quarters for the variables to converge to the long run equilibrium, taking into account the short run dynamics. Furthermore, the findings reveal that about 53% total variation in exports performance is due to the repressors. The Durbin-Watson value of 1.76 shows that there is no problem of serial or auto-correlation in the model.

From the regression estimation, it can be concluded that the theoretical proposition of the relationship between the exchange rate and exports performance is confirmed in the case of Namibia. A currency depreciation results in more exports while a currency appreciation results in a reduction in exports.

Objective: To determine the casual relationship between real effective exchange rate and export performance in Namibia.

The VEC Granger Causality results shows that real effective exchange rate does not Granger causes export since the p-value (0.831) is greater than 5%. The results also revealed that export does not Granger causes real effective exchange rate as the p-value (0.994) is greater than 5% significance level. Therefore, the study failed to reject the null

hypothesis that real effective exchange rate does not cause gross export in Namibia, leading to a conclusion that there is no causality between real effective exchange rate and export in Namibia and that the two variables are independent of each other. Thus answer this specific objectives which is to determine whether there is causality between the two variables real effective exchange rate and export in Namibia.

It can therefore be concluded that exports in Namibia can stimulate increase economic growth, and economic growth will in turn lead to the ultimate survival of entrepreneurs if the costs of production and export incentives are given to various industries of the Namibian economy.

It is therefore imperative that, the government look at different measures to stimulate economic growth as outlined below:

Openness to trade was identified by Kumar and Pacheco (2010) as the key determinant of TFP growth in Kenya. They point out that, openness impacts on productivity and growth through the exploitation of comparative advantage, technology transfer and diffusion of knowledge, increasing scale economies and exposure to competition. Export performance in Namibia has been hampered by the relatively slow pace of transformation of the structure of the economy over the last two and a half decades. Thus, exports remain relatively less diversified, relying heavily on ores and minerals, with low value addition to the manufactured exports. Consequently, exports remain highly vulnerable to external shocks, particularly the low commodity prices and low demand from the rest of the world.

Foreign direct investment (FDI) inflows play a crucial role in the transfer of technology and knowledge spill over to the domestic market (Loko and Diouf, 2009). FDI inflows in key sectors are important for stimulating productivity growth and raising the growth potential in small middle-income countries. The abundance of mineral resources in Namibia has attracted FDI inflow into the mining sector, thus stimulating total factor productivity growth. Industrialization and sustainable economic growth will however require Namibia to attract FDI in the manufacturing sector in order to promote value addition and beneficiation.

Institutional and regulatory factors enhance productivity growth by providing an institutional environment conducive for efficient resource allocation. Regulatory burdens and barriers to starting businesses have potential to discourage investment thus impacting negatively on productivity growth (Loko and Diouf, 2009). According to the Global Competitiveness Reports (GCR), the ease of doing business and regulatory burden on firms is one of the areas that have undermined Namibia's competitiveness and thus potentially productivity growth. Therefore, regulatory reforms to increase the ease of doing business, improvement of access to finance and reforms to address administrative and other inefficiencies must be strengthened to enhance productivity.

Climatic conditions and weather-related shocks are important for an economy like Namibia that is dependent on the agriculture sector. These conditions directly impact on productivity of the agricultural sector and due to the interlinkage of the agriculture sector to other sectors of the economy, these impacts on overall productivity. There have been a

number of drought occurrences over the last two and a half decades and these have all impacted negatively on the economy.

Industrial structure is another factor that influences productivity growth in any economy. Kucera and Roncolato (2012) argue that high and sustainable economic growth requires structural transformation through changes in sectoral composition of output. That is, a shift from low productivity economic activities and sectors to high productivity sectors. Furthermore, less diversified economies are more vulnerable to external shocks, which can undermine productivity growth (IMF, 2014).

Despite a stable political environment and relatively sound solid macroeconomic fundamentals, the seemingly slow pace of economic structural transformation as represented by the slow change in industrial structure in the Namibian economy has partly been a restraint to achieving high and sustainable growth. There have only been small changes in the shares of the industries in GDP over the years, with the services, dominated by government services, accounting for over 50 percent of the GDP, the primary industry representing about twenty percent of GDP and the secondary industry representing less than twenty percent of GDP. The growth in the primary industries shows the highest variability over the years, owing to the changes in climate conditions and fluctuations in the international commodity markets. Furthermore, the structure of the economy's export is characterized by commodities (representing over a third of total exports) and manufactured products predominated by minerals products with low value addition, limited to mainly cutting and polishing of diamonds, copper and zinc refinery. All these

point to an economy whose production capacity is limited, with a small and less diversified manufacturing sector. This has resulted in a situation where most of the locally produced goods are exported while much of the local consumption demand is met by imports.

