Determinants of Employment in the Textile and Clothing Industry in South Africa: An Econometric Perspective and Investigative Analysis

by

Manenzhe Phathutshedzo Patricia

DISSERTATION

Submitted in fulfilment of the requirements for the degree of

MASTER OF COMMERCE

In

ECONOMICS

In the

FACULTY OF MANAGEMENT AND LAW

School of Economics and Management

At the

UNIVERSITY OF LIMPOPO

SUPERVISOR: Prof T Moyo

CO-SUPERVISOR: Mr S Zhanje

Sponsored by the National Research Fund

2018

DECLARATION

I, Phathutshedzo Patricia Manenzhe, hereby declare that all the resources that I have employed in this study have been indicated and acknowledged by means of complete references. This study has not been previously submitted by me for a degree in another university.

Full names………………………………………………………. Date……………………….

Signed…………………………………….

Signature………………………………………………………. Date……………………….
Co- Supervisor

Signature………………………………………………………. Date……………………….
Supervisor

ACKNOWLEDGEMENTS

I thank the Lord Almighty for granting me the strength, guidance, health and wisdom to complete this dissertation; I would have not made it this far without Him.

My deepest and sincerest gratitude goes to my supervisor, Professor T Moyo, and co-supervisor, Mr S Zhanje, for their guidance, advice and unlimited support. Without their encouragement, assistance and belief, the completion of this study would have not been a reality.

To my friends and colleagues, Azania Yokwane, Keabetswe Mojapelo, Shirly Malope, thank you for your encouragement and support.

To my family, my mother and grandparents, Ms. N.V. Thavhana and Mr Thavhana, thank you for your continuous love, support and strong encouragement to always strive for the best.

To my sisters, Aluwani Manenzhe, Rudzani Manenzhe and Thabelo Manenzhe for your belief, support and encouragement.

To my son, Ontonda Ethan Manenzhe for being my motivation and pillar of strength.

Lastly, I thank the HOD Dr T Ncanywa, the Director Prof M Sebola and the Dean Prof Tsheola for allowing me the opportunity to complete my thesis at the University of Limpopo.

ABSTRACT

Unemployment is one of the most economically crippling challenges facing South Africa today. The Department of Trade and Industry identified the Textile and Clothing Industry as a labour absorbing industry for many developing countries, including South Africa. However, the capacity of the sector to create jobs in South Africa has been changing. This study therefore aims to examine the probable causes of employment in the textile and clothing industry of South Africa and to propose policy recommendations that to alleviate the unemployment issues in the industry. The determinants of unemployment are analysed using co-integration analysis from an econometric perspective with annual time series data from 1986 to 2016. The study identifies domestic demand, real output, wage rate, and imports as some determinants in the textile and clothing industry. The results suggest that the model is co-integrated at 5% level of significance and there is a long-run relationship between employment and its determinants. For further examination of the relationship between unemployment and its determinants, the study conducted the Vector Error Correction Model and VECM Granger Causality techniques. The model was found to converge back to equilibrium at 0.183 convergence speed. These techniques revealed that the linear model is a good fit, passing both diagnostic and stability tests. The study also conducted the impulse response functions and variance decomposition to assess how shocks to economic variables reverberate through a system. Employment show an increase given positive economic shocks to output and wage rate. The study has recommended subsidization and incentivizing of the industry by government to assist in keeping operational costs low and improve output. For imports, the study suggested a mutual co-operation through joint ventures between South African companies and Chinese firms. South Africa may benefit from the transfer of technology and expertise, increased production capacity and job creation.

Keywords: Employment, unemployment, long-run relationship, labour-intensive, demand, output

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

CHAPTER 1: INTRODUCTION AND BACKGROUND

1.1. Introduction

The textile and clothing industry is important in economic and social terms in the short run by providing incomes, jobs, and foreign exchange receipts. It is also important in the long run by providing countries the opportunity for sustained economic development in those countries with appropriate policies and institutions to enhance the dynamic effects of textiles and clothing (Keane & Velde, 2008). This industry forms a major part of manufacturing production, employment and trade in many developing countries (Keane and Velde, 2008). Whether the textile or clothing industry is most efficient in job creation depends on the country. Noordas (2004) mentions that employment in the textiles sector in developed countries has generally held up much better than clothing employment. However, it is generally perceived that the clothing industry is more suited to developing countries as it affects entry-level jobs for unskilled labour and that relatively modern technology can be adopted at comparatively low investment costs (Magwaza, 2014).

The clothing industry offers a range of opportunities including entry-level jobs for unskilled labour in developing countries (Keane and Velde, 2008). Gereffi (2002) emphasizes that it is a typical “starter” industry for countries engaged in export-orientated industrialization. The textile industry has become capital-intensive with production differentiation and modern equipment that enhance competitiveness; however, the clothing industry is still largely characterized by labour-intensive production, low wages and mass production. This is supported by Magwaza (2014) who mentions that the local textile production has evolved into a capital-intensive industry due to technological developments that are closing the major product gaps. Competitive advantages for the sector lie in competitive labour costs and the ready availability of natural fibred raw materials i.e. cotton, wool and mohair, leather and vegetable fibres. In some countries improving textile and clothing employment lies at the core of a development strategy for that country while in other countries (that have already had textile and clothing production which may now be under threat) more emphasis is on export diversification.

The main aim of the South African textile and clothing industry is to use all the natural, human and technological resources at its disposal to make it the preferred international supplier of the textiles and apparel (Magwaza, 2014). Consequently, it is an industry in decline even though it has demonstrated potential to contribute significantly to the development of the region. The industry has suffered job losses over the past years as a result of, among other factors, cheap imports (particularly from China), poor training and lack of investments by companies. In addition to this problem is the fact that South Africa was already facing a high unemployment rate (Statistics South Africa, 2015). The share of the industry to total employment may be low (about one percent), even though it is a fact nationally, one cannot overlook its much larger role in the context of specific provinces such as Eastern Cape and Western Cape where it is one of the major employers. In a country where employment runs into millions of people, even a half a percentage point increase in jobs that may be generated by the sector, cannot be regarded as insignificant as it can easily translate to a few thousands of jobs.

As reported by Business Partners (2014) the Department of Trade and Industry has labelled the textile and clothing industry as a labour absorbing industry. It is more beneficial because it accommodates unskilled labour and South Africa is faced with a huge fraction of unskilled labour. Although it is indeed a fact that the sector has been in decline for some time the government, through the Department of Trade and Industry (DTI), has been implementing a range of strategies with the aim of enhancing the competitiveness of the sector through productivity improvements. Furthermore, by diversifying its export markets to include greater intra-African trade, developing new fashion markets, and identifying new niche markets, South African manufacturers such as those in the textile and clothing industry are likely to offset the negative effects of external competition. The establishment of the African Continental Free Trade Area (AfCFTA), also offers new opportunities for South African exporters.

The textile and clothing industry forms a major part of manufacturing production, employment and trade in many developing countries (Keane & Velde, 2008). Therefore, research on factors that determine employment or job creation in the textile and clothing industry is relevant and important. The proposed study aims to examine determinants of employment in the textile and clothing industry in South Africa with the purpose of job creation.

1.2. Research Problem

1.2.1. Background to the research problem

The unemployment rate in South Africa increased from 23.3% in the fourth quarter of 2014 to 26.4% in the first quarter of 2015 (Trading Economics, 2015). It averaged 25.27% from 2000 until 2015 and was at its highest in 2003 by 31.2%. It states in Statistics South Africa (2015) that results for the first quarter of 2015 shows that the working age population (WAP) was 35,8 million of which 15,5 million employed, 5,5 million unemployed and 14,8 million not economically active. Thus resulting in an unemployment rate of 26, 4% (Statistics South Africa, 2015). The number of unemployed people increased by 625 000 to 5.5 million in the first quarter of 2015 (Statistics South Africa, 2015). The largest increases were recorded in the Northern Cape by 5.4%, followed by Limpopo (4.2%), Gauteng (3.8%) then North West (3.2%)(Statistics South Africa, 2015).. Northern Cape, KwaZulu-Natal and Gauteng recorded the largest rise in the official unemployment rate in comparison to the same period last year (Statistics South Africa, 2015). Unemployment is high among women and youth. The absorption for men is higher than that of women in most educational levels (Statistics South Africa, 2015). Youth graduates struggle to find employment due to a number of reasons, one being the fact that they lack the work experience required by the employers.

According to Magwaza (2014), the textile and clothing industry has been identified as a labour absorbing sector for South Africa by the Department of Trade and Industry. South

Africa, among 130 other developing countries, depends on this industry for an increasing share of their employment and exports (Seyoum, 2010). The South African Textile and Clothing Industry are concentrated in the provinces of KwaZulu-Natal and Western Cape. In KwaZulu-Natal, most of the industry is located in Durban and in some towns in the provinces' hinterland. In Western Cape, clothing factories are mainly located in and around the Cape Town metropolitan area. Significant industry activity, but employing fewer workers, takes place in the Eastern Cape Province and Free State province. Smaller pockets of factories are also located in the Northern Cape, Limpopo and North West provinces (Bennett, 2003). The formal clothing manufacturing industry is made up of a wide-range of firms. There is large size that employs more than 200 employees, medium-sized that employs between 50 and 199, small-sized that employ between 6 and 49 and micro-enterprises that employ less than 5 employees (Bennett, 2003). Overall, it is estimated that there are around 1500 formal clothing firms in South Africa (Bennett, 2003). There is a significant number of foreign-owned firms although the industry is mainly South African owned. Industries of Chinese origin own a relatively large number of formal economy enterprises. Only a few clothing firms are vertically integrated with upstream links to the textile manufacturing operations (Bennett, 2003).

As reported by Wesgro (2014), global trading in apparel grew by 13% from 2011 to 2012 to reach R 3.3trillion. South Africa was the 86th largest exporter (exporting around R 878 million) and the 87th largest importer (importing around R 11.9 million). South Africa's exports of clothing grew by 31% from 2012 to 2013. Magwaza (2014) contends that this industry accounted for about 14% of employment in the manufacturing industry and represented South Africa's largest source of tax revenue. The industry contributes around 8% to the country's gross domestic product (Magwaza, 2014). Foreign direct investment (FDI) into the industry reached R2.04 billion between 2003 and 2013 totalling 21 FDI projects and 14 FDI projects were recorded outward from the industry totalling R 1.33 billion (Wesgro, 2014). Three projects were into the Western Cape (totalling around R 317 million) and five outward FDI projects from Western Cape totalled R510 million. The source markets for FDI into the Western Cape were the Netherlands, United States and

United Kingdom (Wesgro, 2014). The main aim of the South African textile and clothing industry is to use all the natural, human and technological resources at its disposal to make it the preferred international supplier of the textiles and apparel (Magwaza, 2014).

1.2.2. Statement of the problem

Undoubtedly, the South African textile and clothing industry contributes greatly to its country. This industry has proven to play a central role in the economic development of many developing countries. Therefore, a decrease in employment in this industry can affect the official unemployment rate and the country's growth as a whole. The South African textile and clothing industry has encountered a number of challenges. The industry has suffered job losses between 2002 and 2012 as a result of, among other factors, cheap imports (particularly from China), poor training and lack of investments by companies. Job losses were recorded in the trade industry at 201 000 in the first quarter of 2015 compared to the fourth quarter of 2014 and the largest decline in employment during the same period last year was in the trade industry by 140 000 (Statistics South Africa, 2015). Employment was analysed by sector and the largest decline in formal sector jobs were observed in the trade industry by 213 000 in the first quarter of 2015 compared to the first quarter of 2014 (Statistics South Africa, 2015). In the first quarter of 2015 employment declined in the trade industry by 131 000 and the manufacturing industry by 23 000. On the informal sector side the largest employment decline was also in the trade industry by 10 000 in the first quarter of 2015 (Statistics South Africa, 2015). The textile and clothing industry has shrunk by 20% in the past 3 years (2012–2014) where 10 119 jobs were lost in 2010, 5338 jobs were lost in 2011, 5330 jobs were lost in 2012 and 3416 posts were cut in 2013. Job losses were estimated at 29 500 between 2007 and 2010 (Magwaza, 2014). As the Textile Federation (2007) reports, a number of textile mills closed and were forced to retrench staff.

The textile and clothing industry contributes largely to the country's unemployment rate and may improve economic growth if it is properly developed. However, the industry is challenged by cheap imports, competition from other countries, insufficient investments, unskilled labour, low domestic demand, trade liberalization and other factors. Unemployment was not always this high; it was fairly low in the 1970s. The supply of labour increased after the fall of apartheid with an exceptional influx of African women who were relatively unskilled into the labour market (Banerjee et al, 2007). In addition to that, there are a number of youth graduates who struggle to find employment. Another factor that affected the unemployment rate in the past years is the global financial crisis in 2008; many countries are still recovering from the damage it caused. Jobs lost during that period have not been fully recovered.

The research therefore investigates the critical question on what factors determine employment in the sector. The proposed study will look at the challenges facing employment in the textile and clothing industry and make policy and strategic recommendations that can be executed to remedy the challenges so that the sector can once again contribute significantly to job creation.

1.3. Definition of Concepts

A number of important concepts are used in the study and the following descriptions have been provided for clear understanding:

Textile and Clothing Industry is a diverse and heterogeneous industry which covers a great number of activities from the transformation of raw materials, into fibres, yarns and fabrics that in turn enter into the production of e.g. hi-tech synthetic textiles, wool, bed-linen, industrial filters, geo-textiles, and clothing and are used in multiple applications e.g. garments, sports equipment, household, furniture, civil engineering (construction, automobiles and aircrafts), and medical textiles (The Textile, 2011). The Textile and Clothing industry is meant to comprise the treatment of raw materials, i.e. the preparation or production of various textile fibres, and/or the manufacture of yarns (e.g. through spinning). It is the transformation of specific fabrics into products such as garments, knitted or woven (= the so-called ‘clothing’ industry); carpets and other textile floor coverings; home textiles (such as bed linen, table linen, toilet linen, kitchen linen, curtains, etc); technical, or 'industrial' textiles (Stengg, 2001). The Textile (2011) mentions nine sub-sectors, namely: man-made fibres, yarns, woven fabrics, knitted fabrics, technical textiles, carpets, household textiles, woven garments and knitted garments.

Textiles are defined as all products which consist of yarns, fabrics and made-up textile articles (carpets, kitchen linens, luggage, etc.) representing Standard International Trade Classification (SITC) 65 (Seyoum, 2010). Textile products range from yarns of natural and man-made origin to fabrics, to household textiles, carpets and textiles that are used in industrial applications. Raw materials such as cotton, wool, jute, flax and silk fall under this broad categorisation but are not considered as textile products as such (The Textile, 2011). Originally, a woven fabric; now applied generally to any one of the following: staple fibres and filaments suitable for conversion to or use as yarns, or for the preparation of woven, knit, or nonwoven fabrics; yarns made from natural or manufactured fibres; fabrics and other manufactured products made from fibres as defined above and from yarns; and garments as well as other articles fabricated from fibres, yarns, or fabrics when the products retain the characteristic flexibility and drape of the original fabrics (Calanese Corporation, 2001).

Clothing is stated to include all garments and accessories, gloves, headwear, neckwear etc. under SITC 84 (Seyoum, 2010). It covers made-up products that are articles of apparel and clothing accessories. Products are distinguished by the underlying manufacturing processes. Clothing products in Chapter 61 of the combined nomenclature (CN) are either knitted or crocheted garments. Apparel products that are produced from woven textile fabrics fall under the CN Chapter 62 (The Textile, 2011). Clothing is a generic term embracing all textile fabrics and felts. Clothing may be formed of any textile fibre, wire, or other material, and it includes any pliant fabric woven, knit, felted, needled, sewn, or otherwise formed (Calanese Corporation, 2001).

Employed persons are those aged 15–64 years who, during the reference week, did any work for at least one hour, or had a job or business but were not at work (temporarily absent) (Statistics South Africa, 2015).

Unemployed persons are those (aged 15–64 years) who were not employed in the reference week; and actively looked for work or tried to start a business in the four weeks preceding the survey interview; and were available for work, i.e. would have been able to start work or a business in the reference week; or had not actively looked for work in the past four weeks but had a job or business to start at a definite date in the future and were available (Statistics South Africa, 2015). Kuper and Kuper (1996) defined unemployment in terms of not being employed and available and looking for work. Dwivedi (2005) defined unemployment as a situation in which those who are able and willing to work at the prevailing wage rate cannot find jobs. Dwivedi (2005) further defined unemployment as the gap between full employment and the number of employed persons.

1.4. Purpose of the Study

1.4.1 The aim of the study

The aim of the study is to examine the determinants of employment in the textile and clothing industry of South Africa with the purpose of establishing job creation within the industry.

1.4.2 The objectives of the study

- To analyse the trends in the textile and clothing industry in South Africa.
- To determine factors which contribute to employment in the textile and clothing industry in South Africa.
- To ascertain which theory of employment is relevant in the textile and clothing industry of South Africa.
- Establish the possible inter-relationship between employment, domestic demand, output, wage rate and imports.

- Explain the direction of causality between employment, domestic demand, output, wage rate and import if a long run relationship is confirmed to be present.
- To assess how economic shocks to employment, domestic demand, output, wage rate and import reverberate through a system using the Impulse response functions and variance decomposition.

1.5. Significance of the Study

As reported by Business Partners (2014) the Department of Trade and Industry has identified the textile and clothing industry as a labour absorbing sector in South Africa. To that effect, an increase in employment in the industry may improve South Africa's high unemployment rate. However, very little study has been done on South Africa's textile and clothing industry especially with regards to job creation and solutions to the job losses issue. Thus, the proposed paper aims to also fill the gap in the literature by examining determinants of employment in the textile and clothing industry as well as measuring the employment elasticity of output in the industry. Therefore it is believed that when completed, the study will shed some light on job creation in South Africa's textile and clothing industry. This in turn will enable policy makers at the Department of Trade and Industries (DTI) to draft better policies to create job opportunities in this ailing industry.

1.6. Limitations of the Study

The unavailability of employment independent data, such as skills levels and technology, has led to the study being confined to certain variables that were available. Although these variables are necessary, the exclusion of some variables could mean that a full view of the determinants of employment in the textile and clothing industry could not be provided. Some of these factors could simply not be quantified.

1.7. Deployment of the Study

The study consists of six chapters. Chapter one is the introduction and orientation of the study which gives an overview of the problem at hand and this chapter contains the statement of the problem. Chapter is an overview of the textile and clothing industry and it discusses the dynamics thereof. Chapter three is the literature review which reviews both the theoretical and empirical literature based on the topic. Chapter four presents the empirical research methods which are used in collecting and analyzing data. The chapter five consists of the research design and outlines the methodology used. Chapter five presents study results and discussion, data analysis and interpretation. Chapter six provides the summary of the whole study or findings; conclusions are drawn from the results of the study and recommendations are made based on the results of the study.

CHAPTER 2: DYNAMICS OF THE TEXTILE AND CLOTHING INDUSTRY IN SOUTH AFRICA

2.1. Introduction

The purpose of this chapter is to give a clearer and detailed understanding of the textile and clothing industry of South Africa. The chapter provides an overview of the progression of the textile and clothing industry. It starts off by explaining the relationship between the textile and clothing industry and employment in the South African context. Then, this is followed by an explanation of the role of the textile and clothing industry in creating jobs. Then the main issues relating to employment in South Africa are discussed. The chapter gives a detailed industry analysis firstly by providing a sector profile and thereafter the discussion of factors that may have a direct or indirect impact on the employment level in the textile and clothing industry. These factors were analysed over a 10 year period (i.e. 2006 to 2015). The chapter concludes by a brief discussion of the policies set in place aimed at addressing employment in the textile and clothing industry.

2.2. The relationship between Textile and clothing industry and Employment

The textile and clothing industry form a major part of manufacturing production, employment and trade in many developing countries (Keane and Te Velde, 2008). Whether the textile or clothing industry is most efficient in job creation depends on the country. Noordas (2004) mentioned that employment in the textiles sector in developed countries has generally held up much better than clothing employment. However, Magwaza (2014) argues that it is generally perceived that the clothing industry is more suited to developing countries as it affects entry-level jobs for unskilled labour and that relatively modern technology can be adopted at comparatively low investment costs. Keane and Te Velde (2008) agree with this when he stated that the clothing industry offers a range of opportunities including entry-level jobs for unskilled labour in developing countries. Gereffi (2002) emphasizes that it is a typical “starter” industry for countries engaged in export-orientated industrialisation. The textile industry has become capital-intensive with production differentiation and modern equipment that enhance competitiveness; however, the clothing industry is still largely characterized by labour-intensive production, low wages and mass production. This is supported by Magwaza (2014) which mentions that the local textile production has evolved into a capital-intensive industry due to technological developments that are closing the major product gaps. Competitive advantages for the sector lie in competitive labour costs and the ready availability of natural fibre raw materials i.e. cotton, wool and mohair, leather and vegetable fibres. In some countries improving textile and clothing employment lies at the core of a development strategy for that country while in other countries (that have already had textile and clothing production which may now be under threat) more emphasis is on export diversification.

2.3. Role of textile and clothing industry in creating jobs

The textile and clothing industry is important in economic and social terms (in the short run) by providing incomes, jobs and foreign exchange receipts. It is also important in the long run by providing countries the opportunity for sustained economic development in those countries with appropriate policies and institutions to enhance the dynamic effects of textiles and clothing (Keane and Te Velde, 2008). The sector absorbs large numbers of unskilled labour, typically drawing them from rural agricultural households to rural locations (Brenton and Hoppe, 2007). The textile and clothing industry can provide employment for unskilled labourers, women and those who hold less than metric (Banjeree, 2007). These are groups that form a large portion of South Africa's unemployment rate. Another group is young people. A low number of young people enter the textile and clothing industry. Encouraging and attracting more young people into the textile and clothing industry can reduce the country's unemployment rate and help eradicate the issue of high youth unemployment.

Keane and Te Velde (2008) stresses that employment levels in the textile and clothing industry are often in favour of women. Textile and clothing activities offer women better employment opportunities that they would have had in the rural area (Keane and Te Velde, 2008). Job creation in this industry has been particularly strong for women in poor countries who previously had no income opportunities other than household or informal sector (Nordas: 2004). The overall share of female workers in the textile and clothing industry is average but particularly high in the clothing industry (International Labour Organization (ILO), 2005). Barrientos, Kabeer and Hossain (2004) summarizes that women now represent more than one-third of the manufacturing labour force in developing countries, and up to half in Asian countries. However, Barrientos et al (2004) noted that the percentage of females employed in manufacturing decrease over time, as countries grew richer and more into higher value added activities. These women are mainly employed at low-skill end of production and have less of an opportunity to be promoted (UNCTAD, 2004). This poses the concern whether the textile and clothing industry can actually improve unemployment in the long-run.

2.4. Main issues in South Africa

Transition from apartheid era

Banerjee et al (2007) analysed employment since the fall of apartheid. Analyses were done by region, gender, race, educational attainment and by age group. Results showed that participation and employment were much higher in urban areas than in rural areas; males were more likely to participate in the labour market and less likely to be unemployed compared to women; Africans have worse labour outcomes than other groups but coloureds and Indians have worse outcomes than whites; unemployment was less as more people got educated and it takes a completed degree to mostly escape unemployment in South Africa; lastly, unemployment increased more for youth and it is highest amongst 20 year olds. Banerjee et al (2007) conclude by stating that these changes alone would have increased unemployment. A large fraction of the increase in unemployment is due, ceteris paribus, to the change in composition of the labour force.

The labour force has now increased because people who weren't considered as unemployed during the apartheid era (i.e. Africans) are now considered as unemployed.

Banerjee et al (2007) highlighted that a substantial part of African population of South Africa grew far from centres of business and industry. Regardless of legal access to these areas now, some prefer to stay where they were born or where their parents lived. This makes search costs for employment high. High search costs could explain high levels of transitional unemployment combined with the enormous shift of labour demand and supply during this period (Banerjee et al, 2007). This made large reallocations necessary.