A Sound macroeconomic environment is undoubtedly a necessary condition and provides a supportive environment conducive for productivity enhancement and sustainable economic growth. Loko and Diouf (2009) and the IMF (2014) both suggest a concave relationship between the size of government and total factor productivity. That is, while a certain level of government spending is necessary for the provision of public goods and infrastructural development, the inefficiencies and most often low quality of public spending allocation and composition has the potential to impact negatively on factor productivity.

There has been a significant reduction in the annual rate of inflation, from an inflation rate averaging over 10 percent in the 1990s to an inflation rate around 5 to 6 percent over the last decade (excluding the years 2008 and 2009). However, despite this favourable trend in price stability, the rising level of government expenditure coupled with increasing debt level over recent years pose a threat to the economy's macroeconomic stability.

Quality of labour is important because this impacts on the efficiency with which the accumulated labour is utilised. The quality of the labour force is determined by formal education attainment and dependent on access but most importantly on the quality of the education system. Technological advancement comes with the need for a highly skilled labour force, therefore, technology-skill mismatch impacts negatively on total factor

productivity. Hence, the education system should be skills-demand oriented in order to ensure that there is no mismatch between the skills demand and supply in the economy.

Objective: To suggest policies for the mitigation of the impact on the domestic economy.

1. Promoting trade-in-services (in addition to tourism) would closely map into and produce synergies with the policy initiative to develop Namibia as a trade-transit hub for the southern African regional market.
2. Duty free access to markets of members of Southern African Customs Union.
3. Trade Development, which includes investment promotion; analysis and institutional support for trade in services; business support services and institutions; public-private sector networking; e-commerce; trade finance; trade promotion; and market analysis and development
4. Trade Policy and Regulations, which include training of trade officials; analysis of proposals and positions and their impact; support for national stakeholders to articulate commercial interest and identify trade-offs; dispute issues; and institutional and technical support to facilitate implementations of trade and to adapt to and comply with rules and standards.

5.3 Recommendations based on the Objectives of the Study

To assist the government in effectively managing and improving the effect of the exchange rate on the exports performance of the country in future, the researcher recommends the following:

5.3.1 Recommendation to examine whether there is a long run relationship between real effective exchange rate and export performance in Namibia.

The study recommends further research work on this topic drilled down to individual entities. Therefore, Government institutions and all companies trading internationally should explore avenues to enhance capacities for managing foreign currency risk exposure. Namibian government should develop clear industrial policy which should guide and motivate entrepreneurship and expansion on the manufacturing sector hence export is currently dominated by the mining products, fishing sector and beef sector. Manufacturing company should massively invest in technologies for value added products. This will promote exportation of finished products instead of exporting products in their raw forms. Companies should explore the route of continued education for those in workplaces through short term training that should be very practical oriented, this could involve professional organizations for finance specialists, bankers, accountants and consultants. As found out in this study, the exchange rate risk faced by firms, forms a significant component of risk profile on entities therefore it is imperative that Namibia and generally private entities with and without international operations effectively manage risk to minimize exposure to exchange rate risk. In an increasingly globalizing economy,

domestic corporations, suppliers, and customers are not protected from the effects of international economic cycles, currency movements, and global competition.

Furthermore, the Government should come up with strategies for diversification of export products and markets destination to meet the challenges of unemployment and poor export performance in time of global crisis.

Here are some of strategies government/ and companies can adapt to address commodity price risk especially those that correlate to financial exposure, such as a drop in oil price and the appreciation of the USD.