Youth unemployment

There is a mismatch between the skills being taught at schools and the skills needed in the workplace (Banerjee, 2007). The youth do not see factory work as a legitimate career path, they desire more glamorous white-collar jobs and aspire to be more than what their parents had. Vlok (2006) mentions that skills deficiencies have been worsened by perceptions of university graduates that the textile industry is a 'sunset industry' and should be avoided when entering the business world. There is a sense of entitlement and impatience amongst South Africa's youth (SASTAC, 2014).

Another reason for youth unemployment is reservation wages. The consequence of this program is that many unemployed South Africans can survive without taking a job, as long as their elders are willing to support them (Banerjee, 2007). They put less effort in job seeking and become more selective of the jobs they choose to go for. Bertrand et al., (2003) show evidence that people who have family members eligible for pension tend to work less than they would otherwise. Pension results in labour force withdrawal by the young children of the pensioners. However, Edmonds et al., (2003) argue that pension income may make it affordable for household members (particularly women) to migrate in order to search for jobs.

China

The influx of relatively cheap Chinese textiles and clothing has severely damaged South Africa's production capabilities and output. Dhliwayo (2012) mentions that manufacturers and retailers find it difficult to compete with low cost alternatives, which are appealing to many low-income earners. This has forced them to either shut down operations or lay off workers. Vlok (2006) mentions that the industry has not been able to adjust sufficiently to challenges of greater import competition due to trade liberalization and rising competitiveness from China. Jacobs (2011) stresses this by stating that South Africa's manufacturing sector has been particularly vulnerable to the competitive threat posed by China in both domestic markets and foreign exports as they lag behind with regards to prices, speed to markets, labour productivity and quality of products.

South Africa's textile and clothing industry was also heavily dependent on the Africa Growth and Opportunity Act (AGOA) that gave it preferential access to markets in the United States. This boosted South Africa's exports, however Asian textile and clothing companies established subsidiary companies in South Africa in order to capitalize on the duty free access to the United States market (Matume, 2006). The influx of Asian companies placed many local companies out of business due to the inability to compete with Asian companies' low production costs and technological superiority. Sudden disinvestment occurred when the AGOA agreement expired in 2007. Companies that exploited opportunities presented by the AGOA agreement caused massive loss of sales and loss of jobs; this is evidenced by the drop of clothing exports to the United States (Vlok, 2006).

Dhliwayo (2012) concluded by stating that there is an urgent need for government and private sector cooperation to revive this ailing industry through investment and incentives. If left unresolved, the Chinese textile and clothing industry could wipe out one of Africa's potentially largest income generating industries to the detriment of local economies and people.

2.5. Industry analysis

This sub-section discusses the textile and clothing industry using economic indicators that had data on them available. The study looks at the past 10 years i.e. 2006 to 2010. The factors considered were domestic demand, real output, real gross domestic investment, real fixed capital stock, employment in the formal and informal sector, real remuneration per employee, labour productivity, imports of goods and services and exports of goods and services. This is based on theory that will be thoroughly explained in Chapter 3.

2.5.1. Sector Profile

The clothing and textile industry of South Africa proves to be a highly diverse and mature industry. Products produced in these industries range from inexpensive mass produced basics to higher value-added fashion and tailored garments and specialized textiles. These industries are interrelated and form part of one cluster group that they can considered as one industry. The exchange rate as well as the interest rate plays a crucial role in the competitiveness and sustainability of the industry. The industry has proven to be sensitive to currency fluctuations and the high cost of borrowing.

The clothing industry is dominated by small number of large retailers, most with head offices in Cape Town, wielding considerable value chain power (Morris and Reed, 2008). The regional local of the Western Cape manufacturers enabled them to meet delivery requirements, speed up purchasing processes and ease of dealing with problems. This, in essence, historically advantaged them. However, retailers now source from across the country with price and quality of service playing an important role. The price pressures from trade liberalization, currency fluctuations, and exercise of power by the local retailers caused clothing firms to follow a number of different survival strategies. Among these strategies were formal factory downsizing, adoption of World Class Manufacturing techniques and firms relocating from urban to rural areas, some firms went as far as relocating across borders to neighbouring countries (Edwards and Morris, 2006; Morris and Reed, 2008).

The textile industry was also confronted with cheap imports from trade liberalization, rising costs and pressures in terms of lower prices and more stringent quality demands. Textile industry firms were affected by these and were forced into survival strategies. These strategies were different to those adopted by the clothing industry firms. Textiles firms resorted to focusing on core products, closing non-core functions and following vertical disintegration strategies. Most of these firms chose to focus on niche markets, leading to a restructuring that has resulted in greater specialization and longer production runs (Morris and Reed, 2008).

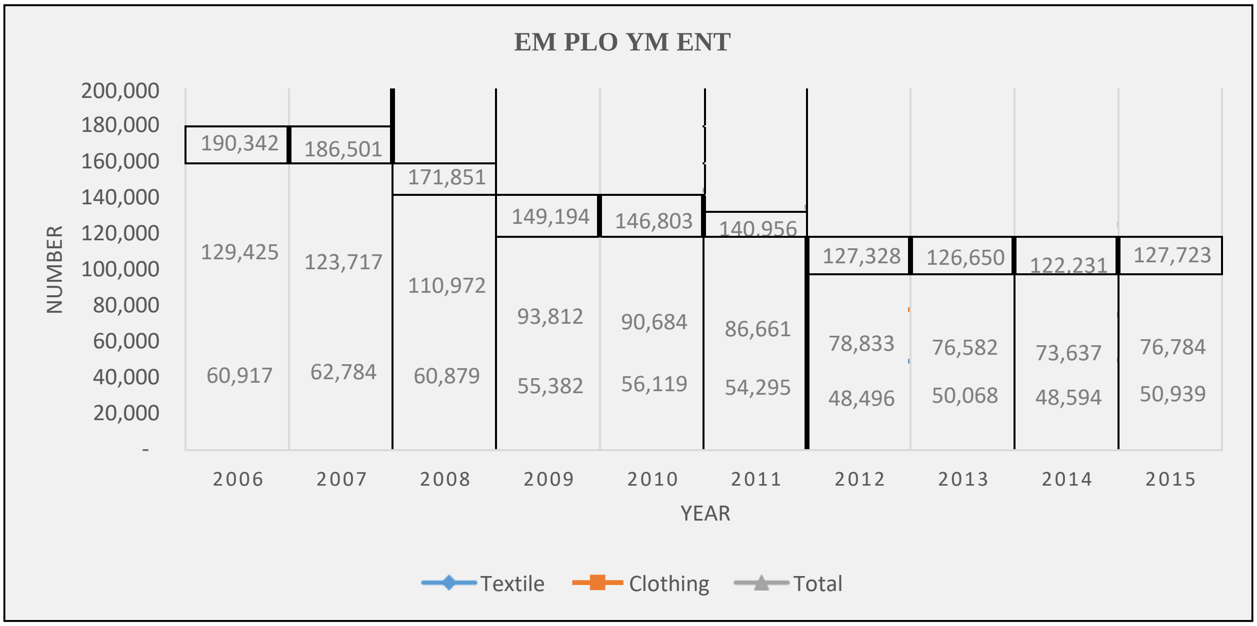
The South African Textile and Clothing Industry are concentrated in the provinces of KwaZulu-Natal and Western Cape. In KwaZulu-Natal, most of the industry is located in Durban and in some towns in the provinces' hinterland. In Western Cape, clothing factories are mainly located in and around the Cape Town metropolitan area. Significant industry activity, but employing fewer workers, takes place in the Eastern Cape Province and Free State province. Smaller pockets of factories are also located in the Northern Cape, Limpopo and North West provinces. The formal clothing manufacturing industry is made up of a wide-range of firms. There is large size that employs more than 200 employees, medium-sized that employs between 50 and 199, small-sized that employ between 6 and 49 and micro-enterprises that employ less than 5 employees. Overall, it is estimated that there are around 1500 formal clothing firms in South Africa (Bennett, 2003). There is a significant number of foreign-owned firms although the industry is mainly South African owned. Industries of Chinese origin own a relatively large number of formal economy enterprises. Only a few clothing firms are vertically integrated with upstream links to the textile manufacturing operations.

Many factors play a role in how the textile and clothing industry operates. The textile and clothing industry has changed over the past years and market dynamics keep developing. It is thus important to look into the industry dynamics and how the industry has been evolving in the past years. This can be done by looking at factors that play an important role in this industry, especially factors that could possibly lead to an increase or decrease in employment.

2.5.2. Employment in the formal and informal sector

Figure 2.1 reflects the number of people employed in the formal and informal sectors of the textile and clothing industry of South Africa. These figures are recorded in numbers. Separate data for the industry is provided.

Figure 2.1: Employment: Formal and Informal



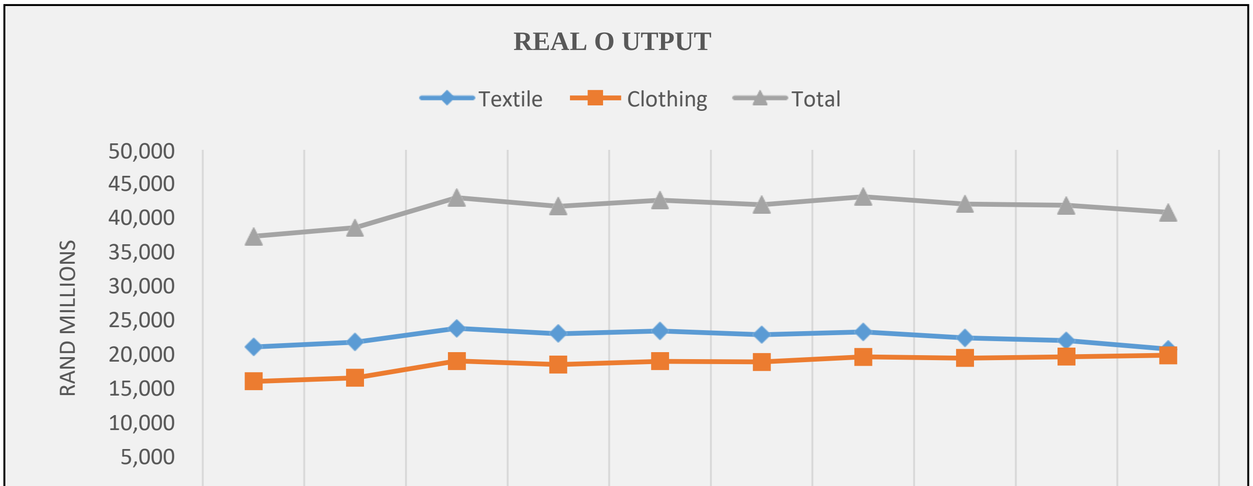
Source: Author's own using DTI data

As depicted, employment in the textile and clothing industry has been decreasing since 2006, and possibly since before 2006. However, there was a slight increase from 2014 to 2015. This shows how unemployment in this industry continues to be crucial issue. More people in this industry get unemployed. There are more people employed in the clothing industry than in the textiles industry. This could be because textiles industry is becoming more capital intensive resulting in the demand for less labourers. The total line goes to show that this decrease in the number of people employed is not just one of either industries but it the industry in its entirety.

2.5.3. Real output

Figure 2.2 reports the real output of the textile and clothing industry of South Africa, recorded in rand millions at 2010 constant prices. Separate data for the industry is also provided.

Figure 2.2: Real Output



	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Textile	21,194	21,909	23,908	23,124	23,531	23,002	23,400	22,495	22,129	20,870
Clothing	16,166	16,696	19,129	18,632	19,126	18,999	19,756	19,590	19,758	19,988
Total	37,360	38,605	43,037	41,756	42,658	42,001	43,156	42,085	41,887	40,857

Source: Author's own using DTI data

As shown in Figure 2.2, even though the number of people kept on decreasing over the past 10 years, output remained quite steady. This could be because the textile and clothing industry was just migrating from labour intensive to capital intensive. Employees were replaced by technology and machines that can do the required for efficiently and effectively. Although there was an increase in the number of people employed from 2014 to 2015, real output reflects that output in the industry decreased. Figure 2.2 shows a decrease in textiles real output but a slight increase in the clothing real output. The textile industry, however, yields more real output than the clothing industry.

2.5.4. Real Gross Domestic Investment

Table 2.1 and Figure 2.3 show the real gross domestic investment in the textile and clothing industry of South Africa, recorded in rand millions at 2010 constant prices. Separate data for the industry is also provided.

Table 2.1: Real gross domestic investment

Real Gross Domestic Fixed Investment						
	Textile		Clothing		Total	
	Value Rm	%	Value Rm	%	Value Rm	%
2006	1219.5	77	363.6	23	1583.1	100
2007	1028	70	443.4	30	1471.4	100
2008	887.3	66	466.8	34	1354.1	100
2009	569.2	66	299.3	34	868.5	100
2010	621.7	67	309.6	33	931.3	100
2011	745.6	68	353.8	32	1099.4	100
2012	722.4	66	376.1	34	1098.5	100
2013	834.5	71	347.3	29	1181.8	100
2014	832.3	73	300.9	27	1133.2	100
2015	715.4	71	292.9	29	1008.3	100

Source: The Department of Trade and Industry

Figure 2.3: Real gross domestic investment

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Textile	77	70	66	66	67	68	66	71	73	71
Clothing	23	30	34	34	33	32	34	29	27	29
Total	100	100	100	100	100	100	100	100	100	100

Source: Author's own using DTI data

Figure 2.3 shows quite a fluctuation in real gross domestic investment. Domestic investment faced a significant decrease from 2008 to 2009. It is worth noting that the global great depression occurred during that time. It seems that the clothing industry was not as greatly affected as the textile industry. However, South Africa has not fully recovered from the effects of the 2008 financial crisis, hence, could not invest in the textile and clothing as before. Other factors could have also played a role in this development. However, South Africa invests more in its textiles industry than it does in the clothing industry. Approximately 70% is invested in textiles and only 30% is invested in clothing. This has been the norm over the past 10 years.

2.5.5. Real Fixed Capital Stock

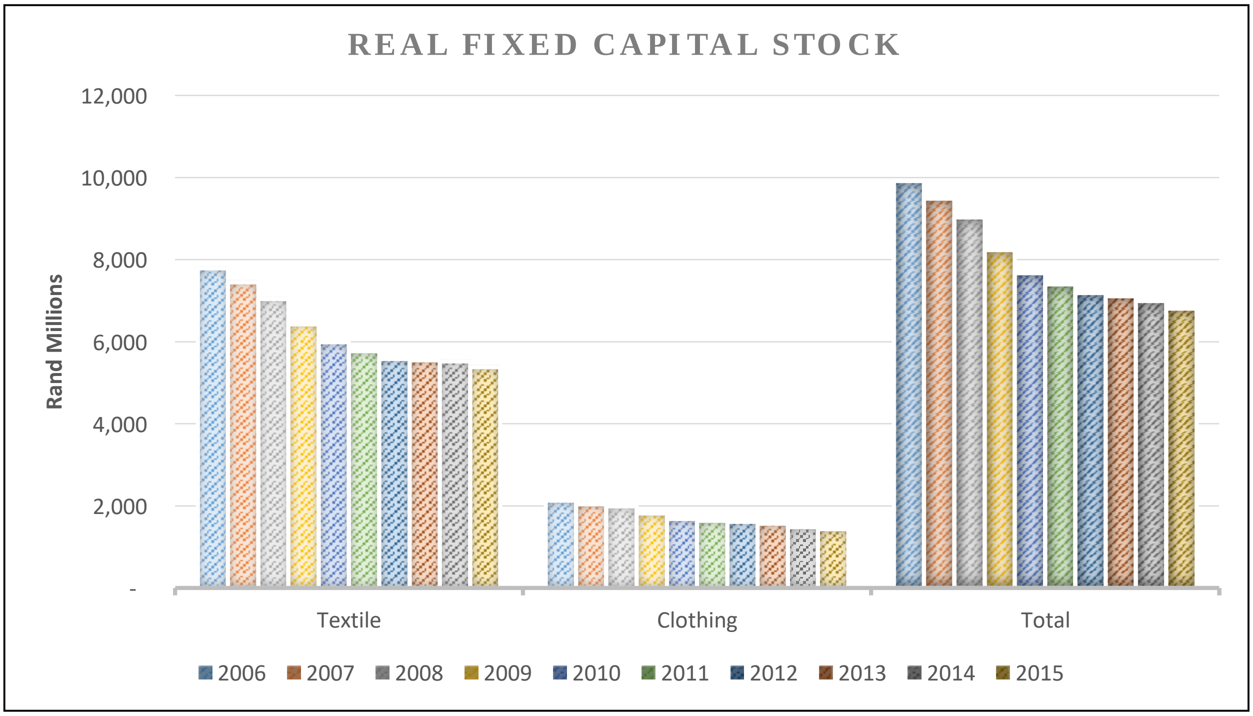
Table 2.2 and Figure 2.4 that displays the real fixed capital stock in the textile and clothing industry of South Africa, recorded in rand millions at 2010 constant prices. Separate data for the industry is also provided.

Table 2.2: Real fixed capital stock

Real Fixed Capital Stock			
	Textile	**Clothing**	**Total**
2006	7,785	2,128	**9,912**
2007	7,444	2,041	**9,485**
2008	7,037	1,985	**9,023**
2009	6,421	1,810	**8,231**
2010	5,988	1,684	**7,672**
2011	5,763	1,632	**7,395**
2012	5,577	1,609	**7,186**
2013	5,548	1,564	**7,111**
2014	5,515	1,479	**6,994**
2015	5,376	1,429	**6,804**

Source: The Department of Trade and Industry

Figure 2.4: Real fixed capital stock



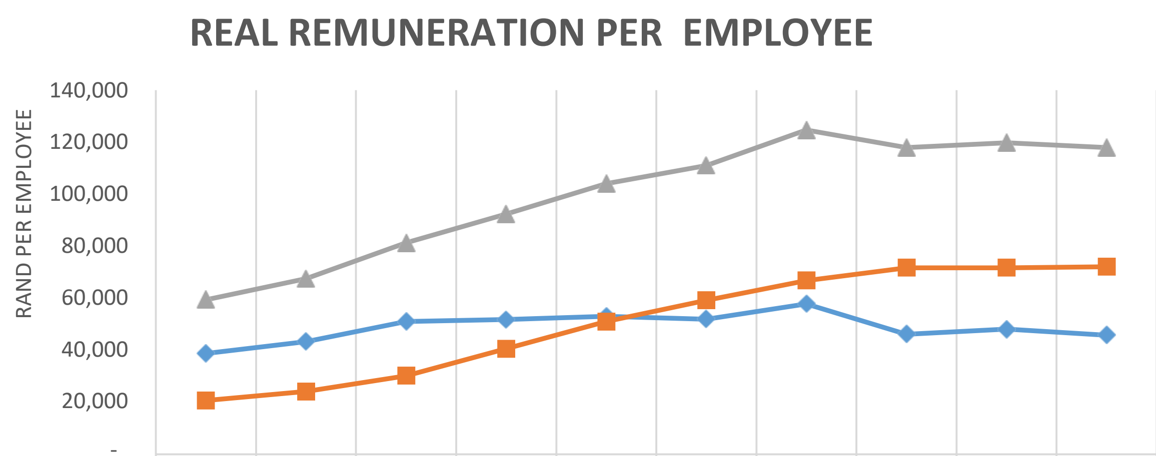
Source: Author's own using DTI data

Table 2.2 and Figure 2.4 show a continuous decrease in the amount that textile and clothing firms invest in capital expenditure. This has seemed to remain steady since 2010/2011. Roberts and Thoburn (2010) argued that South African firms that have responded to liberalization by upgrading their capabilities and fostering product differentiation have achieved more success. South African firms should compete on quality, design and delivery rather than simply on price (Roberts and Thoburn, 2010). This is not possible without investment in capital, technology, innovation and skills. Investment in capital equipment is vital, not only to replace capital goods, but also to upgrade capabilities (Morris and Reed, 2008). However, threat facing the industry (e.g. China) resulted in a lack of confidence in the future of South African clothing and textiles manufacture, which contributed to the lack of investment.

2.5.6. Real Remuneration per Employee

Figure 2.5 reflects the real remuneration per employee in the textile and clothing industry of South Africa, recorded in rand at 2010 constant prices. Separate data for the industry is also provided.

Figure 2.5: Real remuneration per employee



	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Textile	38,771	43,352	51,070	51,744	53,035	51,922	57,856	46,169	48,107	45,783
Clothing	20,658	24,128	30,195	40,596	51,028	59,184	66,849	71,737	71,722	72,149
Total	59,429	67,480	81,265	92,340	104,063	111,107	124,706	117,906	119,829	117,932

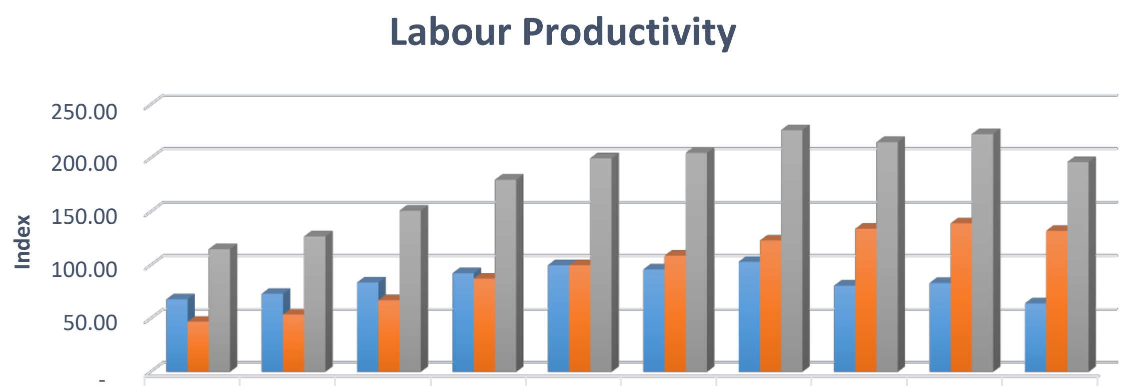
Source: Author's own using DTI data

Figure 2.5 displays that as more people were getting unemployed in these industries, the wage rate was increasing. This does not concur with economic theory (i.e. Classical Theory, Structuralise Theory etc.) that state that an increase in the wage rate leads to an increase in employment. Other factors could have played a role in this outcome. As of 2010, employees in the clothing industry received higher remuneration than those in the textile industry, as opposed to prior 2010. Employees in the clothing industry have been getting higher remuneration each year over the past 10 years while the textiles industry employees' remuneration continued to fluctuate.

2.5.7. Labour Productivity

Figure 2.6 displays the labour productivity of the textile and clothing industry of South Africa, recorded in index 2010 = 100. Separate data for the industry is also provided.