- **Accept the risk and transfer it through pricing.** The risk exposure can remain unmanaged as such. The company may then absorb any increasing commodity prices with all the effects that this would have on margins or may decide to transfer the exposure in part to its suppliers by changing supplier contracts or customers in order to increase end product prices.
- **Avoid or minimise Costly Commodities.** Companies may decide to reduce or replace product components that rely on costly commodities. This of course demands that product development processes and operations need to be adapted. In addition, the necessary changes to the supply chain must be reviewed and evaluated.
- **Seek natural hedges.** As mentioned above; some commodity price exposure may at times correlate with other financial exposures (for example oil and US dollar). While it is generally difficult to hedge actively based on these temporary correlations, their effect will need to be taken into account.
- **Manage the risk through contracts.** Provided that the company has a thorough understanding of the commodities markets, changes to contracts such as fixed or floating price agreements and the use of futures, options and other hedging instruments can enable the company to limit its price risk exposure.

5.3.2 To determine the casual relationship between real effective exchange rate and export performance in Namibia.

Some of the factors that need to be addressed in the Namibian economy in order to stimulate economic growth, as identified in this research paper, include structural reforms to ensure that skills development is enhanced in areas that are critical to economic development. This will require strong partnerships between industries and training institutions. Furthermore, economic structural transformation focusing on areas of Namibia's comparative advantage but most importantly driven by competitive advantage must be prioritized to drive industrialisation. Fiscal reforms must be enforced to address the high level of government expenditure and debt which can pose a threat to macroeconomic stability. Lastly, regulatory reforms to increase the ease of doing business, improve access to finance and reforms to enhance administrative capacity must be strengthened to enhance productivity

5.3.3 To suggest policies for the mitigation of the impact on the domestic economy.

The government of Namibia should make it a highest priority to stimulate economic growth through trading. The study suggests that, policymaker should use the following strategies and planning to boost export of the country:

- **Creation of duty drawback schemes,** Duty drawback scheme also known as surveys of entrepreneurs' opinions suggest, it's a measure that has proven to be successful in the past. Standard duty drawback schemes can be improved by:

(a) Making them accessible indirect exporters and extending them to imported inputs used in production of exported final products;

(b) Eliminating duty pre-payment for exporting firms in order to reduce credit requirements.

- **Increasing the availability of credit.** The government should simplify regulation related to exports; long bureaucracy procedures negatively affect especially new exporters. At the same time, Ministry of Trade Industry should improve information collection and dissemination about foreign markets and requirements for exporting. Actions in this category should also consider product standards and other technical requirements imposed for exporting to developed country markets.
- **Improving cooperation among economic actors.** Besides traditional policy instruments, export growth could be favoured by improving cooperation among exporters, government and business actors.
- **Combining short-term and long-term export growth policies.** The stimulation of export growth requires the combination of short- and long-term policies. In this context, it is important to also exploit the complementarity between EPPs and other domestic policies (aimed, for instance, at enhancing productivity and technological content of domestic products).

5.4 Conclusions based on Objectives of the Study

The study find a negative relation between exchange rate and export performance which indicate that there is exchange rate has any effect on Namibian economy; the study thus

concludes exchange rate fluctuations affect country earnings depending on the extent to which a country is involved in trade, in terms of either exports or imports, the competitive environment within which a firm operates, and the extent of foreign exchange exposure of a firm's balance sheet. In the end, the link between firm profits and exchange rate changes is largely an empirical issue, as it is difficult to say in advance what the final outcome will be in all cases.

Results on the second objective imply to the researcher that, factors which affect export performance are highly dependent on Namibia as country react to shocks in the international market and Government ability to stabilise the economy of the country.

The findings of the study are that, all the major hard currencies of international transaction are sources of foreign exchange risk to Mining, agricultural, fishing sector and all other international trading companies. The US dollar turned out to be the most dominant source of exchange rate risk at both the firm and sector levels.

The practical relevance of the research findings in foreign exchange management lies in the fact that, even though there are a number of techniques such as balance sheet hedging, use of derivatives, leading and lagging amongst others available to manage foreign exchange risk in most developing countries, these measures tend to be rather too sophisticated and difficult to implement in developing countries like Namibia with less developed financial systems. Therefore, given the degree of exposure revealed in this

study, corporates and investors in Namibia should endeavour to apply a combination of simple tools such as the use of forward contracts and swaps to supplement price adjustments and investment in foreign currency in order to minimize their exposure to exchange risk. Despite the shortcomings of the financial system in terms of availability of tools for managing foreign exchange risk exposure, instruments are still available to manage the risk exposure. The study therefore concludes that foreign exchange affect the companies, imports and accounts payables and export sales and accounts receivables thus with the net effect on export performance of the country.

Thirdly, the findings from the third objective prove that, current government policies in place need to be reviewed and be reinforced to address all changes currently experienced by the companies. Trade incentives need to relook to make it more attractive to foreign investors who are willing to invest in Namibia. To promote a favourable trade environment, government needs to revisit some of the trade barrier especial those that are inherited from independence. The Market has change and continues changing therefore there is need for this barrier to be changed.

In conclusion successful export, enhance the domestic environment for potential exporters (in terms of infrastructures, regulation, access to finance, insurance, fiscal policies). It fosters the strategic cooperation between private and public actors and among domestic producers, exporters, and policymakers. Improve the productivity and technological content of domestic goods and provide incentives to nurturing innovation.

It facilitates the access to credit and serves to build the country's image in foreign markets (through marketing, information provision, and advocacy). It offers targeted and tailored assistance and relies on continuous evaluation and is supported by monetary and fiscal policies designed to improve the enabling environment. Finally stimulate institutional development, also considering institutional complementarities.

5. Recommendations for Further Study

This research has laid a foundation for further study to be done at organisational level on the effects of exchange rate on export performance of specific mining companies such as NAMBED, Swakop Uranium, and B2 Gold and others. The research can also be extended to Agricultural as well as Fishing companies. This study recommends that other researchers investigate the impact of Exchange rate volatilities on export performance of mining companies. The researcher recommends fellow researchers to conduct an ARCH and GARCH models to ascertain whether the pattern of findings remains the same.

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Appendix

Appendix I: Letter of concern

NBS
NAMIBIA BUSINESS SCHOOL
UNIVERSITY OF NAMIBIA

28 July 2017

TO WHOM IT MAY CONCERN

Ms Orodesia Amadhila of Student Number: 201410811 is registered for a Master in Business Administration – Finance at the University of Namibia through the Namibia Business School.

This letter serves to inform you that her research proposal was reviewed and successfully met the University of Namibia requirements.

The student has been granted permission to carry out postgraduate studies research. The University of Namibia has approved the research to be carried out by the student for purposes of fulfilling the requirements of the degree being pursued.

If you have any queries please do not hesitate to contact the Business School at the University of Namibia.

Thank you so much in advance and many regards.

Yours sincerely

NAMIBIA BUSINESS SCHOOL
NBS
28 -07- 2017
UNIVERSITY OF NAMIBIA

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Namibia Business School
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Appendix II: Raw Data

DATE	EXPORT	REER	NCPI	REAL INTEREST RATE	GDP
1991	3256	91.9	12,0	0,8	39779
1992	3740	97.3	17,9	-6,4	42639
1993	4226	96.2	8,5	1,0	41965
1994	4689	96.5	10,7	-1,6	42691
1995	5145	97.9	10,0	1,9	44356
1996	6246	94.3	8,1	3,5	45771
1997	6281	94.7	8,8	3,9	47703
1998	6656	89.7	6,2	6,7	49273
1999	7314	90.8	8,6	2,2	50933
2000	9161	93.2	9,2	-1,9	52712
2001	9828	91.6	9,4	-2,4	53333
2002	11278	88.9	12,7	-3,6	55887
2003	9463	98.8	7,3	1,4	58256
2004	11761	106.2	4,1	2,3	65404
2005	13149	106.7	2,3	3,8	67058
2006	17949	106.3	5,0	1,3	71801
2007	20571	104.5	6,6	0,9	75660
2008	26355	100.6	9,1	-0,7	77665
2009	25190	106.3	9,5	-3,3	77895
2010	28558	113.8	4,9	0,1	82599
2011	28270	114.0	5,0	-0,7	86804
2012	34111	112.4	6,7	-2,5	91198
2013	36732	105.8	5,6	-1,6	96319
2014	41222	102.1	5,4	-1,2	102437
2015	42061	100.0	3,4	1,3	108692
2016	50613	97.8	6,7	-1,3	109453
2017	49924	102.9	6,2	-0,3	108610