Figure 2.6: Labour Productivity



	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Textile	68.00	73.19	83.80	92.41	100.00	96.02	103.12	80.81	83.26	64.21
Clothing	46.99	53.76	67.18	87.43	100.00	108.91	123.10	134.14	139.21	132.13
Total	114.99	126.95	150.97	179.84	200.00	204.93	226.22	214.96	222.47	196.34

Source: Author's own using DTI data

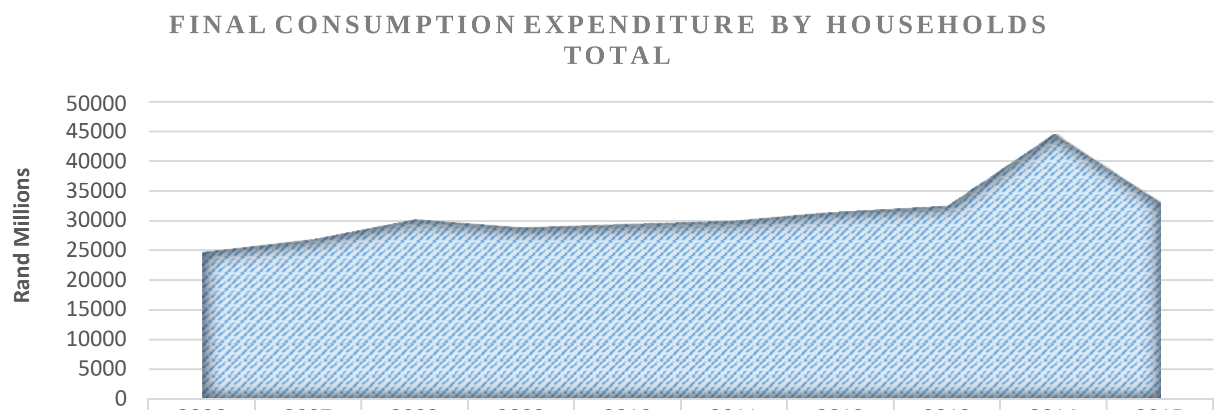
Figure 2.6 reflects labour productivity in the textile and clothing industry, and could be linked to Figure 2.5. The increase in the remuneration per employee in the clothing industry is reflected by a continuous increase in the labour productivity of the clothing industry. The same is seen with the textiles industry labour productivity, it is a reflection of the remuneration rate. However, there was a decrease in labour productivity in the textile and clothing industry from 2014 to 2015.

Comparatively high wage rates and total labour costs, relatively few hours worked per week and inefficient workers leads to high unit labour costs and low levels of productivity. Investment in sophisticated machinery in the textiles industry will reduce unit labour costs and thereby raise productivity and retooling of the clothing industry will similarly result in more efficient production (Morris and Reed, 2008).

2.5.8. Final consumption expenditure by households

Figure 2.7 reflects the final consumption expenditure by households in the textile and clothing industry of South Africa, recorded in rand millions at 2010 constant prices. Separate data for the industry could not be provided due lack of availability of the required information.

Figure 2.7: Final consumption expenditure by households



	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Total	24573.01	26648.89	30097.54	28726.41	29351.43	29848.74	31413.39	32421.66	44481.12	32848.34

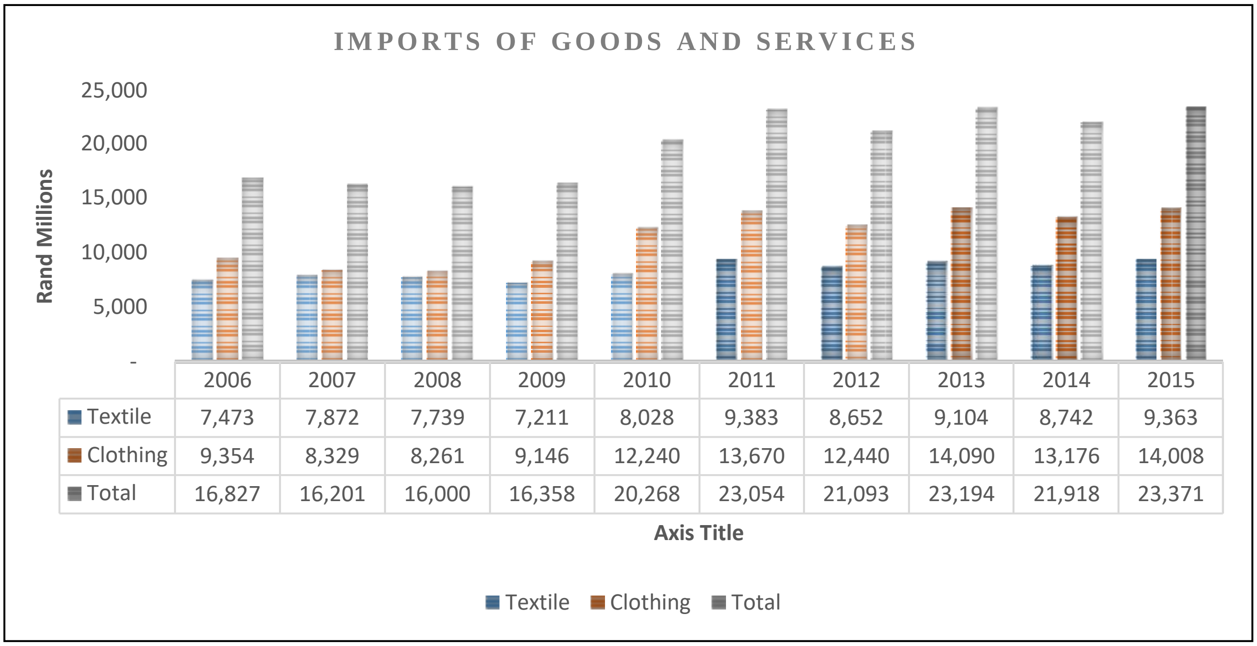
Source: Author's own using DTI data

Figure 2.7 depicts that final consumption expenditure by households in the textile and clothing industry seemed steady from 2008 to 2013 as it ranged between 25 000 and 30 000. It then faced a dramatic increase from 22013 to 2014 followed by a dramatic decrease from 2014 to 2015. The fundamental issue from the perspective of the local clothing and textile industry is whether this growth in domestic demand was satisfied by local production? The answer is that sales of clothing and textiles products into the domestic market have run in the opposite direction. The increased domestic demand in 2013/2014 could have been taken up by an increasing reliance on imported clothing and fabric.

2.5.9. Imports of Goods and Services

Figure 2.8 reflects the imports of goods and services in the textile and clothing industry of South Africa, recorded in rand millions at 2010 constant prices. Separate data for the industry is also provided.

Figure 2.8: Imports of Goods and Services



	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Textile	7,473	7,872	7,739	7,211	8,028	9,383	8,652	9,104	8,742	9,363
Clothing	9,354	8,329	8,261	9,146	12,240	13,670	12,440	14,090	13,176	14,008
Total	16,827	16,201	16,000	16,358	20,268	23,054	21,093	23,194	21,918	23,371

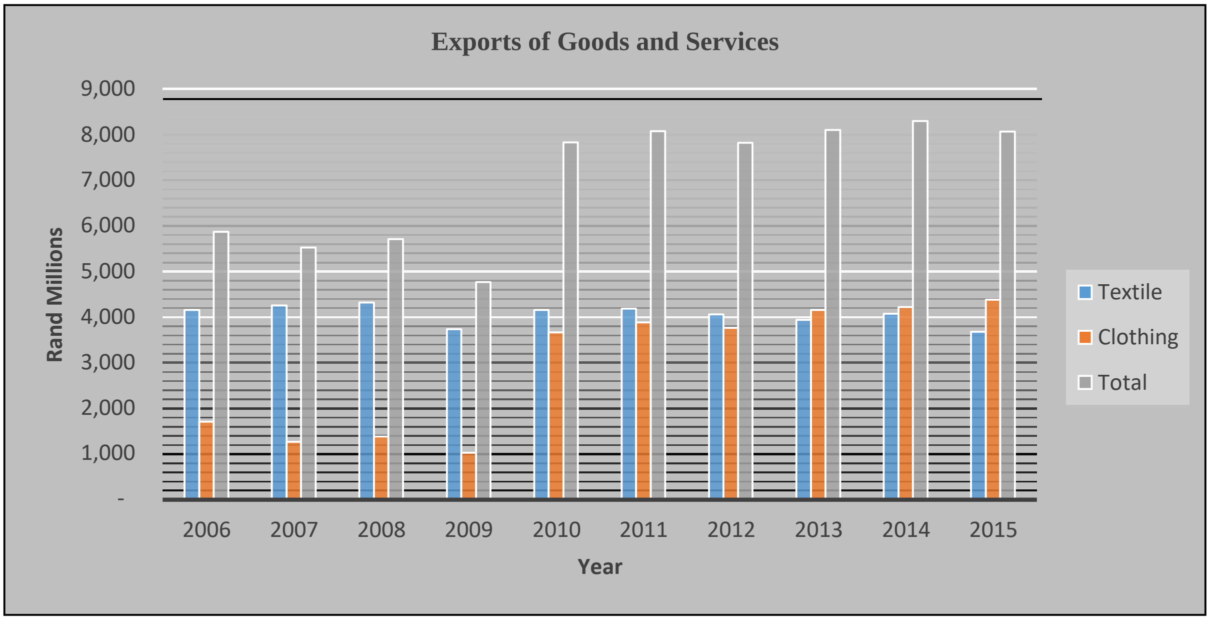
Source: Author's own using DTI data

Imports in the textile and clothing industry experienced a dramatic increase in 2009 and have, since then, been significantly high. It seems that there are more imports of clothing goods and services than there is for textile goods and services. The fluctuations in the imports of textile and clothing goods and services are also a result of various policies which integrated the textile and clothing industry into global markets. These policies are discussed in section 2.6.1.

2.5.10. Exports of goods and services

Figure 2.9 displays the exports of goods and services in the textile and clothing industry of South Africa, recorded in rand millions at 2010 constant prices. Separate data for the industry is also provided.

Figure 2.9: Exports of Goods and Services



Source: Author's own using DTI data

Figure 2.9 shows that although more clothing was being imported, South Africa exported more of its textile goods and services. However, this was only until 2013. Exports of goods and services in the textile and clothing industry dramatically increased in 2009 to 2010 and have since then remained quite stable. Just as with imports, the fluctuations in the exports of textile and clothing goods and services are also a result of various policies which integrated the textile and clothing industry into global markets. These policies are discussed in section 2.6.1.

2.6. Policies in the Textile and Clothing industry

2.6.1. Policies of Integration: Textile and Clothing industry into Global Markets.

Many factors drove to the globalisation of the textile and clothing industry production, chief among these are labour costs and the quota system established by the Multi-fibre Agreement (MFA) in 1974

i) The Multi-fibre Agreement (MFA)

In 1974, the General Agreement on Tariffs and Trading (GATT) was first signed; however, clothing and textile were not included in the agreement. The country's rights to impose quotas on clothing and textiles were then ratified when the MFA was signed in 1974. This agreement was frequently renewed even though it was intended to be temporary (Barnes et al, 2004). This agreement was entered into to provide for bilateral agreements between trading nations that would regulate trade in clothing and textile thus allowing for the imposition of import limits in the case of market disruption (United Nations, 2005). An elaborative quota system served as the principal vehicle where import quotas for detailed categories of goods from each major trading partner were established by each country. MFA quotas were applied differently in different products and exporting countries. Quotas added to the cost of production both indirectly, by restricting supply thus rising prices for consumers, and directly, since quotas were frequently sold and this became the cost of doing business. Quota restriction affected industrial upgrading.

ii) Agreement on Textiles and Clothing (ATC)

The GATT signatories signed the ATC in 1994 committing to phasing out the MFA over a 10 year period. Simultaneously, the World Trade Organisation (WTO) replaced the GATT. The ATC came to an end in December 2004 and with it all quotas on clothing and textiles between members states of the WTO (Flanagaan, 2003). Removal of quotas generally means intensified competition for foreign direct investment in textiles and clothing (United Nations, 2005). Countries will need to develop their ability to move from assembly to finished product to stay competitive as host locations. Countries can eventually get to original brand manufacture. Removal of quotas also means intensified competition among suppliers and low labour costs alone will not be sufficient to attract production of textile and clothing.

iii) The African Growth and Opportunities Act (AGOA)

The Generalised System of Preferences (GSP) program is authorised under GATT. This program is one whereby countries offer certain unequal tariff preferences to developing countries. The AGOA is a United States program and it builds on the existing GSP program by expanding duty-free benefits to an additional 1800 product lines and covers from October 2000 to September 2008. 37 Sub-Saharan African countries are eligible for this agreement (Morris et al, 2004). AGOA is part of the US Trade and Development Act of 2000 and exempts from quota and tariffs imports from 38 African countries that meet certain requirements (United Nations, 2005).

Products that are ineligible under the GSP and AGOA are textile and clothing. AGOA's rules of origin states clothing has to be made from United States fabric, yarn and thread or from fabric, yarn and thread produced in AGOA beneficiary Sub-Saharan African countries. However, countries with that have a Gross National Product per capital of less than $1500 in 1998 are allowed duty-free access for clothing made from fabric originating anywhere in the world for a four year period until September 2004. All AGOA beneficiary Sub-Saharan countries except South Africa and Mauritius qualify for this rule (Morries et al, 2004). In July 2004, AGOA was extended to 2015 and the special third country fabric rule was extended until 30 September 2004.

2.6.2. Impact of Opening up the Textile and Clothing Industry

The textile and clothing industry depended on the domestic market before 1994 (Roberts and Thoburn, 2004), however, the market has been flooded with low price imports since South Africa's integration into the global economy. These cheap imports are primarily from China (Noordas, 2004). The influx of relatively cheap Chinese textiles and clothing has severely damaged South Africa's production capabilities and output. Manufacturers and retailers find it difficult to compete with low cost alternatives, which are appealing to many low-income earners (Dhliwayo, 2004). This has forced them to either shut down operations or lay off workers. The industry has not been able to adjust sufficiently to challenges of greater import competition due to trade liberalization and rising competitiveness from China (Vlok, 2006). South Africa's manufacturing sector has been particularly vulnerable to the competitive threat posed by China in both domestic markets and foreign exports as they lag behind with regards to prices, speed to markets, labour productivity and quality of products (Jacobs, 2011).

South Africa's textile and clothing industry was also heavily dependent on the Africa Growth and Opportunity Act (AGOA) that gave it preferential access to markets in the United States. This boosted South Africa's exports, however Asian textile and clothing companies established subsidiary companies in South Africa in order to capitalize on the duty free access to the United States market (Matume, 2006). The influx of Asian companies placed many local companies out of business due to the inability to compete with Asian companies' low production costs and technological superiority. Sudden disinvestment occurred when the AGOA agreement expired in 2007. Companies that exploited opportunities presented by the AGOA agreement caused massive loss of sales and loss of jobs; this is evidenced by the drop of clothing exports to the United States (Vlok, 2006).

There is an urgent need for government and private sector cooperation to revive this ailing industry through investment and incentives. If left unresolved, the Chinese textile and clothing industry could wipe out one of Africa's potentially largest income generating industries to the detriment of local economies and people (Dhliwayo, 2012).

Large firms attracted investment as response to the impact of globalisation thus enabling them to update machinery and processes (Roberts and Thoburn, 2004). This resulted in increased clothing exports and improved productivity. However, these changes brought along costs since increased productivity meant reduced levels of employment (Bezuidenhout et al., 2007). Small and medium enterprises struggled most because they were unable to attract necessary investments (Roberts and Thoburn, 2004). Bezuidenhout et al (2007) stresses that increasing productivity without reducing employment levels will be extremely difficult. Any technological advancement meant to improve productivity will mean a transition from labour intensive to capital intensive, resulting in fewer workers required.

There was a major shift from protectionist policies that resulted in low productivity towards policies that promoted competition and facilitated efficiency when South Africa integrated into the global economy. Effective policies enabled many firms to benefit from globalisation and overcome the potential challenges. However, rapid integration had many losers (Green, 2009). South African firms that responded by upgrading their capabilities and adopting product differentiation and specialisation have apparently achieved more success. Roberts and Thoburn (2002) thus believe that instead of competing on their price, South African firms should compete on quality, design and delivery. However, this is not possible without capital, technology, innovation and skills.

Morris et al (2004) interviewed industry representatives and indicates that the threats facing the industry are China, illegal imports, dumping and the failure of government to confirm its national policy in respect to supporting the textile and clothing industry. These threats resulted in a lack of confidence in the future of South African clothing and textiles manufacture, which has contributed to the lack of investment.

2.6.3. Policies Aimed at Addressing Unemployment in the Textile and Clothing Industry.

South Africa has a profitable location and manufacturing competences to benefit from the growing African market (Joffe, Kaplan, Kaplinsky & Lewis, 1995), amplified design and marketing capabilities could qualify the industry to take advantage in this market. This can be through proper education and training. Therefore, training programmes were put in place. The Department of Trade and Industry intervened for relevant degrees to be offered in some South African universities such as Nelson Mandela Metropolitan

University (offers a doctorate degree in garment manufacturing), Stellenbosch University, Tshwane University of Technology and Durban University of Technology).

A strong SME (Small and Medium Enterprises) base is considered important to promote competition, create employment and cultivate social stability (Ladzani & Vuuren, 2002). Effective targeted policies can be instigated to foster SMEs, particularly with regards to providing access to finances for SMEs (Green, 2009). South Africa's Industrial Development Corporation (IDC) provides finance for SMEs, despite the risks that discourage commercial investment (IDC, 2008).

In 2009, the Clothing, Textiles, Footwear and Leather Competitiveness Scheme were also launched to encourage the upgrading and modernisation of factories. In the same year, the IDC co-launched the Production Incentive Programme with the Department of Trade and Industry, and it administered the launch of the department's Clothing and Textiles Competitiveness Programme. The Department of Trade and Industry introduced the Clothing and Textile Competitiveness Programme (CTCP) which is funded by National Government and administered by the Industrial Development Corporation (IDC). This programme is aimed at improving the global competitiveness of the sector through a range of structured interventions covering all aspects of business operations, from very specific technical skills through to generic business skills. Companies participating in the programme range from small (1-15 employees), medium (16 -50 employees) and larger (51-300) clothing manufacturers with widely differing levels of sophistication

The Clothing and Textile Competitiveness Programme (CTCP) consists of the Production Incentive Programme (PIP) and the Competitiveness Improvement Programme (CIP). The PIP focuses on individual companies and encourages manufacturing by concentrating on raw materials and sales. It looks into skills development (people), improving processes (new products) and processing (new systems). The CIP focuses on clusters. Companies that produce the same product are clustered together to share resources. It looks into getting a finished product from raw materials to the customer.

The Department of Trade and Industry has encouraged footwear cluster by leading companies to encourage small and medium enterprises to produce a full shoe and sell finished footwear instead of hides. It encourages the use of local input. Only chemicals and finishes that are locally found are used. The South African Police Services, funded by the Department of Trade and Industry, monitors compliance to these rules. A range of general policies are required to ensure that South African industries are able to compete on the global market (Green, 2009). Clusters of firms can increase productivity within the industry as it enables firms to specialise in a small range of products while relying on other firms in the cluster for other products (Barnes & Kaplinsky, 2000).

2.7. Conclusion

The textile and clothing industry has proven to evolve over the past years. It was dependent on the domestic market but started facing challenges when it was opened up in the 1990s. It has, since then, been inefficient as it lacks capital, technology and innovation. The industry also has high labour costs in relation to output due to globalisation. Liberalisation and restructuring of the textile and clothing industry resulted in large declines in employment. Competitiveness declined due to negative growth, declined employment, and increased competition, cheap imports, illegal imports and dumping. Given a country like South Africa, small businesses are encouraged to help reduce unemployment but difficult access to finance makes it hard for these small businesses to grow in this industry. The textile and clothing industry is a labour absorbing industry for many developing countries, including South Africa, and analyses of its determinants of employment are essential.

CHAPTER 3: LITERATURE REVIEW

3.1. Introduction

This chapter reviews the various theories and empirical studies of unemployment and its subsequent relationship with various determinants (such as wage rate, effective demand and output). The chapter starts by defining the concept of unemployment as well as the textile and clothing industry. It explains the types of unemployment and consequences of unemployment. The chapter thereafter presents the various theories of unemployment followed by empirical literature.

3.2. Types of unemployment

Khumalo (2014) classified unemployment into four types. The four types of unemployment are known as frictional unemployment, structural unemployment, seasonal unemployment and cyclical unemployment (D'Souza, 2009).

Frictional unemployment occurs during a transition of a worker from one job to another or when workers enter the job market for the first time (D'Souza, 2009). This occurs of the amount of time it takes for one to find employment or to move from one job to another (Khumalo, 2014). People who leave one job or are looking for employment usually do not find employment immediately although there are vacancies in the economy. There will always be workers who are changing jobs at any point in time or who are entering the labour market. Thus, frictional unemployment is inevitable and it is not deliberated to be a serious problem in the economy (Mohr and Fourie, 2008).

Structural unemployment occurs in periods of economic change (D'Souza, 2009). It comes as a result of the disappearance of jobs due to structural changes in the economy (Mohr and Fourie, 2008). It is also a result of the incompatibility between worker qualifications and job requirements (Khumalo, 2014).

Seasonal unemployment varies predictably with the seasons (D'Souza, 2009). It is caused by variations in seasons, for instance, in agricultural based economies, farmers and labourers have little work during off seasons (Khumalo, 2014). People who have jobs only in busy seasons are deemed seasonally unemployed (Gupta, 2004).

Cyclical unemployment is associated with a reduction in real output during periods of recession (D'Souza, 2009). Adverse supply and demand shocks result in cyclical unemployment (Khumalo, 2014). Adverse supply shocks come in the form of falls in the work forces and capital inputs. Such supply shocks also include increases in the cost of labour, raw materials, energy and supplies, tax rates and firms expected inflation. Some of these tend to increase the cost of production, which, ceteris paribus induces firms to cut their production. The others directly affect aggregate supply and, given the aggregate demand, the real income and employment falls. This in turn results in retrenchment, redundant workers and lay-offs (Gupta. 2004). Cyclical unemployment is the unemployment that increases when there is a slowdown in economic activity and that decreases when real output increases (D'Souza, 2009).

The sum of seasonal, frictional and structural unemployment is also referred to as the natural rate of unemployment. However, the focus of macroeconomics is cyclical unemployment (D'Souza, 2009).

3.3. Theoretical Framework

There are a number of theories which explain employment in a given country. Based on an extensive review of the theoretical literature, some of the major approaches are presented and critically analysed. This section highlights the major theories of unemployment such as the Structuralist theory of unemployment, classical theory of unemployment, Keynesian theory of unemployment and post-Keynesian theory of unemployment. This section will also highlight the factors that influence unemployment with regards to each theory.

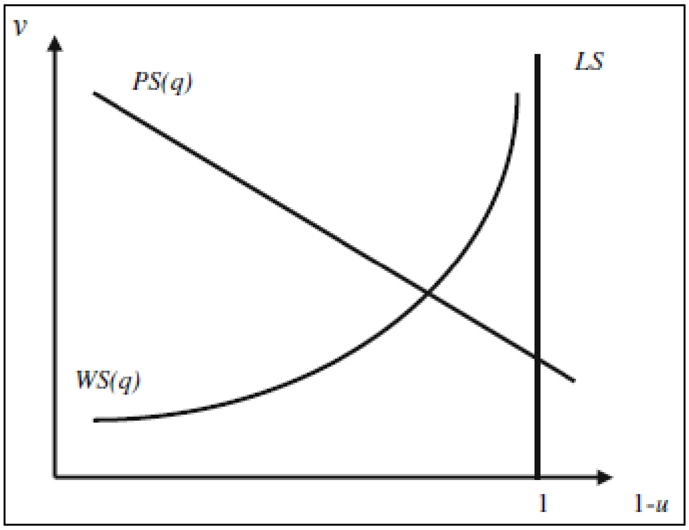
3.3.1. Structuralist Theory of Employment

Phelps (1995) mentions the following three that are centrepieces of the theory:
Firstly, the unemployment rate of a country that is integrated with the world capital market can immediately and permanently rise given a permanent external upward shock to the world real interest. This shift lowers the equilibrium labour demand curve with the result that the employment rate is decreased. The increased overseas interest rate operates through the channel of the domestic interest rate. When the channel to the domestic interest rate is weak it results in a depreciation of the real exchange rate which has a similar effect. Secondly, different interventions in the labour market not only lower the wage rate but also raise the natural unemployment rate. This suggests that wage rate, due to labour market interventions, has an influence on the unemployment rate. Edmund (1995) gives taxation of employment as a leading example. A reduction in taxes can reduce unemployment (Mouhammed, 2011). People have more incentive to work and firms would be more inclined to work. Lastly, Edmund (1995) mentions the role of wealth and social capital or the flow of benefits there from contributes to the high propensity to quit or shirk. This is because with wealth, the dependence on steady employment is considerably reduced. Employers may drive up the going wage in an effort to obtain better employee performance and if they fail to do so, the impact is also a drop of the labour market curve (reflected in the reduction of the marginal productivity of employees). The ultimate effect is then an increased unemployment rate.