Appendix III: Test Results

Unit Root testing

ADF Test Results (estimate model with intercept only and trend only)-At levels

Null Hypothesis: LEXPORT has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 2 (Automatic - based on SIC, maxlag=6)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.752432	0.0379
Test critical values:	1% level	-4.394309	
	5% level	-3.612199	
	10% level	-3.243079	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LEXPORT)
Method: Least Squares
Date: 12/18/18 Time: 12:22
Sample (adjusted): 1994 2017
Included observations: 24 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LEXPORT(-1)	-0.874926	0.233162	-3.752432	0.0013
D(LEXPORT(-1))	0.271152	0.224295	1.208908	0.2415
D(LEXPORT(-2))	0.630474	0.193719	3.254587	0.0042
C	6.992690	1.834730	3.811290	0.0012
@TREND("1991")	0.095918	0.025818	3.715145	0.0015

R-squared	0.546069	Mean dependent var	0.102885
Adjusted R-squared	0.450505	S.D. dependent var	0.107127
S.E. of regression	0.079411	Akaike info criterion	-2.045306
Sum squared resid	0.119816	Schwarz criterion	-1.799878
Log likelihood	29.54367	Hannan-Quinn criter.	-1.980193
F-statistic	5.714154	Durbin-Watson stat	1.562851
Prob(F-statistic)	0.003411		

Null Hypothesis: LREER has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 1 (Automatic - based on SIC, maxlag=6)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.732217	0.2332
Test critical values:	1% level	-4.374307	
	5% level	-3.603202	
	10% level	-3.238054	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LREER)
Method: Least Squares
Date: 12/18/18 Time: 12:23
Sample (adjusted): 1993 2017
Included observations: 25 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LREER(-1)	-0.400946	0.146747	-2.732217	0.0125
D(LREER(-1))	0.458787	0.206735	2.219209	0.0376
C	1.807525	0.662144	2.729806	0.0126
@TREND("1991")	0.002857	0.001430	1.997482	0.0589

R-squared	0.293183	Mean dependent var	0.002238
Adjusted R-squared	0.192209	S.D. dependent var	0.041371
S.E. of regression	0.037183	Akaike info criterion	-3.600289
Sum squared resid	0.029034	Schwarz criterion	-3.405269
Log likelihood	49.00361	Hannan-Quinn criter.	-3.546198
F-statistic	2.903548	Durbin-Watson stat	1.978225
Prob(F-statistic)	0.058811		

Null Hypothesis: LINF has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 2 (Automatic - based on SIC, maxlag=6)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.784703	0.0355
Test critical values:	1% level	-4.394309	
	5% level	-3.612199	
	10% level	-3.243079	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LINF)
Method: Least Squares
Date: 12/18/18 Time: 12:26

Sample (adjusted): 1994 2017
Included observations: 24 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LINF(-1)	-1.096438	0.289703	-3.784703	0.0013
D(LINF(-1))	0.476511	0.228799	2.082663	0.0510
D(LINF(-2))	0.352193	0.210379	1.674087	0.1105
C	2.603784	0.720557	3.613573	0.0019
@TREND("1991")	-0.033299	0.013374	-2.489886	0.0222

R-squared	0.446283	Mean dependent var	-0.013147
Adjusted R-squared	0.329711	S.D. dependent var	0.385986
S.E. of regression	0.316012	Akaike info criterion	0.716976
Sum squared resid	1.897403	Schwarz criterion	0.962404
Log likelihood	-3.603711	Hannan-Quinn criter.	0.782088
F-statistic	3.828395	Durbin-Watson stat	1.962165
Prob(F-statistic)	0.019078		

Null Hypothesis: INT has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 5 (Automatic - based on SIC, maxlag=6)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.078346	0.0029
Test critical values:	1% level	-4.467895	
	5% level	-3.644963	
	10% level	-3.261452	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(INT)
Method: Least Squares
Date: 12/18/18 Time: 12:28
Sample (adjusted): 1997 2017
Included observations: 21 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INT(-1)	-2.352196	0.463182	-5.078346	0.0002
D(INT(-1))	1.445214	0.356740	4.051171	0.0014
D(INT(-2))	1.173999	0.262014	4.480666	0.0006
D(INT(-3))	0.843253	0.259297	3.252073	0.0063
D(INT(-4))	0.395107	0.209427	1.886611	0.0817
D(INT(-5))	0.383531	0.156029	2.458070	0.0288
C	6.736988	1.610508	4.183143	0.0011
@TREND("1991")	-0.367692	0.088685	-4.146019	0.0011