Structuralist theory postulates that changes in real interest rates, asset prices and wealth leads to changes in the natural or equilibrium rate of unemployment (Zimmerman, 2007). Structuralist models use the now standard *WS-PS* framework of modern unemployment theory (Blanchard, 2000). This framework uses a real wage-employment diagram to generate the existence of involuntary equilibrium unemployment (Phelps, 1994).

Figure 3.1: Equilibrium real wage and equilibrium employment

Real
Wage



Aggregate Employment Rate

Source: Zimmerman (2007)

The vertical axis shows the real wage rate and the horizontal axis shows the aggregate employment rate. Stylized, the economy is closed. The unemployment rate is *u* and if the exogenously given aggregate labour supply, *LS,* is normalised to 1 (for simplicity) then (1-*u*) is the aggregate employment rate. *L* is the number of labour market participants, *U* is the number of unemployed and *N* is the number of employed. By definition *U* = *L* - *N*. The employment rate *u* is defined as $u = \frac{L-N}{L} = 1 - \frac{N}{L}$; Then the aggregate employment rate *N/L* results as *N/L* = 1 – *u*.

The actual value of the equilibrium rate of unemployment is determined by a downward-sloping labour demand curve or, in the setting of imperfect goods markets, a price setting curve *PS*. The price-setting curve *PS* represents equilibrium on goods market. It gives the real wage, *V*, which firms are willing to pay (given their correct expectations on their relative competitiveness and real wages). Price setting is a non-increasing function of employment. Hence, price-setting and thus labour demand depends negatively on the mark-ups of prices over wages. The higher the real wage the less labour is demanded and vice versa. What firms will pay for labour generally depends on real asset prices and thus on interest rates (Phelps, 1994). Structuralist theory focuses on the specific assets firms invest in: physical capital, customers and trained employees.

The existence of involuntary equilibrium unemployment is generated by an upward-sloping wage setting (*WS)* curve. The Structuralist theory builds on standard efficiency wage theories, in respect to the *WS* curve, which are made vigorous by incorporating asset prices, real interest rates and wealth. The crucial assumption of efficiency wage theory is that the real wage is not causally dependent on productivity, but productivity is causally dependent on the real wage. Efficiency wage theory postulates that firms do have an incentive to pay real wages above the market-clearing level to increase productivity ("efficiency") of employees and to decrease turnover costs in deterring employees from shrinking and quitting (Yellen, 1984 and Bellante, 1994). The optimal efficiency wage is determined by the real wage costs on the one hand and the benefits of a real wage increase in terms of higher productivity and lower turnover costs on the other.

Shirking and quitting behaviour of employees is determined by job opportunities elsewhere (measured by the aggregate employment rate) and alternative sources of income of labour income: The lower the unemployment rate and the higher the income, the more likely it is that employees want to quit or show some kind of shrinking behaviour, because lower unemployment makes it easier to find a new job and higher non-labour income makes it easier to live without work. Hence, if aggregate employment or non-labour income sources increase, employers will increase efficiency wages to battle shirking and quitting, thereby creating endogenously (i.e. not directly imposed by government laws) involuntary unemployment equilibrium (Zimmerman, 2007). Labour market equilibrium is given if the increased wage costs have increased unemployment so much, that no firm has incentive to increase wages further. Thus, the optimal efficiency wage rises if employees' propensities to shirk or to quit increase in reaction to higher aggregate employment. Hence, *WS* is a non-decreasing function of employment rate. The higher the employment, the higher the required efficiency wage level for labour market equilibrium and vice versa (Zimmerman, 2007).

Zimmerman (2007) further explains the crucial variable *q* in the Structuralist paradigm. It represents the present value of the expected future profits of an additional unit of the firms' investment in their assets. It is interpreted as the price of shares that represent ownership claims to identical amounts of assets of the homogenous firms. Stock prices incorporate approximately all relevant information about the future evolution of firms' assets. *q* Depends positively on expected profitability and negatively on the instantaneous real interest rate. *q* is a shift parameter of the *PS* curve: A rise of stock prices gives firms incentives to invest in their assets. Hence, derived labour demand increases, *PS* shifts to the right and employment increases ceteris paribus and vice versa. However, a decrease in labour demand leads to a fall of employment only if real wages are 'rigid' in the sense that real wage *v* does not adjust enough to accommodate fully a downward shock to labour demand, so that employment bears some of the adjustment (Phelps, 2004). Real wage rigidity is modelled via the *WS* curve. If real wage rigidity would not exist, labour market equilibrium would settle down at the intersection of the *LS* curve and *PS* curve i.e. at the full employment level. In Figure 1, the wage curve *WS* shows the current real wage *v* needed for labour market equilibrium (in the sense of correct expectations). In contrast to *LS*, *WS* represents the macroeconomic relevant labour supply.

The above diagram depicts that the relevant factor that influences employment is the real wage rate which is influenced by factors such as productivity and labour demand. Labour demand is influenced by real asset prices (defined as physical capital, customers and trained employees) and interest rates. Productivity is influenced by factors that would induce an employee to quit or shirk (such as job opportunities elsewhere or non-labour income sources i.e. wealth). Structuralist explains these factors as reasons for involuntary unemployment equilibrium.

3.3.2. Classical Theory of Employment

The classical employment analysis is based on the market law which is simply a description of market exchange activity by French economists Say stating that supply creates its own demand (Mouhammed, 2011). The Classical theory was also analysed by Pigou in 1933 and Solow in 1981. It argues that the labour market consists of demand and supply of labour (Mouhammed, 2011). Rodriguez (2015) highlights three basic ingredients in his analysis of the Classical theory of unemployment, namely, labour demand, labour supply and wage equation. Unemployment and real wages are positively related following a reduction in spending but are negatively related following a reduction in supply (Brunner and Meltzer, 1978).

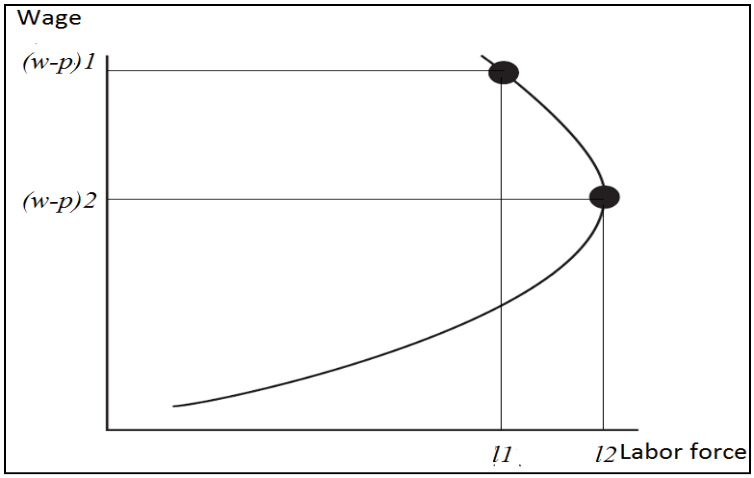
The demand curve is a negative function of real wage in that if wages increase then the quantity demand of labour will decline and the opposite is correct (Mouhammed, 2011). The labour demand schedule determines the amount of labour that firms employ at a given real wage (Rodriguez, 2015). The way to get the labour demand is by means of the neo-classical function of production. The conditions governing production are described by a production function, and the demand for labour is derived from this function (Brunner and Meltzer, 1978). Economic theory says production of goods and services have two factors, namely, labour demand and capital stock. Two assumptions hold, first, constant returns to scale for the production function and second, diminishing returns to either factors of production. On the other hand, firms select the level of labour to maximise their profits by taking prices of labour and capital. Therefore, prices, wages and capital rents represent the cost of the output and each factor of production respectively.

The theorem of the implicit function helps identify the sign of labour demand with respect of real wages. These relations yield a negatively sloped aggregate demand curve for labour relating offers of employment and the relative price of labour or real wage (Brunner and Meltzer, 1978). There is a negative correlation between employment and real wages which denotes a negative-sloped curve for the labour demand (Rodriguez, 2015). Given the slope of labour demand's curve, Rodriguez (2015) further identifies the elements that affect the labour demand shifts. Rodriguez (2015) concludes the analysis of the labour demand curve by stating that productivity and stock of capital are key factors to rise up employment while an increase in real wage or the monopolistic power have a negative effect on it.

The supply of labour is based on individual decisions to give up other activities – loosely described as leisure – and allocate time to labour (Brunner and Meltzer, 2105). The supply of labour is derived from worker's choice whether to spend part of time working or not working (leisure). Supply of hours worked is a positive function of the real wage, because if the real wage rises, workers supply more hours of work (Mouhammed, 2011). A rise in the current real age induces workers to supply additional man-hours now and fewer man-hours in the future (Brunner and Meltzer, 1978). The labour supply curve basically determines the size of the labour force; this refers to total individuals willing to work at a particular real wage. Individuals who are considered to be part of this labour force are those whose opportunity costs in terms of consumption of goods are lower than the real wage (Rodriguez, 2015). The theory of consumption from a microeconomics perspective helps in obtaining the labour supply in the classical theory of unemployment (Brunner and Meltzer, 1978; Rodriguez, 2015). Individuals choose a certain level of consumption and labour in order to maximise their utility function.

Additionally, the amount of available hours is considered and the time during the day that an individual does not work is also measured. The maximisation of profits is also subject to a budget constraint. Specifically, this constraint ensures the consumption must equal labour and capital or non-labour rents. The slope of the labour supply, that is to say the relationship between real wages and employment, will depend on the utility function's form. One can use a logarithmic function and solve according to the constraint. The results will show that real wages affect employment positively. However, Rodriguez (2015) argues that this cannot be taken as conclusive; at the end what makes the difference is the empiric evidence. Rodriguez (2015) further argues that the slope of the labour supply can also be positive or negative depending on the so-called income effect and substitution effect compiled in the Slutsky equation. The diagram below depicts this:

Figure 3.2: Labour Supply Curve Real Wage



Source: Rodriguez (2015)

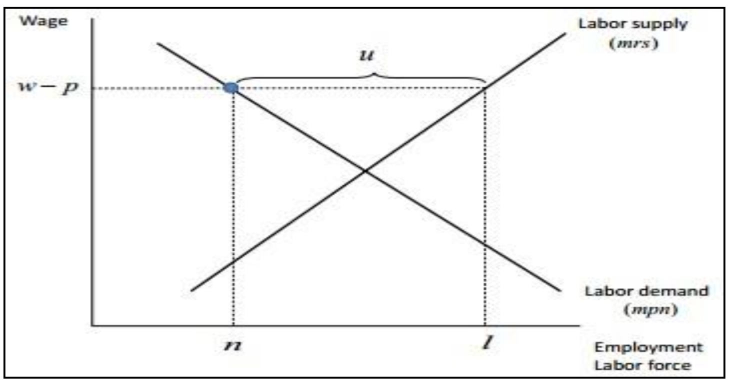
Real wages and the labour force (measured by the amount of work hours) are the axis of the curve. When the net effect is positive, and the substitution effect is bigger than the rent effect, the net effect is positive and workers will work more hours when their wages increase. However, when the rent effect is bigger, the workers will refer to work less. The Slutsky equation will then define a positive-sloped curve among real wages and the amount of hours when the substitution dominates (b) whereas a negative net effect will be accompanied by a negative-sloped curve (a). With reference to the substitution effect, if wages go up, leisure is more expensive due to a higher opportunity cost (in this theory the consumer consumes labour or leisure only) and leisure finally decreases, it is an increase in labour substituting leisure by consumption. This effect is called the substitution effect. The income effect on the other hand, if wages go up, rent increases as well and individuals prefer to consume the extra rent in leisure instead of labour and therefore labour decreases. Note that this theory assumes that leisure is a normal good (the more rent you have, the more you consume) but rent is not constant. However, Rodriguez (2015) concluded and agreed on a labour supply curve with a positive slope.

In equilibrium, demand and supply of labour are intersected at a clearing point that determines the equilibrium real wage rate and full employment (Mouhammed, 2011). The classical theory is essentially a theory of self-employment in which, if prices are perfectly flexible, involuntary unemployment can arise only from frictional delays in the physical change-over from serving one market. However, this law meets serious limitations when an attempt is made to make it applicable to the labour market and to the conditions of employment level (Keynes, 1936). Job opportunities available and employers' demand or workers' services may not be enough for all the number of workers, meaning that not all available working force can be absorbed. According to classical economists, apart from frictional obstructions, unemployment would be non-existent if it were not for the fact that wage-earners habitually stipulate for a rate of wages higher than the equilibrium level (Mouhammed, 2011). In the classical theory, the level of (self-) employment is limited only by the supply of labour available at a given real wage, so that non-employment is either voluntary or frictional.

Classical economists, therefore, answer this problem by stating that wage rate should be cut or lowered so that employers will be induced to employ more workers. Wicksell thought it would be a good idea to raise wages in order for workers to buy more (Jonung, 1989). However, this action may cause workers to lose their jobs as a result of higher wages (Mouhammed, 2011). Flexible rate of wages is a classical approach to solve the problem of unemployment (Rodriguez, 2015). If wages are sufficiently flexible downward then this decline can maintain full employment (Jonung, 1989). Rodriguez (2015) explains how salaries are set up by external agents (like labour unions) and employees through collective or individual bargaining over the competitive level. The real wage is determined by the bargains between employers and workers, and the real wage in turn determines level of employment. Generally, wages are fixed according to a given level of unemployment but they are also subject to other measures of the labour market like labour taxes or unemployment insurance (Rodriguez, 2015). Blanchard et al. (1999) remarks several key factors in the process of configuring a wage equation, namely, the wage itself, productivity, reservation wage (minimum wage a worker is willing to accept) and labour market conditions.

Classical approach is of the view that there are higher wages when there is more employment and the labour market is performing well. Classical approach argues a flexible wage rate in achieving full employment and regards workers who resist a cut in the wage rate as voluntarily unemployed and any disturbances in the initial equilibrium conditions are considered as temporary and minor. This can be further explained through the use of a graph:

Figure 3.3: Unemployment in the Classical Theory of Employment



Source: Rodriguez (2015)

Equilibrium level of employment, *n*, and real wage, *w/p*, are obtained. At this point both have the intersection between wage equation and labour demand. The unemployment is determined, thus, by the gap between this intersection and the labour supply at a given real wage. Under this perspective, unemployment appears because the real wage is above the competitive level, where labour supply and labour demand cross out. To reduce unemployment the solution is very intuitive: reducing the wage equation till it reaches equilibrium level.

If wages are sufficiently flexible downward, then this decline can maintain full employment (Jonung, 1989). The wage rate is also influenced by productivity. The increase in wages is most likely due to increased labour productivity and wage reduction will reduce work intensity and productivity (Mouhammed, 2011). Mouhammed (2011) is of the view that higher wages should stimulate the substitution effect by employing more machines for labour and this substitution will increase labour productivity and employment in the long-run. Labour market conditions also influence unemployment in the classical theory (Blanchard, 1998). Classical economist, Hayek, is of the view that unemployment is due to discrepancy between the distribution of labour between industries and the distribution of demand among their producers Nishiyama and Leube, 1984). This discrepancy is caused by a distortion of the system of relative prices and wages. In other words, the unemployment is caused by a deviation from the equilibrium prices and wages which would establish them with a free market and stable money. This is actually a mismatch between demand and supply of labour, which is usually caused by expansionary monetary and fiscal policies and powerful trade unions. In short, for Hayek the unemployment problem is caused by resources being in the wrong places at the wrong time and can be corrected if wages and prices are determined by the equilibrium of supply and demand.

Similar to the structuralist theory of unemployment, the main factor that determines unemployment in the classical theory is a flexible wage rate. Classical economists believe that supply creates its own demand and equilibrium is achieved through a flexible wage rate. Factors that further influence unemployment according to classical economists are productivity and labour market conditions. Classical economists believe that anyone who refuses to work at the given wage rate is voluntarily unemployed and this is only temporary. However, Keynes holds a different view and challenges the discrepancies found in the classical theory of unemployment.

3.3.3. Neoclassical or Monetarist Theory of Employment

The monetarist theory of unemployment is counter unemployment theory developed by the famous monetarist, Milton Friedman, who interpreted the General Theory as a market-clearing model in which an increase in nominal wages induced workers to increase the amount of labour supplied as they confuse a change in nominal wages for a change in real wages (Garrison, 1984). Milton Friedman believed that unemployment is the difference between labour demand and labour supply. Since economic theory states that households and firms base their decisions on labour supply and demand on real wages and not nominal wages (Khumalo, 2014), this is to say, real wage should rise where there is excess demand for labour and it should fall when there is excess supply (Gottschalk, 2002). Real wages is the money wage that has been adjusted for cost inflation. Chernomas (1983) defined the natural rate of unemployment as the equilibrium in the labour-market, where there is no excess supply or demand in the aggregate for labour. Workers are unwilling to work longer hours if an increase in their money wage does not mean an increase in their real wages and firms are not willing to produce more if their selling price increases by the same rate as the cost of production (Khumalo, 2014).

In Friedman's theory, the natural rate of unemployment is determined by all real conditions affecting the supply and demand for labour. These factors include all institutional arrangements such as the degree of unionisation, minimum wage laws, proportion of women in the workforce, status of worker education and so forth. However, deviations from the natural rate of unemployment occurred when there were errors in expectations of price level and therefore of the real wage (Khumalo, 2014).

The monetarists theory of unemployment assumed that the level of full employment could be achieved and unemployment removed by changing the money supply (Jain and Khanna, 2010). Monetarist emphasised the importance of money in macroeconomics because it temporarily affects the output and employment levels or, in the long run, change in the money supply affects only the price level (Khumalo, 2014). Khumalo (2014) further explains that the theory also assumed that the velocity of money is constant hence changes in the supply of money directly influence aggregate demand, that is, increase in money supply causes an increase in aggregate demand. The monetarist/neoclassical theory attach greater importance to monetary policy than fiscal policy.

Monetarists seemed to believe that any unemployment creating wage imbalance likely had its origin in monetary disturbances e.g. a decrease in the supply of money would leave prices and wages unchanged, raise real wages, and thus accelerate the unemployment problem (Vedder and Gallaway, 1997). Monetarists, like most Keynesians, attached little importance to labour markets and gave little emphasis to the role of wages in unemployment determination (Khumalo, 2014).

3.3.4. Keynesian Theory of Employment

Keynes (1936) observes that the assumption that real wage depends on the money-wage bargains between employers and works is not obviously true, and appears to depend on the tacit assumption that the price-level is determined independently by the quantity of money. This assumption clashes with the classical view that money is neutral. Keynes demonstrates that the predictions of Classical theory do not accord with the observed response of workers to changes in real wages. Keynes (1936) observes that levels of unemployment are associated with a real wage above the market clearing levels but employers and workers cannot reduce the real wage simply by agreeing lower money-wages. Keynesians are of the view that employment is what determines the real wage, not the other way around like classical model predicts (Rodriguez, 2015). Consequently, real wage cannot be considered as a mechanism to adjust employment anymore.

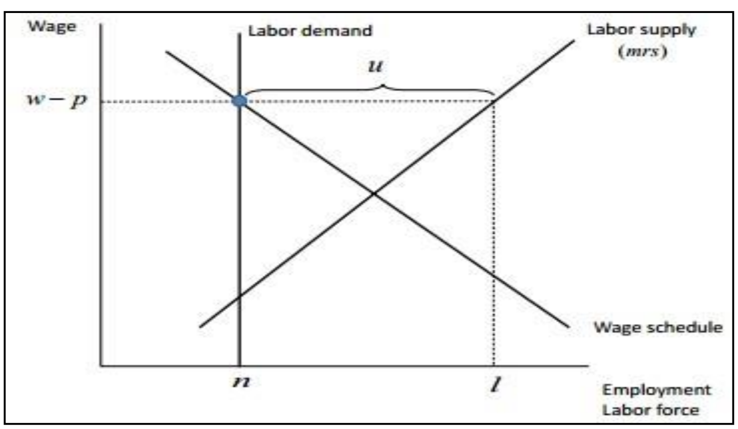
Keynesian approach does not consider unemployment as an involuntary or voluntary phenomenon but rather cyclical generated by the deficiency of aggregate demand. Keynes definition of involuntary unemployment is that men are involuntarily unemployed if, in the event of a small rise in the price of wage-goods relatively to the money-wage, both the aggregate supply of labour willing to work for the current money-wage and the aggregate demand for it at that wage would be greater than the existing volume of employment (Keynes, 1936). Keynes (1936) defined unemployment as ‘involuntary’ if a rise in the price level that reduces real wages increases employment. The finding that unemployment is not closely linked to changes in real or money wages suggests that most cyclical unemployment is not involuntary in Keynes’ sense (Brunner and Meltzer, 1978). According to the Keynesian theory, unemployment rises and falls cyclically in response to unanticipated changes in aggregate demand without much change in wage rates.

Keynes (1936) explains this in his book *The General Theory of Employment, Interest and Money*. In his book, Keynes explains that unemployment can arise from a lack of aggregate demand. The core of Keynes' theory is the principle of effective demand. Employment depends on the quantity of output (total income or production) that firms produce under the assumption prices are completely fixed. Moreover, the productions of firms are given by the respective demand. As a result, the aggregate demand for food sets up the income at a certain price, what finally leads to a new employment level (Rodriguez, 2015). The prospects of high levels of output and demand depend upon size of effective demand. Effective demand is the total monetary expenditure of the community and is therefore a price which depends on other two variables, namely aggregate demand price (money value which producers receive) and aggregate supply price (money value which producers realize). If aggregate demand price falls short of aggregate supply price then producers will be induced to reduce output and the demand for labour since their expectations were not fully satisfied. This deficiency in effective demand leads to unemployment.

Velben (1921) points out that the volume of output is set to attain a satisfactory profit and is a manifestation of the predatory instinct of the vested interests which aim at domestic and international dominance. Vested interests determine the volume of output after taking into consideration the aggregate demand. In part by actual increase of demand and in part through a lively anticipation of an advanced demand, aggressive business enterprise extends its venture (Velben, 1904). The level f aggregate demand will provide the necessary increases in total revenues. On the other side, the cost of production has to decline. If revenue rises and costs decline, then the reasonable level of profits can be found (Mouhammed, 2011). Technology increases production and reduce the cost of inputs used in the production process, and enterprises cut wages and increase productivity in order to cut cost per unit of output (Mouhammed, 2011). The decline in costs, given rising revenues, will increase the profit level (Velben, 1921). Consequently, higher profits will force businesses to expand and employ more workers. Thus, employment will increase and the rate of unemployment will decline.

Keynesians are of the view that capitalists hire workers and invest to produce output when the expectations about the economy and profits are favourable (Mouhammed, 2011). If expectations about the future are supported by reality, investments and employment continue rising until equilibrium is reached. This equilibrium is attained by the intersection of the aggregate demand and supply, the point of the effective demand, which may be less than the full employment equilibrium (Mouhammed, 2011). Consequently, if expectations about the future of the economy are not favourable, capitalists invest less and employ less number of workers. Hence, the equilibrium is achieved where cyclical unemployment exists. This unemployment is due to the deficiency of the aggregate demand, particularly investment expenditures (Keynes, 1936). The Keynesian theory of unemployment can also be explained through the use of a graph:

Figure 3.4: Unemployment in the Keynesian Theory of Employment



Source: Rodriguez (2015)

As with the classical theory, unemployment is also represented through the gap between labour supply and the intersection between labour demand and wage equation providing equilibrium levels of real wages and employment. The main difference resides in the way to increase employment. In order to achieve higher employment, the labour demand curve must shift to the right. This shift can only be conceived if the economy experiences positive fluctuations in the aggregate demand. Under this view there is no way to overdue economic downturns by letting real wage to better adapt to particular levels, there is no direct impact of real wages on labour demand and employment (Rodriguez, 2015)

Keynes (1936) argues that demand is a function of income level (not price level) in that the richer a person gets, the more would be his demand for goods and services. Keynes (1936) further argues that employment is a function of demand (not wage rate) and the size of the total expenditure in the economy, given what consumers were actually willing to spend. Any portion of income which remains unconsumed is automatically saved.

The new mind set presented by Keynes urges to focus on the monetary and fiscal policies as vehicles for changing the aggregate demand, and in the second instance, employment (Rodriguez, 2015). Effective demand is composed of two types of expenditure, namely consumption expenditure and investment expenditure. Consumption is a function of income, suggesting that as income increases consumption expenditure increase. To correct the employment condition, Keynes (1936) does not argue that the effective demand deficiency can be compensated by an equivalent increase in private investment expenditure but rather public investment expenditure. Since public investment is not motivated by profit consideration, it is called autonomous investment. However, the size thereof need not be as large as the original gap between income and consumption expenditure.

Contrary to structuralist theory of employment and classical theory of employment, Keynesians observe that the main factor that affects unemployment is effective demand. Where demand aggregate (expected output by industry) and aggregate supply (total level of employment) intersects as a result of effective demand, Therefore, a factor that influences effective demand is output. Given that effective demand can be deficient, Keynes (1936) highlights that.

3.3.5. Post-Keynesian Theories of Employment

Income, aggregate demand and effective demand are three entirely distinct and separate concepts. The Post Keynesian notes the difference between aggregate and effective demand, but treats effective demand as equilibrium income in that short-term expectations are fulfilled. Income is linked to current output and effective demand is linked through future output to current employment but both are equilibrium values in the mechanical sense. However, the relation between them is subtle and indirect. Aggregate demand relates the total money-income expected by industry as a whole to the total level of employment, where the direction of causation runs from employment to income. Aggregate supply relates the total level of employment, where the direction of causation runs from expected income to employment. The intersection of the aggregate demand and supply functions determines as equilibrium values the effective demand and the level of employment.

Involuntary unemployment, in the post Keynesian view, is explained by insufficiency of effective demand, instability of exchange rates and international mobility of finances which create uncertainty that weakens entrepreneurial confidence to make investments to reduce unemployment (Davidson, 1998; Rodriguez, 2015). Other Keynesians think that the unexpected increase in price level or higher rate of inflation will reduce real wage and increase demand for labour. Mouhammed (2011) believes that if labour productivity increases at a rate faster than the increase in wages, then the rates of inflation and unemployment will decline. Phillips curve suggests that there is a trade-off between the rate of unemployment and rate of inflation.

Shifting of production and outsourcing to other countries generates a high rate of structural unemployment (Mouhammed, 2011). An appreciated domestic currency makes exports expensive in the world market which then reduces export level and causes unemployment in the exporting industries. On the other hand, this currency appreciation increases imports from foreign countries which then raises the rate of unemployment (Mouhammed, 2011). Therefore, exports should increase and imports should decrease in order to increase the employment level.

Post Keynesian considers other factors that affect employment. These include effective demand, the exchange rate, inflation rate, labour productivity and imports.

The important theories of employment mentioned above suggest that there are very important variables for increasing employment. Employment is considered to be determined mainly by real interest rate, taxation, wealth, wage rate, price level, technological improvements, labour productivity, and consumption by households, investment, Gross Domestic product, effective demand, exchange rates, and international mobility of money, inflation, imports and exports. Given the availability of data and relevance of each variable to the aim of the study, these theories will inform the econometric model that will be used to fulfil the aim.

3.3.6. Okun’s Law

In 1962, Arthur Okun reported on a pattern he observed in the relationship between unemployment and output (Khumalo, 1994). Arthur Okun (1962) pointed out a negative relationship between unemployment and output, which became known as ‘Okun’s law’. Okun’s Law refers to a strong correlation between the unemployment rate and real gross domestic product (GDP) (Lancaster and Tulip, 2015). Okun perceived an inverse short-run relationship between unemployment and output (Ball et al., 2013).

The ‘levels’ form of the relationship can be written as: $U_t - U^* = \theta \ (Y_t - Y^*)$. Where U is the unemployment rate and Y is the logarithm of the level of real GDP. Okun called U* ‘full employment’ and Y* ‘potential output’. The term ‘potential output’ has been applied to a variety of different ideas. Basu and Fernald (2009) and Kiley (2013) discuss the relationship between various definitions. It can represent the permanent or smoothed component of GDP; the level of output that would obtain if prices and wages were flexible;

the level of output that would obtain if prices and wages were flexible; the level of output at which some other criterion (like financial sustainability) is satisfied; and so on. However, Okun's law literature employs a definition of potential output growth as the rate of GDP growth at which unemployment rate is stable.

Okun also pointed out that a similar relationship can be written in differences: $\Delta U_t = \beta(\Delta Y_t - \mu)$, where $\Delta U$is the change in the unemployment rate, ΔY is growth in log GDP (typically represented in terms of annualized percentage changes) and μ is the rate of GDP growth consistent with stable unemployment. Variations of this equation have been estimated for many different countries, at different frequencies and for different sample periods. Ball et al., (2015) also reported that an equation like this describes the relationship between output and unemployment in professional forecasts in many countries. In particular, Okun's law provides (a) time-varying estimates of potential output and (b) forecasts of the unemployment rate that compare favourably with alternative forecasts (Lancaster and Tulip, 2015).

Okun's law is an unchanging association between the annual change in the rate of unemployment and the growth rate of real gross national product (O'Hara, 1999). Okun's law measures the output gap where negative numbers mark a loss of actual output relative to potential output and positive numbers mark periods of boom when the economy produces more than its "full employment output". Khumalo (2014) explains that the association between output and unemployment, under Okun's law, can be demonstrate by three different methods, namely: a) by the correlation of variations in the unemployment rate with the growth rates of real GNP, b) by the correlation of unemployment rates with deviations of potential from actual GNP, and c) by using the assumption of a constant ratio between actual and potential GNP and a constant growth rate of potential GNP. While the first estimation method is relatively simple, the second and third method requires assumptions about the development potential of GNP or the non-accelerating inflation rate of unemployment (NAIRU) (O'Hara, 1999).

The unemployment rate is basically sensitive to fluctuations in real GDP around its long-run trend (Krugman and Wells, 2006) and these fluctuations in the unemployment rate are normally smaller than the corresponding changes in the output gap (Khumalo, 2014). Okun (1962) originally estimated that the rise in real GDP of one percent above potential output would lead to a fall in the unemployment rate of only half a percentage. Presently, the estimates of Okun's law is that the negative relationship between the output gap and unemployment rate find that a rise in the output gap of a percentage point reduces unemployment rate by about half of a percentage point (Khumalo, 2014). This relation is also known as the Okun coefficient. Okun coefficient can change over time because the relationship of unemployment to output growth depends on laws, technology, preferences, social customs, and demographics (Neely, 2010).

Okun's law was later subject to criticism as it neglected other relationships that have a significant impact on output and unemployment. Such relationships included investment activity on labour productivity and production potential; the nature and rate of technological innovation and endogenous technical progress (Khumalo, 2014). It is because of this reason that there have been different versions of Okun's law since its invention. Knotek (2007) explains four of these versions namely the difference version, the gap version, the dynamic version and the production-function version.

The difference version of Okun's law captured how changes in the unemployment rate from one quarter to the next moved with quarterly growth in real output. It captures the contemporaneous correlation between output growth and movements in unemployment, that is, how output growth varies simultaneously with changes in the unemployment rate. It took the form: *Change in the unemployment rate = a + b* (Real output growth)*, where the parameter *b* is often called "Okun's coefficient" and the ratio "*-a/b"* gives the rate of output growth consistent with a stable unemployment rate, or how quickly the economy would typically need to grow to maintain a given level of unemployment.

The gap version connected the level of unemployment to the gap between potential output and actual output. In potential output, Okun sought to identify how much the economy would produce "under conditions of full employment". Thus, the gap version took the form: *Unemployment rate = c + d* (Gap between potential output and actual output)*, where the variable *c* can be interpreted as the unemployment rate associated with full employment and the coefficient *d* would be positive to conform to the intuition above. The problem with both potential output and full employment is that neither is directly observable macroeconomic statistic and as such, they allow for considerable interpretation on the part of the researcher. This has led economists to propose a number of variations on Okun's original relationships.

A common form for the dynamic version of Okun's law would have current real output growth, past real output growth, and past changes in the unemployment rate as variables on the right side of the equation which will explain the current change in the unemployment rate on the left side. This version bears some similarities to the difference version of Okun's law, however, it is fundamentally distinct since it no longer only captures the contemporaneous correlation between changes in the unemployment rate and real output growth. The production-function versions of Okun's law typically combines a theoretical production function (or a particular way in which labour, capital, and technology combine to produce output) with the gap-based version of Okun's law. Production-function versions of Okun's law have the benefit of an underlying theoretical structure.

Although Okun's law was generally deemed a reliable and stable relationship, it was only accepted as an empirical regularity rather than a theory (Prachowny, 1993). Okun's law was not considered a theory because it was based on observation as opposed to a result from theory (Khumalo, 2014). Only the production-function versions of Okun's law have the benefit of an underlying theoretical structure (Koetnek, 2007).

3.3.7. Pigou's Theory of Employment

Professor A.C. Pigou published his Theory of Unemployment in 1933. The general view of this theory was that monetary and fiscal policy could be used to moderate industrial fluctuations and the 'plasticity' of wage rates could ensure full employment. Pigou's Theory of Unemployment deals with a sequence of real interdependencies associated with the demand for the provision of raw materials, the short run demand for final goods, and the demand for labour (Knight, 2014). Pigou then attempts to introduce the interdependence between real and monetary influences on labour markets with the aid of his notion of the elasticity in the demand for labour (Knight, 2014). Therefore, the prevailing feature of this theory was the elasticity of the real demand curve for labour which Pigou claimed to be quite large (Collard, 2011). Pigou strongly believed that the unemployment problem revolved around the labour market and that at the root of the unemployment problem were extremely high wages (Khumalo, 2014).

Pigou (1933) stated that the level of unemployment would be ascertained by the difference between aggregate supply of and demand for labour at any wage rate. The supply curve represented the size of the labour force and could be treated as vertical since it did not respond to wages although individual labour supply curves could either be upward sloping or backward bending. The demand curve thereof was downward sloping and depended on labour's marginal product. The supply of labour was always greater than its demand because the unemployment rate was always positive thus unemployment would have to be explained in terms of movements in wages and the demand for labour (Sweezy, 1994).

According to Sweezy (1994) Pigou's theory of unemployment had four central concepts, namely: (a) wage and non-wage goods; (b) wage and non-wage-goods industries; (3) the short period; and (4) the period of production of the generality of wage-goods (on which depends the definition of the "very short period"). In particular, the Pigouvian Theory of Unemployment was in accordance with the terms of a modified wage-fund doctrine (Sweezy, 1934). Accordingly, the economy was supposed to be separated into industries which produced wage-goods and those which produce non-wage-goods (Pigou, 1933). The wage-goods fund (that is, the amount of wage-goods available for payment as wages) is flexible as it can be altered in a short period of time by subtractions from stocks and by restriction of wage-goods consumption by non-wage earners. According to Khumalo (2014) it is also possible to determine the amount of labour which is likely to be demanded and the elasticity of demand for minor changes in the real wage rate, with a given real wage rate (in regards to wage-gods units) and a given supply of labour. This is fundamentally the background of the treatment of demand for labour in the aggregate.

Of the goals that Pigou set for the short period elasticity of real demand for labour, four are of fundamental importance for his short period analysis of unemployment. They are: (a) to formally develop a micro model of variations in the real demand for labour in a particular occupation; (b) to model the theoretical effects on the real elasticity of demand for labour as a whole associated with a change in the period of production; (c) to extend the micro model of variations in the real demand for labour from particular occupations to a model of aggregate real demand for labour in the macro-economy; and (d) to formally model the relationship between elasticity of money demand and aggregate real demand for labour (Knight, 2014).

Furthermore, Pigou (1933) further divided industries into those engaged in making wage goods at home and in making exports the sale of which creates claims to wage goods abroad (Keynes, 1936). Pigou (1933) made assumptions were *x* men were to be employed in the first and *y* men were to be employed in the second. The output in value of wage-goods of the *x* – men were assumed to be *f (x)* and the general rate of wages *f’x*. Further, Pigou (1933) assumes that $x + y = f(x)$, meaning that, the number of men employed in the wage goods industries is a function of total employment.

Thus, the elasticity of the real demand for labour in the aggregate can be written as:

$$E_r = [f'(x) / f(x)].\ [F'(x) / F''(x)]$$

Where $E_r = [f\text{'}(x) / f(x)]. [F\text{'}(x)/ F\text{''}(x)]$ is the value of the output of the wage-goods industries in terms of the wage unit.

However, like most theories created before, Pigou's Theory of Unemployment received its fair share of criticism. According to Collard (2011) the theory received mixed reactions. Blaug (1997) critiqued the theory that it was difficult to summarise because it seemed to hang together on comparative static grounds and appeared to depend on quasi-dynamic considerations introduced ad hoc in an otherwise static context. Keynes said Pigou's Theory of Unemployment was no different from the Classical Theory which he had strongly opposed (Collard, 2011).

3.4. Empirical Literature

This section provides a review of the empirical literature focused on a number of studies which have investigated the determinants of unemployment. Focus is also given to the determinants of unemployment in the textile and clothing industry. The evidence is important in that it contributes towards an evaluation of the relevance of some of the theories presented in the section on theoretical framework.

3.4.1. Literature from Developing Countries

a) Determinants of Employment in the Indian textile Industry

Narayanan (2003) used the Generalised Methods of Moments (GMM) to investigate the determinants of employment in the Indian textile industry for the period 1973 - 1999. 32 sub-sectors were chosen for the textile industry. They were broadly classified under six groups, namely, cotton, wool, silk, jute, synthetics, and others. Of these, 8 sub-sectors are in the cotton group, 4 are in wool group, 3 are in the silk group, 3 are in man-made fibres group, 6 in the jute group and 8 in the others. The results showed wages to have a negative effect on employment in the sector, consistent with the theory. The capital stock was found to have a positive effect, implying a complementary relationship between capital and labour in the textile sector. The number of man-days needed per year in the sector was found to have a positive effect on employment.

b) *Determinants of Employment Growth at MNEs: Evidence from Egypt, India, South Africa and Vietnam.*

Bhaumik, Estrin and Meyer (2004) conducted research on the “Determinants of Employment Growth on Multi National Enterprises (MNEs) (evidence from Egypt, India, South Africa and Vietnam).” The ordinary least squares (OLS) was used to estimate the model specifications. Furthermore, heteroscedasticity was appropriately corrected. For a dataset covering four diverse emerging economies, research reveal that wholly-owned FDI operations have higher employment growth, while local industry characteristics moderate the growth effect. Results show that there is both a quality-quantity trade off in employment and a significant degree of sustainability between labour and technology-based services. Also, employment growth is inversely related to both the initial number of employees and the extent of local competition faced by the MNE affiliate.

c) *Robust Estimates of Okun’s Coefficient for South Africa*

Geldenhuys and Marinkov (2006) conducted research on the robust estimates of Okun’s coefficient for South Africa. The paper estimated the relationship between economic activity (cyclical GDP) and changes in the unemployment rate (cyclical unemployment) for South Africa. A variety of de-trending methods were used to decompose output and unemployment series into their trend and cyclical components. The de-trending methods used yielded unemployment and output cycles that differed substantially in terms of the chronology phases of the cycles as well as the amplitudes and frequencies of the cycles. However, irrespective of the de-trending method used to evaluate the dynamic relationship between cyclical output and cyclical unemployment, the contemporaneous relationship between these two variables was always found to be statistically significant. A negative relationship between unemployment gap and the output gap was apparent from all the figures.

The paper also addressed the question of asymmetries in Okun's coefficient. Estimates of the contemporaneous Okun's coefficient ranged between -0.17 and -0.78, while estimates of the long-run Okun's coefficient ranged between -0.24 and -0.09. In all estimations, the long rum coefficient was found to be larger (often substantially) than the short run coefficient. These results seemingly indicate the presence of an Okun's law relationship in South Africa over the period 1970-2005. Recursive estimates of the contemporaneous Okun coefficient further revealed that this relationship remained relatively stable over the sample period. In addition, the paper finds evidence of asymmetries in Okun's law, although size of Okun's coefficient does not vary considerably whether the economy is in an upswing or recession. Thus, the results indicated the presence of an Okun's law relationship in South Africa over the period 1970-2005 with some evidence of asymmetries.

It is also worth noting that an asymmetric specification of Okun's law was motivated on the following grounds: first, it helps to discriminate between competing theories of joint behaviour in labour and goods markets. Second, it strengthens the case for an asymmetric (convex) Phillips curve, where unemployment decreasing below NAIRU ultimately leads to explosive inflation whilst unemployment increasing above the NAIRU has a waning effect. Third, the extent of asymmetries is useful for policymakers formulating structural and stabilisation policies. Fourth, forecasting errors would arise if an asymmetric relationship is specified and estimated as a symmetric relationship. More generally, this would lead to model misspecification.

d) Trade Liberalisation and Employment Performance of Textile and Clothing Industry in Tanzania

Olayiwola and Rutaihwa (2010) conducted research titled "Trade Liberalisation and Employment Performance of Textile and Clothing Industry in Tanzania" for the years 1980 to 2007. The objective of the study was to investigate the effect of trade liberalization on employment performance of textile industry in Tanzania. The basic issue of concern was that implementing trade liberalisation has distinct bearings on employment and wage in many African countries. The co-integration method of analysis was adopted. The Njikam (2009) model was considered which states that technology depends on import penetration, domestic industry protection and export orientation.

The analysis shows that the effective rate of protection and export intensity have a significant positive impact on demand for labour, but import penetration has a significant negative impact on wage. Also, only import penetration has a significant negative impact on wage. Penetration has a larger impact than export orientation, this is because growth in import competition results in a deterioration in labour demand. Findings by Olayiwola and Rutaihwa (2010) point to the fact that to make liberalisation to be effectual in Tanzania, the process of trade reform needs to be gradual and also to be strengthened with appropriate institutional support.

e) Determinants of Unemployment in Namibia

Eita and Ashipala (2010) conducted a study on the determinants of unemployment in Namibia for the period 1971 to 2007. The study applies the Valakhani (2003) model to Namibia. The advantage of the Valadkhani model is that it estimates unemployment equation instead of the employment equation as done by some studies. The model is slightly adjusted to fit the Namibian situation.

Despite its potential defects, the unemployment model is estimated using the Engle-Granger two-step econometric procedure. This technique involves the determination of long-run co-integration relationship by testing for stationarity of the residuals from the long-run equation. Stationarity of the residuals is tested using the Augmented Dickey-Fuller (ADF) test statistic. Rejection of the null of non-stationarity (unit root) means that the variables in the equation are co-integrated. The study conducted unit root tests and since most economic variables are non-stationary, the study uses co-integration methodology to analyse the data. The long run or co-integration estimation results revealed that there is co-integration between unemployment and the explanatory variables. Since variables are co-integrated, the next step is to estimate the ECM.

The results revealed that there is a negative relationship between unemployment and inflation in Namibia. Unemployment responds positively if actual output is below potential output, and if wages increase. An increase in investment causes unemployment to decrease significantly. The results provide evidence that the Phillips curve holds for Namibia and unemployment can be reduced by increasing aggregate demand. It is important to increase output up to the country's potential, and there is a need for wage flexibility (workers need to reduce their wage demands) in order to decrease unemployment in Namibia. Increasing investment will reduce unemployment significantly.

f) Econometric Analysis of Labour Demand in the South African Textiles, Clothing and Footwear Manufacturing Sector

Chikwaha et al (2013) conducted a quarterly time series data econometric analysis of labour demand in the South African TCF manufacturing sector for the period 1990 to 2011. The model used is an error correction model (ECM) executed upon a vector autoregressive model (VAR). A model by Heshmati and Ncube (2003) was also modified in this econometric analysis where the results obtained showed a negative relationship between both the wage level as well as imports and the demand for workers. The wage structure in South Africa is a perpetually problematic factor of the labour market and therefore is also a significant determinant in the viability of business and investment while the import structure on TCF is not clearly and thoroughly defined. Chikwaha et al (2013) suggest a complete restructuring of import tariffs on the entire sector was suggested.

g) Empirical Test of Okun's Law in Nigeria

Bankole and Fatai (2013) ran an empirical test of Okun's law in Nigeria. The paper estimated the Okun's coefficient and checked the validity of Okun's law in Nigeria using the time series annual data during the period 1980-2008. The study attempted to provide a robust empirical analysis of the relationship between RGDP and unemployment for Nigeria during the period (1980-2008). The study's empirical analyses consisted of Hodrick-Prescott (HP) filter detrending technique, Augmented Dickey-Fuller (ADF) and the Kwiatkowski-Phillips-Schmidt-Shin (KPSS). Engle Granger co-integration test and Fully Modified OLS to estimate relationship between unemployment rate and economic growth.

The results showed that the data series are stationary in their differences. Tests of co-integration revealed long-run association between unemployment and economic growth. On the other hand, the results support that unemployment and output are unrelated. Therefore, the findings suggests that Okun’s law is not valid for Nigeria. It can be suggested that the lack of growth does not explain the unemployment problem in Nigeria. In particular, the empirical evidences showed that there is positive coefficient in the regression, implying that Okun’s law interpretation is not applicable to Nigeria.

Bankole and Fatai (2013) recommended that the Nigerian government and policy makers should employ economic policies that are more oriented to structural changes and reform in labour market. Bankole and Fatai (2013) further explain that aggregate supply policies would be more adequate such as tax and benefit system reforms aimed at increasing work incentives (e.g. reducing tax wedge and the level of job security provisions on layoffs) and greater wage flexibility (based on less centralised collective bargaining system and a better understanding between parties involved in the wage bargaining process).

h) The Determinants of Unemployment in Swaziland: An econometric Perspective and Investigative Analysis

Khumalo (2014) conducted an econometric analysis on the determinants of Employment in Swaziland for the years 1991 to 2012. The determinants of unemployment were analysed using co-integration analysis from an econometric perspective. The study identifies the potential gross domestic product, inflation (indicated by the consumer price index) and government spending as some of the determinants of unemployment in Swaziland.

Khumalo (2014) started by running unit root tests using the Augmented Dickey-Fuller test and Phillips-Perron test to inspect the stationary properties of the variables. The Engle-Granger method was thereafter employed so as to determine the presence of a co-integrating correlation between the variables. Results show that the coefficients of the explanatory variables appear to be in agreement with the econometric theory except for government spending which has a positive sign, contrary to economic theory. An increase in potential GDP results in a decrease in unemployment and an escalation in inflation leads to a decline in unemployment. Economic theory suggests that government spending will reduce unemployment however results in this study appear to be contradictory. Khumalo (2014) attributes this to the expenditure pattern of the government of Swaziland.

The existence of a co-integration relationship between the dependent and independent variables because the residuals were found to be stationery at 10% level of significance. The presence of co-integration relationship between variables requires the estimation of the ECM in order to cater for dynamic short-run and long-run relationship of the variables and to measure the speed at which prior deviations from the equilibrium are corrected. Results show that the ECM for the model is negative, this implies that it is statistically significant. The ECM corrects the deviation from equilibrium at 7% adjustment speed.