R-squared	0.760743	Mean dependent var	-0.180952
Adjusted R-squared	0.631913	S.D. dependent var	2.452268
S.E. of regression	1.487795	Akaike info criterion	3.914800
Sum squared resid	28.77595	Schwarz criterion	4.312713
Log likelihood	-33.10539	Hannan-Quinn criter.	4.001157
F-statistic	5.904997	Durbin-Watson stat	2.277613
Prob(F-statistic)	0.003002		

Null Hypothesis: LGDP has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=6)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.242985	0.4480
Test critical values:	1% level	-4.356068	
	5% level	-3.595026	
	10% level	-3.233456	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LGDP)
Method: Least Squares
Date: 12/18/18 Time: 12:30
Sample (adjusted): 1992 2017
Included observations: 26 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LGDP(-1)	-0.310802	0.138566	-2.242985	0.0348
C	3.294965	1.453433	2.267022	0.0331
@TREND("1991")	0.013394	0.005891	2.273471	0.0327

R-squared	0.184006	Mean dependent var	0.038632
Adjusted R-squared	0.113050	S.D. dependent var	0.027541
S.E. of regression	0.025937	Akaike info criterion	-4.358095
Sum squared resid	0.015473	Schwarz criterion	-4.212930
Log likelihood	59.65523	Hannan-Quinn criter.	-4.316292
F-statistic	2.593248	Durbin-Watson stat	1.664271
Prob(F-statistic)	0.096471		

ADF Test Results (estimate model with intercept only and trend only)-At First Difference

Null Hypothesis: D(LREER) has a unit root

Exogenous: Constant, Linear Trend
Lag Length: 1 (Automatic - based on SIC, maxlag=6)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.489807	0.0633
Test critical values:	1% level	-4.394309	
	5% level	-3.612199	
	10% level	-3.243079	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LREER,2)
Method: Least Squares
Date: 12/18/18 Time: 12:35
Sample (adjusted): 1994 2017
Included observations: 24 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LREER(-1))	-0.956727	0.274149	-3.489807	0.0023
D(LREER(-1),2)	0.252454	0.218317	1.156365	0.2612
C	0.006788	0.020495	0.331209	0.7439
@TREND("1991")	-0.000218	0.001272	-0.171191	0.8658

R-squared	0.407305	Mean dependent var	0.002592
Adjusted R-squared	0.318401	S.D. dependent var	0.051601
S.E. of regression	0.042601	Akaike info criterion	-3.322844
Sum squared resid	0.036298	Schwarz criterion	-3.126502
Log likelihood	43.87413	Hannan-Quinn criter.	-3.270754
F-statistic	4.581397	Durbin-Watson stat	1.932229
Prob(F-statistic)	0.013424		

Null Hypothesis: D(LGDP) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=6)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.539427	0.0070
Test critical values:	1% level	-4.374307	
	5% level	-3.603202	
	10% level	-3.238054	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LGDP,2)
Method: Least Squares
Date: 12/18/18 Time: 12:31
Sample (adjusted): 1993 2017
Included observations: 25 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LGDP(-1))	-1.012952	0.223145	-4.539427	0.0002
C	0.029261	0.013994	2.090933	0.0483
@TREND("1991")	0.000619	0.000800	0.773064	0.4477

R-squared	0.484125	Mean dependent var	-0.003086
Adjusted R-squared	0.437228	S.D. dependent var	0.037587
S.E. of regression	0.028197	Akaike info criterion	-4.187050
Sum squared resid	0.017491	Schwarz criterion	-4.040785
Log likelihood	55.33813	Hannan-Quinn criter.	-4.146482
F-statistic	10.32300	Durbin-Watson stat	1.513509
Prob(F-statistic)	0.000689		

ADF Test Results (estimate model with intercept only and trend only)-At 2nd Difference

Null Hypothesis: D(LREER,2) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 1 (Automatic - based on SIC, maxlag=6)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.718232	0.0053
Test critical values:	1% level	-4.416345	
	5% level	-3.622033	
	10% level	-3.248592	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LREER,3)
Method: Least Squares
Date: 12/18/18 Time: 12:39
Sample (adjusted): 1995 2017
Included observations: 23 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LREER(-1),2)	-1.629042	0.345265	-4.718232	0.0001
D(LREER(-1),3)	0.345304	0.217094	1.590574	0.1282
C	-0.007906	0.026924	-0.293644	0.7722