The study conducts diagnostic and stability tests on the model. Khumalo (2014) applied the Breusch-Godfrey test for autocorrelation, White's Heteroscedasticity test for the presence of an unequal variance in the model and the Jarque-Bera normality test for the normal distribution of residuals in the model. Results of these diagnostic tests revealed that there is no serial correlation, there is no evidence of heteroscedasticity and the residuals are normally distributed as the p-value of the normality test is above 5%. Khumalo (2014) also conducted the CUSUM Test and CUSUM Test of squares as a measure of the stability of the model. The conclusion drawn was that the model is stable. Khumalo (2014) estimated the existence of a causal relationship between unemployment and its determinants. The results show that causality exists between:

- LCPI (inflation) and LUNEMP (unemployment),
- LGSP (government spending) and LUNEMP (unemployment),
- LGSP (government spending) and LACTGDPPOT (potential GDP),
- LGSP (government) AND LACTGDPPOT (potential GDP),
- LCPI (inflation) and LACTGDPPOT (potential GDP), and
- LGSP (government spending) and LCPI (inflation).

Lastly, Khumalo (2014) conducted the simulation experiment that shows that the linear model is of good fit because the simulated (forecasted) unemployment tracks the actual values of unemployment.

3.4.2. Literature from Developed Countries

i) Classical versus Keynesian Theory of Unemployment: An Approach to the Spanish Labour Market

Rodriguez (2015) performed a study on Classical versus Keynesian theory of unemployment on the Spanish labour market for the years 1960 to 2015. The purpose was to identify what model better explains the Spanish market. Rodriguez (2015) runs an econometrical analysis that recognises what variables affect most to unemployment. For this purpose an econometrical model was run taking the one done by Raurich et al. (2009) as reference. Rodriguez (2015) built a Spanish labour demand and wage equation. Rodriguez (2015) uses employment, real wage, real GDP, factor productivity, net capital stock, labour factor productivity, interest rate and social security benefits per person as variables.

With the demand for labour equation, results show that a big and negative coefficient of the real wages was found. The impact of long-term and short-term interest rate is irrelevant. This is because there are missing observations due to short-term and long-term interest rate data is shorter (only available since 1977). Also the capital variable is important in this equation as in one of the factors of production along with the labour force. With the wage equation, the key variable is the total productivity of factors, which has a positive correlation with real wages.

Rodriguez (2015) also tested for homoscedasticity, autocorrelation and multi-collinearity on these equations. Homoscedasticity and multi-collinearity were found in both equations. A contrast was done to prove the results. In both cases, R-squared is almost 100, which denotes the correctness of the model. Homoscedasticity was found which is good because it means all the random variables have the same variance and is one of the assumptions for the regression of multiple variables. Autocorrelation was not found, known as the correlation between values of the process at different times. The model however shows a severe multi-collinearity due to the fact that the model is done by temporal series where the likelihood to experience correlation among the independent variables is generally high.

Results showed that the classical theory is more relevant to the Spanish labour market, which means a reduction in wage rate leads to reduced unemployment. According to the econometric evidence, the classical theory fits most as the data supports the negative correlation between real wages and employment, and productivity becomes crucial.

j) Okun's Law and Potential Output

Lancaster and Tulip (2015) conducted research on Okun's law and potential output in Australia. They believed that Okun's law provided a simple and accurate means of understanding and predicting changes in the unemployment rate in Australia. Okun's law also implied a rate of output growth consistent with stable unemployment, called the growth of potential output. Estimates of potential output growth in the study were imprecise and fluctuated over time and the most recent estimate was a bit below 3% a year, with a +/- one standard error band covering the range $2^1/_4$to $3^3/_4$ per cent. This was a percentage point or two below estimates from before the mid-1990s.

In addition to providing an estimate of 'potential output growth', the paper also explored the negative relationship between output and unemployment known as Okun's law and the following findings were found to be key: a) Okun's law provides a useful description of changes in the Australian unemployment rate over the past 50 years; b) Forecasts of changes in the unemployment rate based on Okun's Law are about as accurate as Reserve Bank of Australia (RBA) forecasts. In contrast to RBA forecasts, recent forecasts by Okun's law have been unbiased; c) The short-run relationship between output and unemployment rate has been stable over time; d) allowing potential GDP growth to vary over time significantly improves simpler versions of Okun's law; e) The rate of GDP growth consistent with a stable unemployment rate has fallen from around 5% in the 1970s to around 2.9% in 2015; f) Changes in the unemployment rate have become increasingly persistent over time; g) Okun's law is able to explain most of the asymmetry in unemployment rate changes; h) Okun's law hold in changes and I) estimates of the level or change in the NAIRU are helpful for explaining or predicting changes in unemployment.

3.5. Conclusion

Various theoretical models have been developed on the trends and behaviour of employment over the years. One of the first theories of unemployment emanated in 19622 from Arthur Okun who reported on a pattern he observed in the relationship between unemployment and output. Other theoretical developments have originated from proposals by different rival schools of thought i.e. Keynesians, Structuralists, Monetarists, Classical, Pigou and Post-Keynesians. These schools of thought were in constant disagreement over the causes of unemployment however, they were all in agreement that unemployment was a problem that depressed the economy and needed to be resolved.

Models were developed based on these theoretical developments and a wide range of studies have employed these models as well as applied them empirically. The results helped to identify the various determinants of employment. Variables that determine employment in the textile and clothing industry and how they affect the employment rate of a country depends on that specific country. This study, however, incorporates domestic demand, output, wage rate, exports and imports as determinants of employment in the textile and clothing industry of South Africa.

CHAPTER 4: RESEARCH METHODOLOGY

4.1. Introduction

Chapter four reviewed the literature on the various theories of unemployment in an attempt to formulate a relevant analytical framework for South Africa. This was coupled with the brief description of the relationship between the various determinants of employment in the textile and clothing industry in South Africa. This chapter builds on that background to set the analytical framework from this study. The chapter centres on the collection, approaches, analysis, and interpretation of data in order to draw fair and meaningful conclusion regarding the determinants of employment in the textile and clothing industry in South Africa. It further presents the research design and methodology that underpins the study. Firstly, the research design is outlined. Secondly, the area of study is clarified. Thirdly, information on the data collected is provided. Fourthly, an overview of how the data analysis is detailed. Ethical considerations are explained and a conclusion to the chapter is given.

4.2. Research Design

The study executed a quantitative study design in an attempt to achieve the objectives mentioned in Chapter 1, meaning that it was through a quantitative study that the researcher was able to examine the determinants of employment in the textile and clothing industry of South Africa. The objectives of the study, mentioned in chapter 1, are as follows: To analyse the trends in the textile and clothing industry in South Africa; to determine factors which contribute to employment in the textile and clothing industry in South Africa; to ascertain which theory of employment is relevant in the textile and clothing industry of South Africa; to establish the possible inter-relationship between employment, domestic demand, output, wage rate and imports and; to explain the direction of causality between employment, domestic demand, output, wage rate and import if a long run relationship is confirmed to be present.

4.3. Area of the study

The study was set in a South African context, in an attempt to find out the determinants of employment in South Africa's textile and clothing industry. It is hoped that the study can provide useful policy lessons for other countries in Africa, particularly with regard to enhancing the capacity of the textile and clothing industry to contribute towards job creation.

4.4. Data collection and reliability

The data was sourced from two sources, namely, Quantec EasyData and the Department of Trade and Industry. Quantec is a comprehensive collection of South African macroeconomic, industry, trade and regional indicators. Quantec consists of the macro-economic service, regional service, international trade service and industry service. These are the four topical data services to suit any data requirements and a researcher can subscribe to any combination of the four. EasyData is a service by Quantec that provides users with online access to a comprehensive collection of South African and global socio-economic and market indicators. It offers and maintains a wide variety of data sets and special care is taken to ensure that the data is up-to-date, reliable and well structured. In particular, Quantec is a resource for analysts and economists tasked with monitoring and analysing the South African economy. It is widely used in econometric studies that have been published and are also currently used in policy.

The Department of Trade and Industry is a government institution aimed at ensuring a dynamic industrial, globally competitive South African economy, characterised by inclusive growth and development, decent employment and equity, built on the full potential of all citizens. One of the DTI's themes is industrial development where it focuses on the development and implementation of the up-scaled Industrial Policy Action Plan (IPAP 2), which seeks to promote long-term industrialisation and industrial diversification. It further aims to expand production in value-added sectors, places emphasis on more labour-absorbing production and services sectors and the increased participation of historically disadvantaged individuals in the economy. The DTI has interventions in three diversified clusters where textile and clothing industries are found in cluster 2. In so doing, the DTI collects industrial data, mainly from Quantec, and places them on their website.

Data on employment, output, wage rate and imports are industry based data that will be obtained from the Department of Trade and Industry. Data on domestic demand was not available from the Department of Trade and Industry and was thus sourced from Quantec EasyData. Domestic demand, output, wage rate and imports were collected in rand millions at constant 2010 prices while employment is collected in number of employees. The inclusion of these variables was explained in Chapter 3 i.e. literature review.

4.5. Explanation of Variables

The proposed study relied on secondary data which was annual in nature. The data spans the period 1971 to 2015 (45 years i.e. 45 observations). The following variables are considered for this study:

i) **Employment** which is the number of people employed in the formal and informal sectors of the textile and clothing industry. This is the dependent variable. Number of people employed was used instead of the supply or demand for labour because the study seeks to ascertain what determines employment in the textile and industry, not the supply or demand of labour thereof. The study will not attempt to analyse equilibrium level of demand and supply of labour but rather focuses on what determines the level of employment (i.e. number of people employed) in the textile and clothing industry in South Africa.

ii) **Domestic demand** which is the final consumption expenditure by households in the textile and clothing industry. This is supported by the core of Keynes' (1936) theory of unemployment which is effective demand. Keynes believed that aggregate demand for goods and services set up the income at a certain price which finally leads to a new employment level (Rodriguez, 2015).

iii) **Output** which is the real output of the textile and clothing industry. This is supported by Okun's law (1962) which points out the negative relationship between unemployment and output.

iv) **Wage rate** which is the remuneration per employee in the textile and clothing industry. Classical economists and Structuralists explain how an increase in wages and/or real wages leads to a decrease in unemployment; this is also supported by neo-classical economists.

v) **Imports** which is the import of the goods and in the textile and clothing industry. Post Keynesian theory explains involuntary unemployment by instability of exchange rates (Davidson, 1998; Rodriguez, 2015). Post Keynesian economist are of the view that an appreciated currency makes exports expensive which discourages exportation and thus causes unemployment in the exporting industries whilst this currency appreciation increases imports from foreign countries which then raises the rate of unemployment (Mouhammed, 2011). Therefore, exports should increase and imports should decrease in order to increase the employment level.

4.6. Data analysis

The study started by analyzing the Vector Auto-Regressive (VAR)model where a specific procedure was followed. The variables were firstly transformed into logs so that the coefficients become elasticities.Graphical representation of unit root tests was then performed. The results thereof were then confirmed by more robust unit root test techniques such as Augmented Dickey Fuller Test (ADF) and Phillips Perron (PP) Test. Given that the variables were stationary in first difference, the lag length was then determined. Co-integration was tested using the Johansen Co-integration Test. The evidence of co-integration led to the estimation of the model using the vector error correction model to determine a long-run relationship. The results thereof were confirmed using the VAR granger causality test. The model was then subjected to diagnostic and stability tests to determine whether the model was of good fit. The VAR methodology is summarised in Figure 4.1.

4.6.1. Model Specifications

The model was specified by taking into consideration the dependent variable along with its independent variables. A detailed equation was then estimated. Thus a linear representation of the equation expressed in logarithms was depicted after transforming the variables into logs.

The dependent variable is employment while the independent variables are domestic demand, output, investment, wage rate, and imports. The standard equation is given as follows:

$$EMP = f\,(DD, Y, WR, M) \qquad (4.1)$$

Where; EMP = Employment, DD = Domestic Demand, Y = Output, WR = Wage Rate and M = Imports and X = Exports.

A detailed form of equation (4.1) will be as follows:

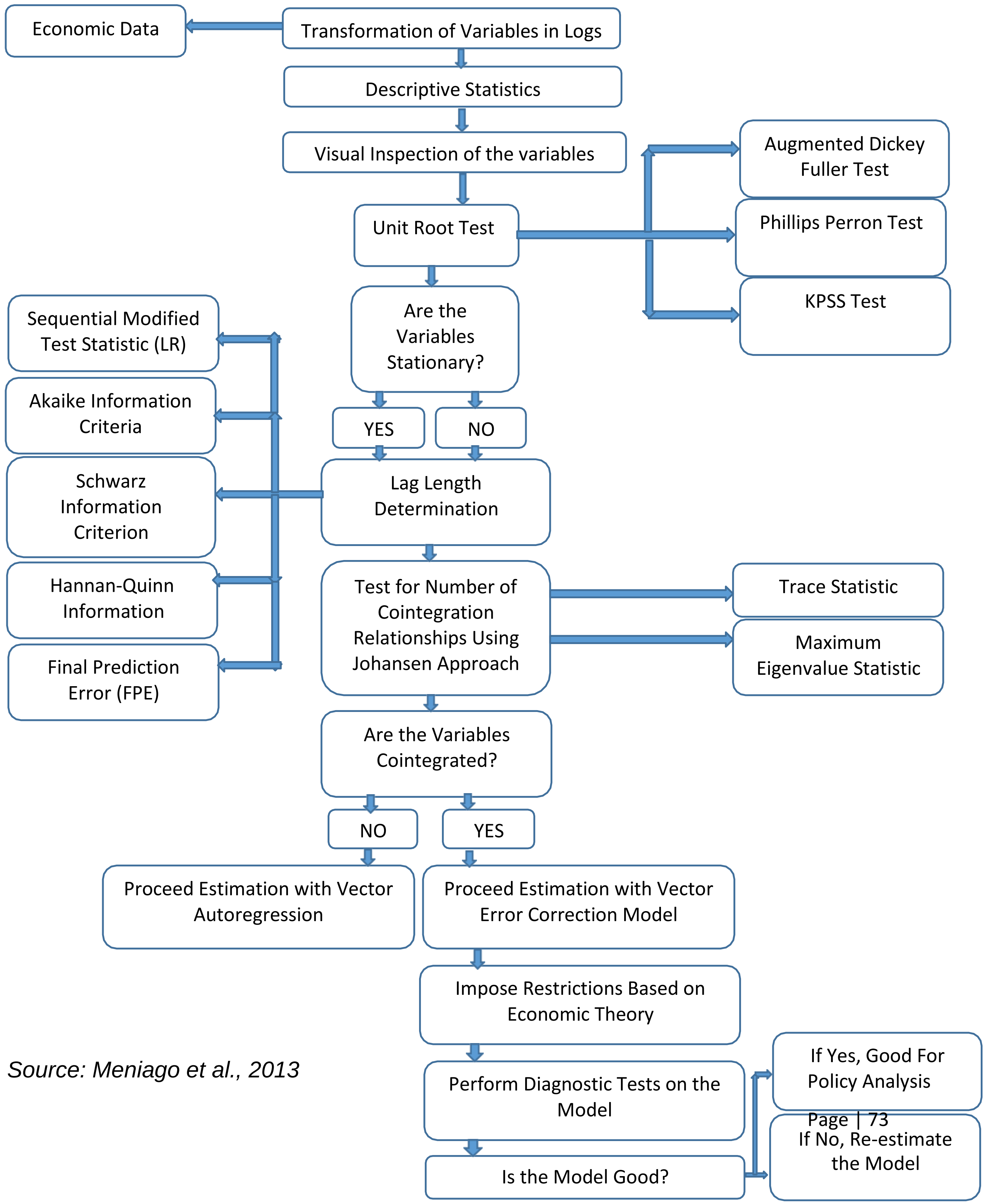
$$EMP = \beta_0 + \beta_1 DD + \beta_2 Y + \beta_3 WR + \beta_4 M + \mu \qquad (4.2)$$

In the equation, β_0 represents the intercept or constant of the relationship in the model where β_1, β_2, β_3, and β_4 are coefficients of each of the independent variables and the μ is the stochastic or error term. Since the data on the variables are collected in different forms, they are firstly transformed in logs so that the coefficients become elasticities. The linear representation of the equation expressed as logarithms will be in this manner:

$$LNEMP = \beta_0 + \beta_1 LNDD + \beta_2 LNGDP + \beta_3 LNWR + \beta_4 LNM + \mu \qquad (4.3)$$

The specified model follows an empirical study, the *Econometric Analysis of Labour Demand in the South African Textiles, Clothing and Footwear Manufacturing Sector* study by Chikwaha et al. (2013) where actual employment, imports, output and wages were considered as variables. This study included domestic demand as a variable in order to test the Keynesian Theory that explains that an increase domestic demand leads to an increase in employment stated as one of the objectives.

Figure 4.1: Summary of the VAR analysis process



Source: Meniago et al., 2013

The specified model follows an empirical study, the *Econometric Analysis of Labour Demand in the South African Textiles, Clothing and Footwear Manufacturing Sector* study by Chikwaha et al. (2013) where actual employment, imports, output and wages were considered as variables. This study included domestic demand as a variable in order to test the Keynesian Theory that explains that an increase domestic demand leads to an increase in employment stated as one of the objectives.

4.6.2. Vector Autoregressive (VAR) Model

Since the seminal work of Sims (1980), there has been an increase in popularity of the Vector autoregressive (VAR) model in empirical macro-economics. In a standard VAR model, each variable is allowed to have an independent effect on the dependent variables (Cakir and Kabundi, 2011).

The VAR model is then represented as follows:

$$\ln EMP_t = \alpha_0 + \sum_{j=1}^{m} \alpha_{1j} \ln EMP_{t-j} + \sum_{i=1}^{m} \alpha_{2i} \ln DD_{t-i} + \sum_{j=1}^{m} \alpha_{3j} \ln Y_{t-j} + \sum_{k=i}^{m} \alpha_{4k} \ln WR_{t-k} + \sum_{i=1}^{m} \alpha_{5l} \ln M_{t-l} + \mu_{1t} \quad (4.4)$$

$$\ln DD_t = \beta_0 + \sum_{i=1}^{m} \beta_{1i} \ln EMP_{t-i} + \sum_{j=1}^{m} \beta_{2j} \ln DD_{t-j} + \sum_{k=i}^{m} \beta_{3k} \ln Y_{t-k} + \sum_{i=1}^{m} \beta_{4l} \ln WR_{t-l} + \sum_{i=m}^{m} \beta_{5m} \ln M_{t-m} + \mu_{2t} \quad (4.5)$$

$$\ln Y_t = \psi_0 + \sum_{i=1}^{m} \varphi_{1i} \ln EMP_{t-i} + \sum_{j=1}^{m} \varphi_{2j} \ln DD_{t-j} + \sum_{k=i}^{m} \varphi_{3k} \ln Y_{t-k} + \sum_{i=1}^{m} \varphi_{4l} \ln WR_{t-l} + \sum_{i=m}^{m} \varphi_{5m} \ln M_{t-m} + \mu_{3t} \quad (4.6)$$

$$\ln WR_t = \gamma_0 + \sum_{i=1}^{m} \gamma_{1i} \ln EMP_{t-i} + \sum_{j=1}^{m} \gamma_{2j} \ln DD_{t-j} + \sum_{k=i}^{m} \gamma_{3k} \ln Y_{t-k} + \sum_{i=1}^{m} \gamma_{4l} \ln WR_{t-l} + \sum_{i=m}^{m} \gamma_{5m} \ln M_{t-m} + \mu_{4t} \quad (4.7)$$

$$\ln M_t = \sigma_0 + \sum_{i=1}^{m} \sigma_{1i} \ln EMP_{t-i} + \sum_{j=1}^{m} \sigma_{2j} \ln DD_{t-j} + \sum_{k=i}^{m} \sigma_{3k} \ln Y_{t-k} + \sum_{i=1}^{m} \sigma_{4l}\, lWR_{t-l} + \sum_{i=m}^{m} \sigma_{5m} \ln M_{t-m} + \mu_{5t} \quad (4.8)$$

The structure is that each variable is a linear function of past lags of itself and past lags of the other variables.There are several main advantages in using a VAR, which is an advanced and more efficienttechniques than the error correction modeling (ECM) (Odularu, 2006). First, it is possible to clearly distinguish between short-run and long-run effects since both first differences and levels of the variables enter the VAR. Second, the speed of adjustment toward the long-run relationship can be directly estimated. Finally, the VAR has a sound statistical foundation in the theory of co-integration developed by Engle and Granger (1987).

4.6.3. Unit Root Test

In principle, it is important to test the order of integration of each variable in a model to establish whether the series is either stationary or non-stationary and how many times the variables need to be differenced to derive stationary series. Gujarati (2003) states that a data series is stationary only if the mean and the variance are constant over time. There are several ways of testing for the presence of unit root, namely Augmented Dickey Fuller test (Dickey and Fuller, 1981), Phillips-Perron test (Phillips and Perron, 1988) and the KPSS test (Kwiatkowski et al., 1992).

Augmented Dickey-Fuller (ADF) test

The ADF test, tests three equations (Meniago et al., 2013) which test the constant (intercept) only, constant and trend and none of the deterministic components, respectively. The ADF tests the null hypothesis that X has a unit root against the alternative hypothesis that X does not have a unit root. That is: H_0 = X has a unit root and H_1 = X has no unit root. In particular, if the corresponding test statistic is greater than the critical value at the given significance level, then we do not reject the null hypothesis and conclude that there exists a unit root in the series. Conversely, if the corresponding test statistics is less than critical value at the corresponding test statistics, then we reject the null hypothesis and conclude that there is no existence of a unit root in the same series.

Phillips-Perron (PP) test

Phillips-Perron is slightly different from the ADF test in terms of heteroscedasticity in errors and the serial correlation. To approximate the ARMA structure of errors in the test regression, PP test uses a different approach where it ignores any serial correlation as compared to the ADF test that uses a parametric auto regression. The PP tests uses nonparametric correction to deal with any correlation in the error terms (Meniago et al, 2013). Similarly to the ADF, the PP test analyses the null hypothesis that X has a unit root against the alternative hypothesis that X does not have a unit root. The decision rule for the two Stationarity tests (ADF and PP) is therefore the same.

KPSS test

The KPSS test on the other hand assumes that *y* is stationary at null. In the case where the results are contradictory using both the ADF and KPSS for instance, the KPSS test is opted for instead, given that presumptions are that KPSS test caters for drawbacks produced by the ADF test (Kwiatkowski et al., 1992).

However, this study uses the Augmented Dickey-Fuller (ADF) test and Phillips-Perron (PP) tests to investigate the presence of unit roots in time series. Once the unit root has been confirmed, an analysis of the existence of a long run equilibrium relationship among variables is performed. This is referred to as co-integration.

4.6.4. Choice of Lag Length

It is imperative to firstly estimate that the suitable lag length to see which number of lags best fits the time series data. The estimation of the appropriate lag length is based on different information criteria for the selection of a model such as the sequential modified test statistic (LR) (Chellasamy and Anu, 2017), Final Prediction Error (FPE) (Chellasamy and Anu, 2017), Akaike information criterion (AIC) (Akaike, 1973), Schwarz information criterion (SIC) (Schwarz, 1978) and the Hannan-Quinn information criterion (HQ) (Hannan and Quinn, 1978). These information criteria are already built into the E-Views statistical package and can be used to select the most relevant model by determining the appropriate lag length of the VAR system. The information criteria with the smallest values are preferred and are always indicated by astericks.

4.6.5. Co-integration

When the order of integration of the variables has been identified through the stationary test, the next step is to perform the co-integration test. This test is often used as a requirement for determining whether a standard VAR (unrestricted VAR) or VECM (restricted VAR) should be utilised to study the relationship between variables (Meniago et al., 2013). It is imperative that one should make sure that all the series in the data sets contain the same order of integration I (1) before proceeding to a co-integration test (Khetsi, 2014). According to Olayiwola and Rutaihwa (2010) if variables are integrated of the same order, there is need to test for the co-integrating relationship using the Johansen approach. The co-integration test adopted in this study is suitable to deal with multivariate time series data. The concept of co-integration provides a sound methodology for modelling both long run and short run dynamics in a system (Dunnis and Ho, 2005)

Both the trace test and the maximum eigenvalue test are used when employing the Johansen co-integration test. Johansen and Juselius (1990) hypothesized that these tests evaluates the null hypothesis of no co-integration in the variables against the alternative that there exist co-integration. These tests are summarized by the following equations:

$$J_{trace} = -T \sum_{i=r+1}^{n} \ln\left(1 - \hat{\lambda}_i\right) \quad (4.9)$$

$$J_{max} = -T \ln\left(1 - \hat{\lambda}_{r+1}\right) \quad (4.10)$$

The trace test is shown by equation (4.9) while the maximum eigenvalue test is shown by equation (4.10).

Here T is the sample size and $\hat{\lambda}_i$ is ith largest canonical correlation. The trace test tests the null hypothesis of r co-integrating vectors against the alternative $r+1$

hypothesis of n co-integrating vectors. The maximum eigenvalue test, on the other hand, tests the null hypothesis of r co-integrating vectors against the alternative hypothesis of co-integrating vectors (Hjalmarsson and Par, 2007).

Therefore, maximum eigenvalue test and trace test results are used to indicate the existence of a unique co-integrating vector between variables in the model. In this regard, if co-integration is found among the variables, this implies that a long run relationship exists. Then VECM will be used to correct the disequilibrium in the co-integrating relationship captured by the error correction term (ECT).

If no co-integration is found among the variables then estimation is proceeded using vector auto-regression (VAR). Before estimating the VECM, the variables in co-integrated equations are considered as endogenous in the Vector Autoregressive (VAR) model. The model makes use of both differenced data and logged differenced data of the chosen variables in a VAR model. If the variables are not found to have a long run relationship, then the unrestricted VAR approach will be used to ascertain the short run relationship.

4.6.6. Vector Error Correction Modelling (VECM)

According to Olayiwola and Rutaihwa (2010) if there is co-integration among dependent variables, an error correction model has to be estimated by incorporating the lagged error correction term in the set of repressors. The error correction term is the residual from the static long run regression and it is the set of differenced non-stationary variables to be estimated to capture both short-run and long-run dynamics.

Enders (2010) derived visual structures of VECM and in this study the structure is contextualised as follows:

$$
\underbrace{\begin{bmatrix} \ln EMP_t \\ \ln DD_t \\ \ln WR_t \\ \ln Y_t \\ \ln M_t \end{bmatrix}}_{(1)}
=
\underbrace{\begin{bmatrix} \gamma_{11} & \gamma_{12} & \gamma_{13} & \gamma_{14} \\ \gamma_{21} & \gamma_{22} & \gamma_{23} & \gamma_{24} \\ \gamma_{31} & \gamma_{32} & \gamma_{33} & \gamma_{34} \\ \gamma_{41} & \gamma_{42} & \gamma_{43} & \gamma_{44} \\ \gamma_{51} & \gamma_{52} & \gamma_{53} & \gamma_{54} \end{bmatrix}}_{(2)}
\underbrace{\begin{bmatrix} \ln EMP_{t-1} \\ \ln DD_{t-1} \\ \ln WR_{t-1} \\ \ln Y_{t-1} \\ \ln M_{t-1} \end{bmatrix}}_{(3)}
+
\underbrace{\begin{bmatrix} \alpha_{11} & \alpha_{12} & \alpha_{13} & \alpha_{14} \\ \alpha_{21} & \alpha_{22} & \alpha_{23} & \alpha_{24} \\ \alpha_{31} & \alpha_{32} & \alpha_{33} & \alpha_{34} \\ \alpha_{41} & \alpha_{42} & \alpha_{43} & \alpha_{44} \\ \alpha_{51} & \alpha_{52} & \alpha_{53} & \alpha_{54} \end{bmatrix}}_{(4)}
\underbrace{\begin{bmatrix} \beta_{11} & \beta_{21} & \beta_{31} & \beta_{41} \\ \beta_{12} & \beta_{22} & \beta_{32} & \beta_{42} \\ \beta_{13} & \beta_{23} & \beta_{33} & \beta_{43} \\ \beta_{14} & \beta_{24} & \beta_{34} & \beta_{44} \\ \beta_{15} & \beta_{25} & \beta_{35} & \beta_{45} \end{bmatrix}}_{(5)}
\underbrace{\begin{bmatrix} \ln EMP_{t-1} \\ \ln DD_{t-1} \\ \ln WR_{t-1} \\ \ln Y_{t-1} \\ \ln M_{t-1} \end{bmatrix}}_{(6)}
+
\underbrace{\begin{bmatrix} \varepsilon_{1t} \\ \varepsilon_{2t} \\ \varepsilon_{3t} \\ \varepsilon_{4t} \\ \varepsilon_{5t} \end{bmatrix}}_{(7)}
$$

Where:

Column 2 represents short run coefficients.

Column 4 are adjustment coefficients.

Column 5 represents long run co-integrating vectors.

The VECM can then be estimated after having determined the number of co-integration vectors. The VECM model is a restricted VAR designed for use with non-stationary series that are identified to be co-integrated. Once VECM has been run, restrictions are imposed based on economic theory.

4.6.7. VAR Granger causality

After estimating VAR, the VAR Granger causality test is used to determine whether one variable “Granger-causes” another. An independent variable is said to Granger cause a dependent variable if, given the past values of the dependent variable, past values of the independent variable are useful for predicting the dependent variable (Granger, 1969). VAR Granger causality shows a linear prediction and it is valid if granger causality is found in at least one direction (Sorensen, 2005).

For each equation and each endogenous variable that is not the dependent variable in that equation, VAR Granger causality computes and reports Wald test that the coefficients on all lags of an endogenous variable are jointly zero (Granger 1969). VAR Granger causality tests the hypotheses that each of the other endogenous variables does not granger cause the dependent variable in that equation.

Giles (2011) estimated that the absence of Granger causality can be tested by estimating the following VAR model:

$$Y_t = a_0 + a_1 Y_{t-1} + ... + a_p Y_{t-p} + b_1 X_{t-1} + ... + b_p X_{t-p} + u_t \qquad (4.11)$$

$$X_t = c_0 + c_1 X_{t-1} + ... + c_p X_{t-p} + d_1 Y_{t-1} + ... + d_p Y_{t-p} + v_t \qquad (4.12)$$

Then, testing H_0: $b_1 = b_2 = ... = b_p = 0$, against H_A: 'Not H_0', is a test that *X does not* Granger-cause *Y*. Similarly, testing H_0: $d_1 = d_2 = ... = d_p = 0$, against H_A: 'Not H_0', is a test that *Y does not* Granger-cause *X*. In each case, a *rejection* of the null implies there is Granger causality.

This study will adopt the VAR Granger causality test to ascertain whether domestic demand, wage rate, output and import do granger cause employment.

4.6.8. Diagnostic and Stability Tests

After running VECM, it is imperative to run diagnostic and stability tests. **Jarque-Bera residual test** is run to test for the normality of residuals. In this case the null hypothesis indicates that residuals are normally distributed which is tested against that the alternative that residuals are not normally distributed. **Breusch-Godfrey LM test** will be run to test for serial correlation where the null hypothesis stands for no serial correlation and is tested against the alternative hypothesis that there is serial correlation. **Lung-BoxQ statistic test** will be run to test for auto correlation where the null hypothesis states that there is no auto correlation which is evaluated against an alternative hypothesis that acknowledges the presence of auto correlation. **White's heteroscedasticity LM test (with and without cross terms)**will be run to test for heteroscedasticity where the null hypothesis null hypothesis admits that heterskedasticity is not present in the model while the alternative hypothesis advocates that heterskedasticity is found in the model. Alternatively, if the P-Value is less than the level of significance (given at 5 percent) then the null hypothesis is rejected. However, if the P-Value is more than the level of significance (given at 5 percent) then the null hypothesis is not rejected.

The **Cusum Test** and the **Cusum of Squares Test** are run to test for stability of the model. The outcome is then confirmed by analysing the **AR root graph**, which indicates the inverse roots of the characteristic AR polynomial. If all the roots lie within a unit circle, it implies that the VAR is stable. If the model is of good fit it can then be used for policy analysis, if not, then the model will have to be re-estimated. Further, the impulse response function and the variance decomposition were both performed to assess how shocks to economic variables reverberate through a system.

4.7. Impulse Response Function

The impulse response function (IRF) is useful for tracing out the time path of the effect of structural shocks on the dependent variables of the model. It reflects how, given a positive shock of one standard deviation to an independent variable, how the dependent variable will react (Lu and Xin, 2010).Proper procedures for computing IRF for a co-integrated system are firstly to determine the co-integration rank by LR test, then estimate the ECM model as $Y_t = \beta Y_{t-1}$+Pp−1 where i=1 given βi and Y_t= i + D_t + U_t after converting the ECM back to VAR model and finally use the resulting VAR model to perform IRF (Lin, 2016) .Impulse response function(IRF) tracks the impact of any variable on others in the system. It is an essential tool in empirical causal analysis and policy effectiveness analysis. This study will, therefore, adopt the impulse response function.

4.8. Variance Decomposition

Impulse response functions show the effects of shocks on the adjustment path of the variables. Forecast error variance decompositions measure the contribution of each type of shock to the forecast error variance (Campbell, 1990). Both computations are useful in assessing how shocks to economic variables reverberate through a system. Impulse response and forecast error variance decomposition analysis are the prominent tools in interpreting estimated linear and nonlinear multivariate time series models (Nyberg and Lanne, 2014).

The variance decomposition results are then used to analyse how one standard shock stemming from exogenous variables attribute to the endogenous variable. This analysed how much in percentages would a shock in any independent variable account for the fluctuations in a dependent variable (i.e. employment) over the following 10 years. This analysis was done for both short run and long run. Changes over the years were also highlighted. To analyse the data, the study relies on the E-Views 8 statistical package.

4.9. Ethical Considerations

Access to Quantec EasyData data is through a licence which the School of Economics and Management at the University of Limpopo holds and so the researcher has permission to use that database. The researcher is subscribed to Quantec EasyData and can make use of the data thereof. Access to the Department of Trade and Industry is granted to the public and anyone who wishes to download that data and make use of it can do so by going to the DTI's website. No subscription or registration is required from the user. Since the data used for this study is aggregated industry data, there is no disclosure of the names of the companies that make up the industry. So the study does not disclose the names of any respondents that were instrumental in giving the data.

4.10. Conclusion

The Chapter presented the procedures involved in the Vector Error Correction Model approach. The co-integration technique has been chosen as the preferred parameter estimation technique for the determinants of employment in the textile and clothing industry of South Africa model. This is because of its several advantages over alternative techniques, that is, in the case for the textile and clothing industry of South Africa. Based on the co-integration approach, Johansen co-integration test, which contains information on both the long run and short run relationship between variables is estimated. The estimated model has to pass all the diagnostic checks which involve auto correlation tests, heteroscedasticity test and residual normality test. The estimated model also has to pass the stability test of the CUSUM Test, the CUSUM Test of Squares and the inverse roots of AR characteristic Polynomial. If the model passes all these tests then it can be used for policy analysis. If not, the model will have to be re-estimated. The impulse response function and variance decomposition were also used to assess how shocks to economic variables reverberate through a system. That is, how employment reacts or will react to a shock in any of the dependent variables. The following chapter analyse these tests.

CHAPTER 5: DATA ANALYSIS AND INTERPRETATION OF RESULTS

5.1. Introduction

The chapter examines the relationship between employment in the textile and clothing industry and its determinants using the Vector Error Correction Model approach. The model represses employment (LNEMP) against potential domestic demand (LNDD), real output (LNY), real wage rate (LNWR) and imports (LNM) over the period 1971 to 2015. Diagnostic tests and stability tests were also run to ensure the validity of the estimated regression. Lastly, the impulse response function and the variance decomposition were both performed to assess how shocks to economic variables reverberate through a system.

5.2. Unit Root Test Results

This section presented different approaches taken to test for unit root. Firstly, graphical representation is displayed. However, these are not sufficient to conclude on whether a variable is stationary or not. More robust techniques such as ADF and PP were then used to confirm the acceptance or rejection of the existence of a unit root test as shown in Table 5.1 for all variables.

Figure 5.1: Graphical analysis - Employment

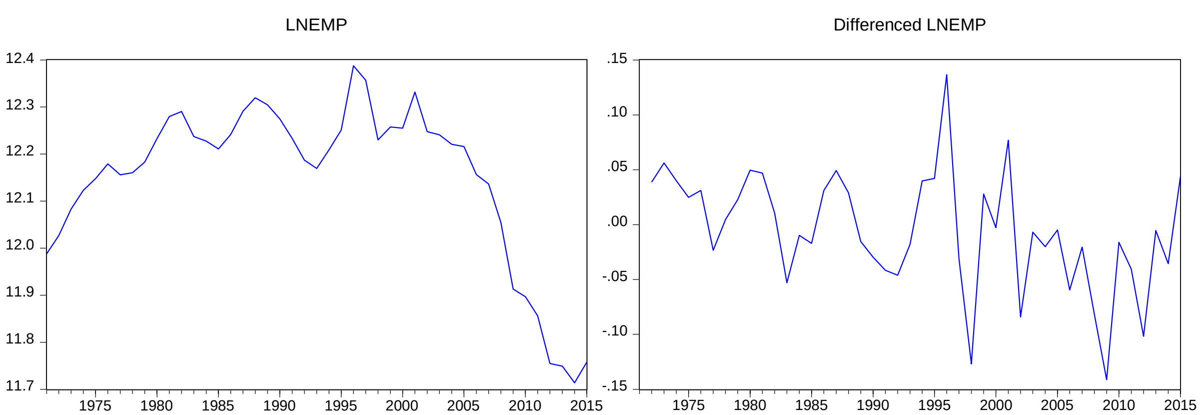


Figure 5.1 shows employment (LNEMP) at level form and employment (DLNEMP) at 1st difference. LNEMP is not stationary and has to be differenced at least once in order to oscillate around the mean. Whereas DLNEMP seems to oscillate around the mean, LNEMP is differenced once.

Figure 5.2 Graphical analysis: Domestic demand

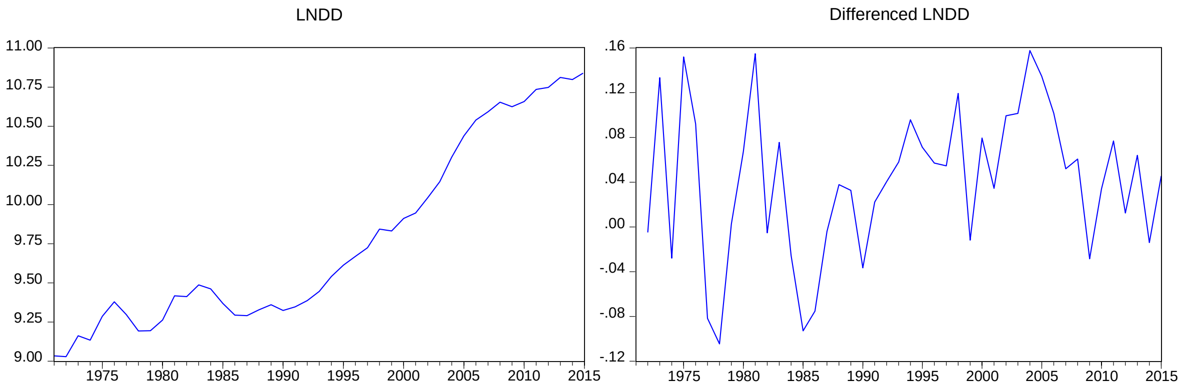
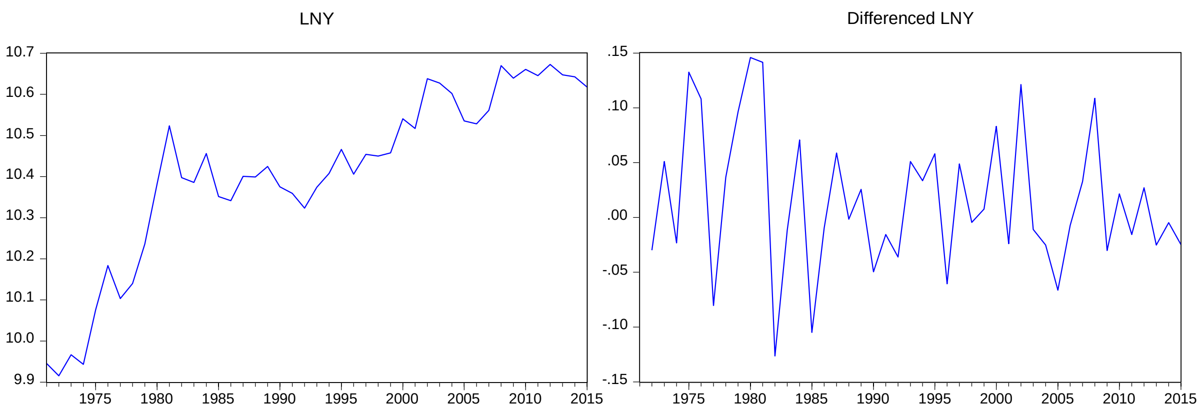


Figure 5.2 shows domestic demand (LNDD) at level form and domestic demand (DLNDD) at 1st difference. LNDD is not stationary and has to be differenced at least once in order to oscillate around the mean. DLNDD appears to show that domestic demand does oscillate around the mean of zero after being differenced once. This was confirmed by more robust techniques such as ADF and PP in Table 5.1.

Figure 5.3 Graphical analysis: Output



Graphical analysis of output unit root test showed in Figure 5.3 shows output (LNY) at level form and output (DLNY) at 1st difference. LNY is not stationary and has to be differenced at least once in order to oscillate around the mean. DLNY seems to show that output does oscillate around the mean after being differenced once.

Figure 5.4 Graphical analysis: Wage rate

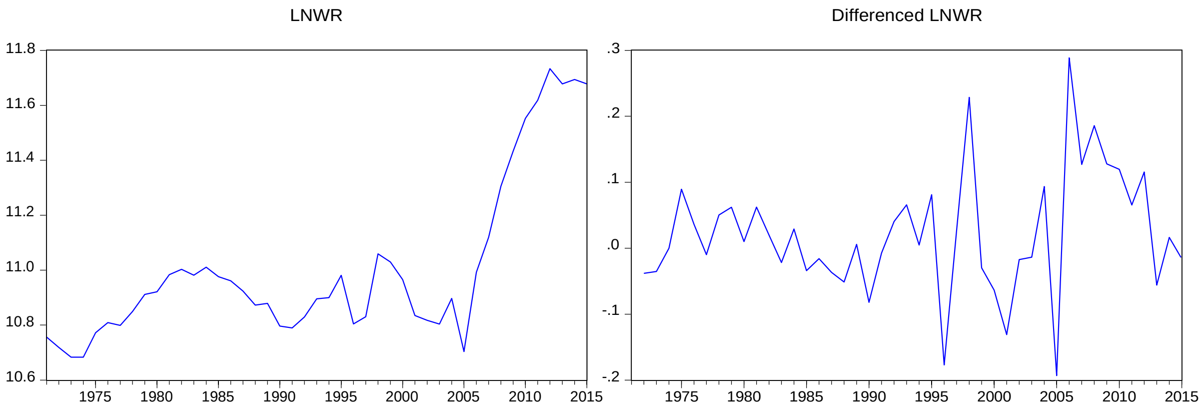
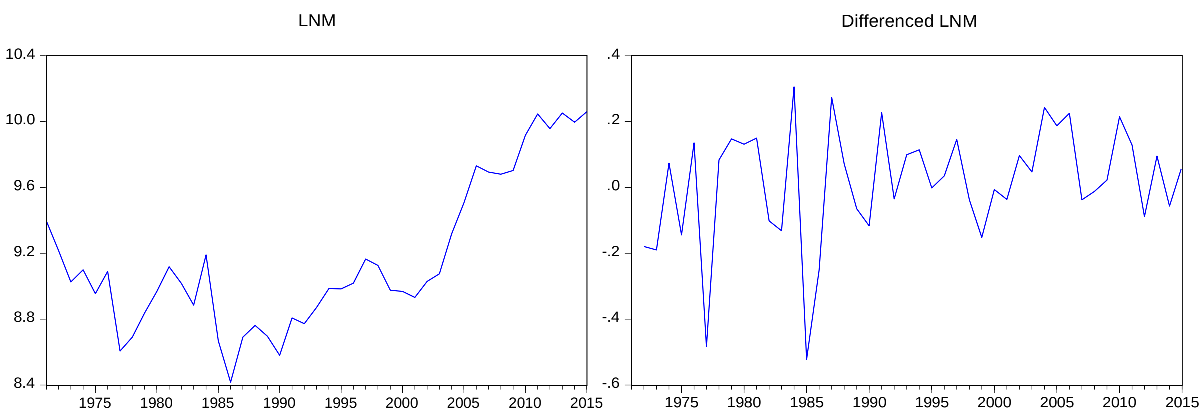


Figure 5.4 shows wage rate (LNWR) at level form and wage rate (DLNWR) at 1st difference. LNWR is not stationary and had to be differenced at least once in order to oscillate around the mean. DLNWR appears to oscillate around the mean after being differenced once but more reliable unit root techniques were then used to verify the Stationarity status of the variable.

Figure 5.5 Graphical analysis: Imports



Lastly, Figure 5.5 depicts imports (LNM) at level form and imports (DLNM) at 1st difference. LNM is not stationary and has to be differenced at least once in order to oscillate around the mean. DLNM seems to oscillate around the mean after being differenced once. More robust techniques such as ADF and PP were then used to confirm the acceptance or rejection of the existence of a unit root test as shown in table 5.1.

The Augmented Dickey-Fuller test and Phillips-Perron unit root tests were then applied to inspect the stationarity properties of the variables. The null hypothesis of both ADF and PP test are that the series has a unit root whereas the alternative hypothesis states that the series does not contain a unit root. This is represented as follows:

H_0 = Series has a unit root (not stationary)
H_1 = Series has no unit root (stationary)

The PP test was used to affirm the results of the ADF in this case. The methodology section specified the estimation to be used when performing the unit root tests. All the series were transformed into logarithms in order to reduce their variability. The full results of the ADF and PP unit root tests for all variables are shown in Appendix 1 and summarised in Table 5.1 as follows:

Table 5.1: Results of Unit Root and Stationarity Tests

Variable	Intercept		Trend and Intercept		Order of Integration
	Augmented Dickey-Fuller	Phillips-Perron	Augmented Dickey-Fuller	Phillips-Perron	
LNEMP	0.0509 (0.9581)	-0.3268 (0.9124)	-1.1666 (0.9050)	-1.1008 (0.9174)	
∆LNEMP	-4.8791 (0.0002)***	-4.8676 (0.0003)***	-5.5310 (0.0002)***	-5.5002 (0.0003)***	I(1)
LNDD	0.2904 (0.9751)	0.6574 (0.9898)	-1.3470 (0.8622)	-1.2348 (0.8906)	
∆LNDD	-4.8902 (0.0002)***	-4.8926 (0.0002)***	-4.9422 (0.0013)***	-4.9889 (0.0011)***	I(1)
LNY	-2.0541	-2.2262	-2.4788	-2.2543	

	(0.2636)	(0.2003)	(0.3366)	(0.4490)	
∆LNY	-6.7975 (0.0000)***	-6.8931 (0.0000)***	-6.9830 (0.0000)***	-7.3502 (0.0000)***	I(1)
LNWR	0.0892 (0.9613)	-0.0745 (0.9458)	-1.0407 (0.9274)	-1.2078 (0.8965)	
∆LNWR	-6.1294 (0.0000)***	-6.6187 (0.0000)***	-6.2152 (0.0000)***	-6.2144 (0.0000)***	I(1)
LNM	-0.5588 (0.8692)	-0.5588 (0.8692)	-2.4493 (0.3506)	-2.3795 (0.3847)	
∆LNM	-7.0981 (0.0000)***	-7.1613 (0.0000)***	-5.8872 (0.0001)***	-8.8124 (0.0000)***	I(1)

*** shows the rejection of the null hypothesis at 1%, 5% and 10% level of significance, where an automated number of lags is used for the ADF and PP test.