@TREND("1991")	0.000578	0.001640	0.352665	0.7282

R-squared	0.633698	Mean dependent var	0.002548
Adjusted R-squared	0.575861	S.D. dependent var	0.079962
S.E. of regression	0.052076	Akaike info criterion	-2.915466
Sum squared resid	0.051526	Schwarz criterion	-2.717989
Log likelihood	37.52786	Hannan-Quinn criter.	-2.865801
F-statistic	10.95661	Durbin-Watson stat	1.956208
Prob(F-statistic)	0.000212		

Johansen Co-integration Test Results

Date: 12/18/18 Time: 23:25
Sample (adjusted): 1993 2017
Included observations: 25 after adjustments
Trend assumption: Linear deterministic trend
Series: LEXPORT LREER LINF INT LGDP
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 *	0.838467	90.72389	69.81889	0.0005
At most 1	0.651123	45.14772	47.85613	0.0879
At most 2	0.401543	18.82180	29.79707	0.5058
At most 3	0.208241	5.986794	15.49471	0.6971
At most 4	0.005956	0.149342	3.841466	0.6992

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 *	0.838467	45.57617	33.87687	0.0013
At most 1	0.651123	26.32592	27.58434	0.0717
At most 2	0.401543	12.83500	21.13162	0.4675
At most 3	0.208241	5.837452	14.26460	0.6342
At most 4	0.005956	0.149342	3.841466	0.6992

Max-eigenvalue 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

VECM-VECTOR ERROR CORRECTION MODEL

Vector Error Correction Estimates
Date: 12/20/18 Time: 23:31
Sample (adjusted): 1994 2017
Included observations: 24 after adjustments
Standard errors in ( ) & t-statistics in [ ]

Cointegrating Eq:	CointEq1
LEXPORT(-1)	1.000000
LREER(-1)	-0.280197 (0.19761) [-1.41791]
LINF(-1)	-1.387822 (0.08891) [-15.6090]
INT(-1)	-0.097911 (0.00753) [-13.0010]
LGDP(-1)	-3.632480 (0.09132) [-39.7776]
C	34.71023

Error Correction:	D(LEXPORT)	D(LREER)	D(LINF)	D(INT)	D(LGDP)
CointEq1	0.050971 (0.20868) [0.24425]	0.096967 (0.09354) [1.03664]	0.771889 (0.72017) [1.07181]	0.118320 (5.78332) [0.02046]	0.109028 (0.04505) [2.42031]
D(LEXPORT(-1))	-0.217312 (0.40507) [-0.53648]	-0.127208 (0.18157) [-0.70062]	-0.013324 (1.39790) [-0.00953]	-0.011298 (11.2257) [-0.00101]	-0.204656 (0.08744) [-2.34056]
D(LEXPORT(-2))	0.433874 (0.44271) [0.98005]	-0.305674 (0.19844) [-1.54041]	0.286283 (1.52779) [0.18738]	3.772854 (12.2688) [0.30752]	-0.090314 (0.09556) [-0.94507]
D(LREER(-1))	0.808402 (0.69521) [1.16281]	0.319467 (0.31162) [1.02518]	-3.728469 (2.39919) [-1.55405]	12.42941 (19.2666) [0.64513]	0.112686 (0.15007) [0.75089]
D(LREER(-2))	0.185608 (0.84767) [0.21896]	-0.209500 (0.37996) [-0.55138]	0.586376 (2.92532) [0.20045]	-7.919179 (23.4916) [-0.33711]	-0.184927 (0.18298) [-1.01064]
D(LINF(-1))	0.020743 (0.17667)	0.076982 (0.07919)	0.204769 (0.60971)	1.506140 (4.89621)	0.072519 (0.03814)

	[0.11741]	[0.97210]	[0.33585]	[0.30761]	[1.90154]
D(LINF(-2))	-0.017355	0.106127	0.083090	-0.246037	0.047714
	(0.16916)	(0.07582)	(0.58378)	(4.68798)	(0.03652)
	[-0.10260]	[1.39965]	[0.14233]	[-0.05248]	[1.30669]
D(INT(-1))	0.001572	0.004310	0.027628	0.174355	0.006481
	(0.01666)	(0.00747)	(0.05749)	(0.46163)	(0.00360)
	[0.09438]	[0.57726]	[0.48061]	[0.37769]	[1.80231]
D(INT(-2))	0.003062	0.011081	0.013178	0.096929	0.003758
	(0.01649)	(0.00739)	(0.05692)	(0.45709)	(0.00356)
	[0.18562]	[1.49891]	[0.23151]	[0.21206]	[1.05564]
D(LGDP(-1))	0.616887	-1.134490	-2.599121	11.73363	0.004707
	(1.16514)	(0.52226)	(4.02092)	(32.2898)	(0.25151)
	[0.52945]	[-2.17228]	[-0.64640]	[0.36339]	[0.01872]
D(LGDP(-2))	1.502046	0.075305	2.394977	-39.30011	-0.099085
	(0.98234)	(0.44032)	(3.39007)	(27.2238)	(0.21205)
	[1.52905]	[0.17102]	[0.70647]	[-1.44360]	[-0.46727]
C	-0.008209	0.098861	-0.035096	0.764813	0.080078
	(0.12534)	(0.05618)	(0.43254)	(3.47346)	(0.02706)
	[-0.06549]	[1.75972]	[-0.08114]	[0.22019]	[2.95980]
R-squared	0.530525	0.391022	0.569311	0.331928	0.615386
Adj. R-squared	0.100172	-0.167208	0.174513	-0.280472	0.262824
Sum sq. resids	0.123919	0.024898	1.475827	95.17328	0.005774
S.E. equation	0.101620	0.045550	0.350693	2.816222	0.021936
F-statistic	1.232767	0.700468	1.442032	0.542012	1.745467
Log likelihood	29.13961	48.39797	-0.588500	-50.58627	65.93438
Akaike AIC	-1.428301	-3.033164	1.049042	5.215522	-4.494532
Schwarz SC	-0.839274	-2.444137	1.638069	5.804549	-3.905505
Mean dependent	0.102885	0.002805	-0.013147	-0.054167	0.039622
S.D. dependent	0.107127	0.042161	0.385986	2.488754	0.025549

Determinant resid covariance (dof adj.)	1.09E-10
Determinant resid covariance	3.40E-12
Log likelihood	146.6150
Akaike information criterion	-6.801246
Schwarz criterion	-3.610683

Dependent Variable: D(LEXPORT)
Method: Least Squares (Gauss-Newton / Marquardt steps)
Date: 12/21/18 Time: 10:46
Sample (adjusted): 1994 2017
Included observations: 24 after adjustments
D(LEXPORT) = C(1)*(LEXPORT(-1) - 0.280196993069*LREER(-1) -
1.38782170893*LINF(-1) - 0.0979111090961*INT(-1) - 3.63247980304
*LGDP(-1) + 34.7102286061) + C(2)*D(LEXPORT(-1)) + C(3)

*D(LEXPORT(-2)) + C(4)*D(LREER(-1)) + C(5)*D(LREER(-2)) + C(6) *D(LINF(-1)) + C(7)*D(LINF(-2)) + C(8)*D(INT(-1)) + C(9)*D(INT(-2)) + C(10)*D(LGDP(-1)) + C(11)*D(LGDP(-2)) + C(12)

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	0.050971	0.208684	0.244249	0.8112
C(2)	-0.217312	0.405068	-0.536482	0.6014
C(3)	0.433874	0.442705	0.980053	0.3464
C(4)	0.808402	0.695212	1.162813	0.2675
C(5)	0.185608	0.847666	0.218964	0.8304
C(6)	0.020743	0.176674	0.117411	0.9085
C(7)	-0.017355	0.169160	-0.102595	0.9200
C(8)	0.001572	0.016657	0.094384	0.9264
C(9)	0.003062	0.016494	0.185621	0.8558
C(10)	0.616887	1.165138	0.529454	0.6061
C(11)	1.502046	0.982337	1.529054	0.1522
C(12)	-0.008209	0.125336	-0.065492	0.9489

R-squared	0.530525	Mean dependent var	0.102885
Adjusted R-squared	0.100172	S.D. dependent var	0.107127
S.E. of regression	0.101620	Akaike info criterion	-1.428301
Sum squared resid	0.123919	Schwarz criterion	-0.839274
Log likelihood	29.13961	Hannan-Quinn criter.	-1.272032
F-statistic	1.232767	Durbin-Watson stat	1.761557
Prob(F-statistic)	0.361021		

Appendix IV: Language Editing Certificate