In other words, *implies statistical significance at 10% level, **signifies statistical significance at 5% level and ***represents statistical significance at 1% level. ∆ denotes a variable that was differenced once and I(1) denotes a variable that is stationary at first difference.

Using intercept as well as trend and intercept, all variables were found to be stationary at 1st difference for both ADF and PP tests. Thus, they are I (1) variables. ADF test results were confirmed by the PP test results.

5.3. The VAR lag order selection criteria

The information criteria considered for the lag order selection are the sequential modified test statistic (LR), Final Prediction Error (FPE), Akaike Information Criterion (AIC), Schwarz Information Criterion (SC) and the Hannan Quinn information criterion (HQ) which already built into the E-Views statistical package. The information criteria with the smallest value are preferred and this is indicated by asterisks. The results of the VAR lag order selection criteria are shown in Appendix 2 and are summarized in Table 5.2.

Table 5.2: VAR Lag Order Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ

0	104.4990	NA	4.18e-09	-5.102514	-4.889237	-5.025992
1	282.4790	301.1969*	1.66e-12*	-12.94764	-11.66798*	-12.48851
2	296.8593	20.64863	3.06e-12	-12.40304	-10.05699	-11.56130
3	316.7765	23.49214	4.74e-12	-12.14239	-8.729953	-10.91803
4	352.8476	33.29632	3.92e-12	-12.71013	-8.231311	-11.10317
5	387.9955	23.43198	4.91e-12	-13.23054	-7.685334	-11.24097
6	461.2113	30.03723	1.89e-12	-15.70314*	-9.091551	-13.33096*

*indicates lag order selected by the criterion

LR: sequential modified LR test statistic (each test at 5% level)

FPE: Final prediction error

AIC: Akaike information criterion

SC: Schwarz information criterion

HQ: Hannan-Quinn information criterion

The results shows that optimum lag length for the model is 1 based on LR, FPE and SC. Thus, the lag order selected is one.

5.4. Johansen Co-integration test results

The Johansen co-integration test was employed in order to determine the presence of a co-integrating relationship between variables. Both the Trace test and Maximum Eigenvalue test were considered in this analysis.

Table 5.3: Johansen Cointegrating test allowing deterministic trend intercept (no trend) in CE and Test VAR

Hypothesised No of CEs	Eigen Value	Trace Statistic	0.05 Critical Value	Prob**	Max Eigen Statistic	0.05 Critical Value	Prob**
None*	0.631720	86.85500	69.81889	0.0012	42.95319	33.87687	0.0032
At most 1	0.400284	43.90181	47.85613	0.1120	21.98589	27.58434	0.2211
At most 2	0.260217	21.91592	29.79707	0.3032	12.96011	21.13162	0.4559
At most 3	0.185511	8.955810	15.49471	0.3695	8.823338	14.26460	0.3012
At most 4	0.631720	86.85500	69.81889	0.0012	0.132473	3.841466	0.7159

Trace and Max-Eigen value test indicates 1 co-integrating equation(s) at the 0.05 level, * denotes rejection of the hypothesis at the 0.05 level and **MacKinnon-Haug-Michelis (1999) p-values.

The results in Figure 5.3 show that the Johansen Co-integration test has been used to test for co-integration in the model. Intercept (no trend) in CE and test VAR has been chosen as the deterministic trend specification to test for linear trend in the data. Null hypothesis states that there is no co-integration and the alternative hypothesis states that there is co-integration.

The null hypothesis of no co-integrating equation (CE) is rejected at the 5% level of significance for both trace and Max-Eigen tests since the trace statistic (86.85500) outweighs the critical value (69.81889), and the Max-Eigen statistic (42.95319) is greater than the critical value (33.87687). The trace's probability value (0.0012) and Max-Eigen's probability value (0.0032) are greater than the 5% level of significance and this also means that the null hypothesis of no co-integrating vectors is rejected. Hence both tests indicate that there is one co-integrating equation at 5% level.

Table 5.4: Normalised long-run Co-integrating Equation

Normalised	**Cointegrating**	**coefficients**		
LNEMP	**LNDD**	**LNY**	**LNWR**	**LNM**
1	6.1464	10.1843	-11.5986	-10.8562
	(1.2257)	(1.5097)	(2.3789)	(1.4767)

*standard error in parentheses

The results of the normalised long-run co-integrating equation are also shown in Appendix 3. The normalised coefficients displayed in Table 5.3 represent the long run elasticities, and the normalised coefficients for the model generated from the co-integrating vector are shown as follows:

$$LNEMP = +6.1464LNDD + 10.1843LNY - 11.5986LNWR - 10.8562LNM \quad (5.1)$$

The normalised coefficients associated with a unique co-integrating vector from the Johansen procedure resulted in the derivation of the following long run equation:

$$LNEMP = -6.1464LNDD - 10.1843LNY + 11.5986LNWR + 10.8562LNM \quad (5.2)$$

The results above show the long run co-integrating equation. The equation shows how changes in Domestic Demand (DD), Output (Y), Wage Rate (WR) and Imports (M) will impact on Employment (EMP) in the long run. It is worth noting that the signs for each value needs to be reversed before interpretation as indicated by equation (5) i.e. negative sign is reversed into a positive and a positive sign is reversed into a negative sign as equation 4 is transformed into equation 5.

The equation reveals that a 10% increase in DD (domestic demand) results in a 6.15% decrease in EMP (employment) in the long run. This is contrary to economic theory. Keynes believed that aggregate demand for goods and services set up the income at a certain price which finally leads to a new employment level (Rodriguez, 2015). Keynes (1936) was of the view that effective demand was a core factor when it comes to determining employment. However, given the textile and clothing industry in South Africa, an increase in domestic demand could be encouragement to move from labour intensive to capital intensive. The negative relationship between DD and EMP is supported by Magwaza (2014) who mentions that the local textile production has evolved into a capital-intensive industry due to technological developments that are closing the major product gaps.

The equation further displays that a 10% increase in Y (output) leads to a 11.6% increase in EMP in the long run. These results show that output is a major determining factor of employment. Okun’s law (1962) points out that there is a positive relationship between employment and output. This is supported by a study by Geldenhuys and Marinkov (2006) on the robust estimates of Okun’s coefficient for South Africa which proved that there is a strong positive relationship between employment and output. This is also evident in the textile and clothing industry. Real output is therefore a major determining factor of employment in the textile and clothing in South Africa.

As shown in the equation, a 10% increase in WR (wage rate) generates a10.18% decrease in EMP (employment) in the long run. This is contrary to economic theory such as the Classical theory of employment, neo-classical theory of employment and Structuralists theory of employment. They explain how an increase in wages and/or real wages leads to an increase in employment. The contradiction could be because an increase in the wage rate could lead to employers demanding less employees and become more capital intensive. In that way, they supply goods and services at a cost effective and efficient way. This is supported by a study *An Econometric Analysis of Labour Demand in the South African Textiles, Clothing and Footwear Manufacturing Sector* done by Chikwaha et al. (2013) where the results showed that wages have a negative relationship with the demand for workers.

The equation also reflects that a 10% increase in M (imports) results in a 10.86% increase in EMP (employment) in the long run. This is contrary to Post Keynesian theory which states that the higher the demand for imports then less supply of employment will be needed. This is also supported by a study *Trade Liberation and Employment Performance of Textile and Clothing Industry in Tanzania* done by Olayiwola and Rutaihwa (2010) where it was emphasised that the increase in import competition leads to a decline in labour demand. Chikwaha et al. (2013) supports the results when focus is solely on the manufacturing sector. The contradiction to a priori expectation may be due to the fact that the clothing industry is dominated by retailers who import their stock. Morris and Reed (2008) emphasise that the South African clothing industry is dominated by a small number of large retailers who account for 70% of formal clothing sales in South Africa. These retailers have the power to set prices, as well as make demands on quality and delivery.

From these results, it is clear that both the Keynesian theory of unemployment and Classical theory of unemployment are applicable in the South African context with regards to the textile and clothing industry. Domestic demand and wage rate are determinants of employment but are negatively correlated. The Keynesian theory has more effect than the Classical theory. In other words, wage rate is more of an employment determining factor than domestic demand as it has a greater effect on the dependent variable. Output is a significant determinant of employment in the textile and clothing industry. This is supported by Okun's Law which emphasises a positive relationship between output and employment.

5.5. Vector Error Correction Model

Results of the vector error correction model are reported in Appendix 4. The speed of adjustment is -0.183 and has an expected negative sign which indicates that the system converges to equilibrium and therefore satisfies *a priori* expectation. This is quite slow as the speed of adjustment is only 18.3%. This is also seen in a study by Olayiwola and Rutaihwa (2010), given an employment equation, where the estimated coefficients for employment equation in terms of sign met apriori expectation i.e. the sign was negative. Results showed that 14% of the short run disequilibrium adjusts to the long run equilibrium each year and also indicated that the speed of adjustment to converge to the long run equilibrium is slow (Olayiwola and Rutaihwa, 2010). Another study by Khumalo (2014), given an unemployment equation, showed that the ECM for the model is negative which implied that it was statistically significant. The study further reflected that deviation from equilibrium can be corrected at a 7% speed of adjustment. Lastly, a study by Chikwaha et al (2013) showed 8% adjustment back to equilibrium in the employment level. These are relatively low. Empirically, these findings may be so because of the non-inclusion of other variables that may influence employment or the demand for workers.

5.6. VECM Granger Causality test

Table 5.4 estimates the existence of causal relationship between employment and its determinants (output, wage rate, domestic demand and imports) which were obtained from Appendix 5. The decision rule is that when the P-Value is less than the level of significance the null hypothesis is to be rejected, thus accepting the alternative hypothesis. The null hypothesis is given as that the independent variable (x) does not Granger-cause the dependent variable (y). The alternative hypothesis is given as the opposite.

Table 5.5: VECM Granger Causality/Block Exogeneity Wald Tests

	LNEMP	LNDD	LNWR	LNY	LNM
Dependant Variable					
LNEMP	-	1.480717 (0.2237)	2.840935* (0.0919)	0.043343 (0.8351)	0.076191 (0.7825)
LNDD	0.017819 (0.8938)	-	7.499785*** (0.0062)	1.030078 (0.3101)	2.622931 (0.1053)
LNWR	1.547098 (0.2136)	1.654414 (0.1984)	-	0.691038 (0.4058)	1.077484 (0.2993)
LNY	12.75208*** (0.0004)	8.818071*** (0.0030)	6.090663** (0.0136)	-	5.670663** (0.0136)
LNM	0.907763 (0.3407)	6.227789** (0.0126)	0.596694 (0.4398)	0.907547 (0.3408)	-

*,**,***, represents statistical significance at 10%, 5%, 1% and figures in parentheses are p-values

The results show that only wage rate Granger-cause employment at 10% level of significance given p-value of 9.19%. This is consistent with the Classical, Neo-classical and Structuralists theories of employment which state that an increase in the wage rate leads to an increase in employment. However, it is contrary to the long-run co-integration results. This was explained as a result of the possibility of an increase in the wage rate which could lead to employers demanding fewer employees and becoming more capital intensive. Chikwaha et al. (2013) found the same results with regards to wage rate in their study titled *An Econometric Analysis of Labour Demand in the South African Textiles, Clothing and Footwear Manufacturing Sector*. However, Sorensen (2005) explained that VAR Granger causality is valid if granger causality is found in at least one direction.

The results further reflect that only wage rate Granger-cause domestic demand at 1% level of significance given P-value of 0.62%. Furthermore, results show that all independent variables do Granger-cause output. Employment and domestic demand Granger-cause output at 1% level of significance given 0.04% and 0.3% P-values respectively, while wage rate and import Granger-cause output at 5% level of significance given 1.36% as P-value for both. However, only domestic demand Granger-cause import at 5% level of significance with a P-value of 1.26%.

5.7. Diagnostic and Stability tests

5.7.1. Diagnostic tests

Table 5.6 show a summary of diagnostic test results. When the P-Value is greater than the level of significance (given as 5 percent) then do not reject Ho. However, when P-Value is less than 5 percent level of significance then rejects Ho.

Table 5.6 Summary of diagnostic test results

Test	Ho	P-Value	Conclusion
Jarque-Bera	Residuals are normally distributed	0.8241	Given that P-Value is greater than 5% LOS, do not reject null hypothesis (Ho).Hence residuals are normally distributed.
Breusch-Godfrey LM test	No serial correlation	0.4801	Since P-value is greater than 5% LOS, do not reject null hypothesis (Ho). This implies that there is no serial correlation.
Ljung-Box Q	No auto/serial correlation	0.114	Shown that P-Value is greater than 5% LOS, do not reject null hypothesis (Ho). This suggests that there is no auto/serial correlation.
ARCH LM	No heteroscedasticity	0.0686	Reflected that P-Value is greater than 5% LOS,do not reject null hypothesis (Ho). This means that there is no heteroscedasticity.
White (without cross terms)	No heteroscedasticity	0.4864	Depicted that P-Value is greater than 5% LOS, do not reject null hypothesis (Ho). Therefore, there is no heteroscedasticity.

White (with cross terms)	No heteroscedasticity	0.2075	Displayed that P-Value is greater than 5% LOS, do not reject null hypothesis (Ho). Ultimately, there is no heteroscedasticity.

The Jarque-Bera test is used to ascertain whether residuals are normally distributed or not. Results show a P-value of0.8241 (82.4%)is greater than 5% level of significance(LOS). Hence the null hypothesis of normally distributed residuals is not rejected meaning that residuals are normally distributed. The Breusch-Godfrey LM test is used to ascertain the existence or non-existence of serial correlation. Results show a P-value of 0.4801which is 48.01%. This is greater than 5% level of significance which means that the null hypothesis is not rejected. Therefore, there is no serial correlation in the equation.

To test for the existence of auto-correlation, the Ljung-Box Q was used. Results reflected a P-value which is greater than the level of significance i.e. 0.114 (11.4%) P-value is greater than 5% level of significance. This means that the null hypothesis cannot rejected and there is, therefore, no auto correlation. The ARCH LM test is performed to test whether there is heteroscedasticity or no heteroscedasticity in the model. The P-value of 0.0686 (6.86%) is greater than the level of significance of 5%. This means that null hypothesis was not rejected and the existence of heteroscedasticity was not found in the model.

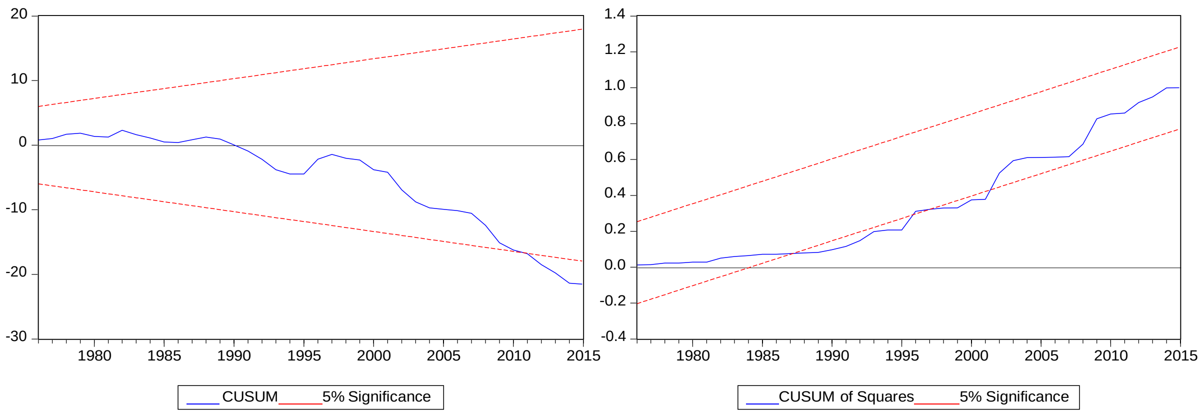
White (with and without cross terms): The other techniques which can be used to test for heteroscedasticity is the White's test with and without cross terms. Both test showed that there is no heteroscedasticity in the model. The results for White without cross terms showed that the P-value of 0.4864 (48.64%) is greater than the 5% level of significance while White with cross terms reported a P-value of 0.2075 (20.75%) which is greater than 5% level of significance. Hence, the null hypothesis was not rejected for both tests and the existence of heteroscedasticity was not found.

Results show that the model passed all diagnostic tests. The residuals are correctly specified and there is no evidence of auto correlation, serial correlation or heteroscedasticity in the model.

5.7.2. Stability test

The CUSUM Test was used to test the stability of the estimated equation and the CUSUM Test of Squares test was ran to confirm results of the CUSUM test. If the cumulative sum (of squares) falls mostly within the 5% significant lines then the model is stable and correctly specified.

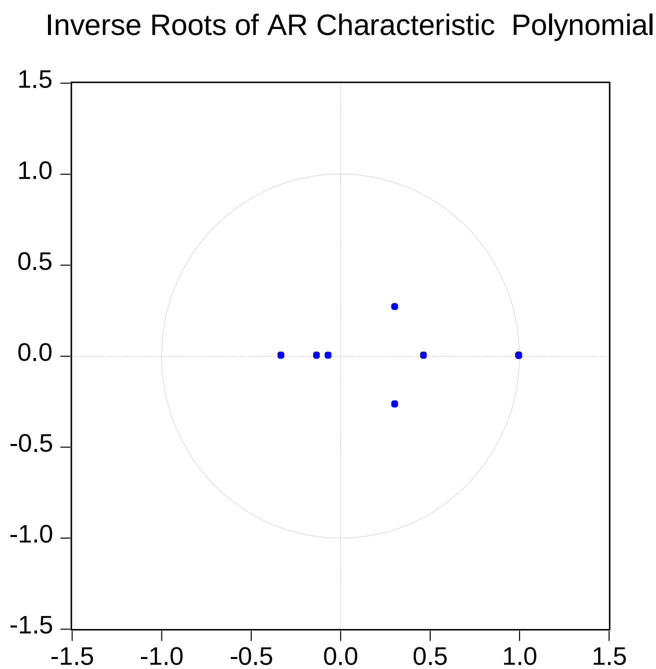
Figure 5.6: CUSUM of Squares Test Results:



Since the cumulative sum (and of squares) of the CUSUM Test and the CUSUM of Squares Test respectively remains mostly within the area bounded by the 5% critical lines the model can be considered to be stable. Figure 5.6 reflects that CUSUM of Squares test results exceeds the 5% line and immediately converges to be within the 5% line. Given that not all portions of the cumulative sum (and of squares) are wholly within the 5% critical lines, there is a need to verify the stability of the model using the graph of the inverse roots of AR characteristic polynomial.

Therefore the stability of the VECM results was also augmented by the AR root graph shown in Figure 5.7. The stationary condition for general AR (p) processes is that the inverted roots of the lag polynomial lie inside the unit circle. An inverse root of AR characteristic polynomial is measuring of stability of the VAR model. The estimated VAR is stable (stationary) if all roots have modulus less than one and lie inside the unit circle. If the VAR is not stable, certain results (such as impulse response standard errors) are not valid.

Figure 5.7: Inverse Roots of AR Characteristic Polynomial

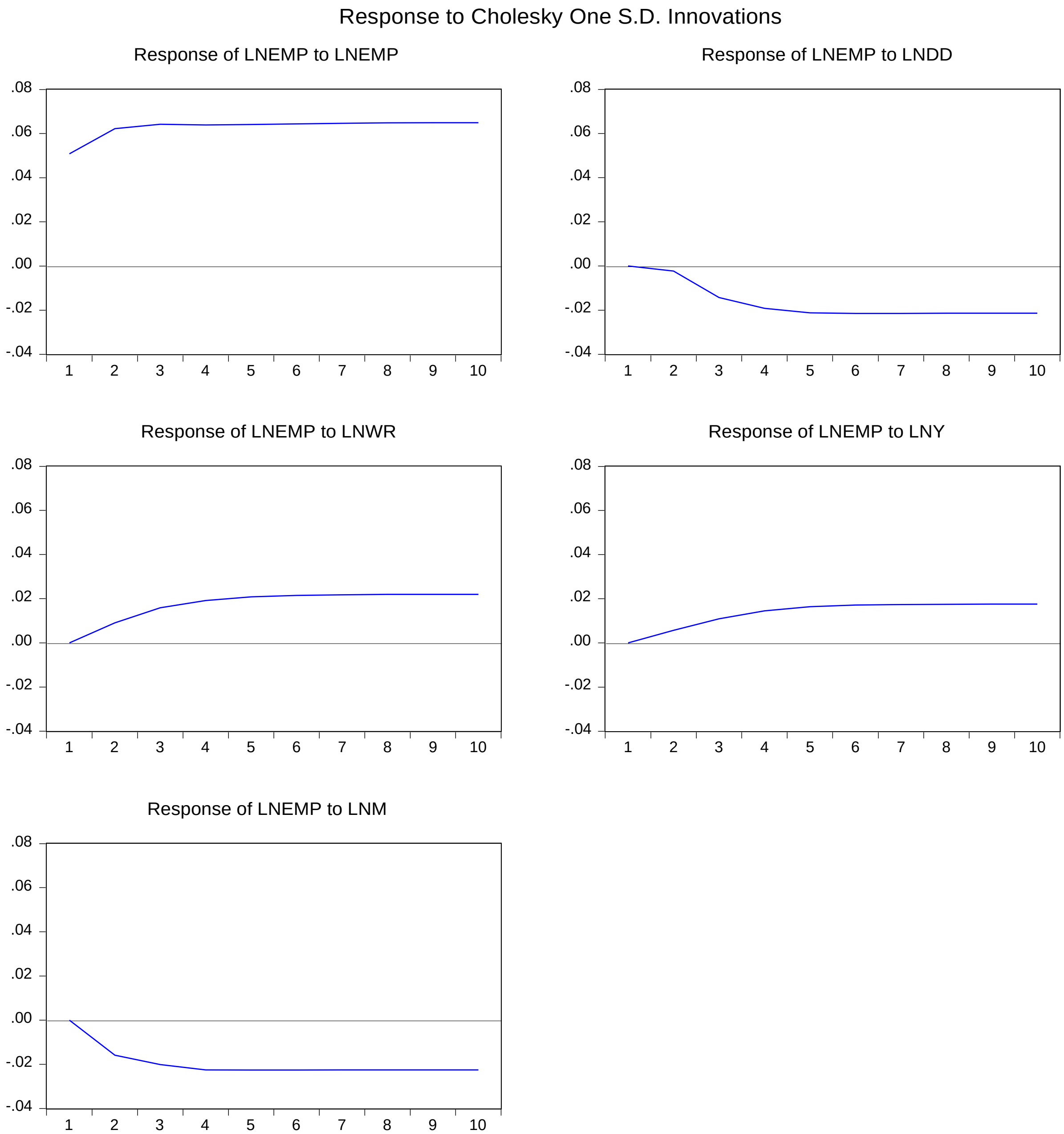


Inverse roots of AR characteristic polynomial graphed in Figure 5.7 confirm the stability condition of the VAR model and enable to perform the impulse response analysis. The outcome from the AR root graph confirms the stability test results realized from the CUSUM Test and CUSUM of squares test methods. Thus, there is no evidence of instability in the model.

5.8. Analysis of Impulse Response Function

An analysis of the impulse response function was performed over the next 10 year period. The impulse response function revealed the responsiveness of endogenous variables (i.e. employment, domestic demand, wage rate, output and imports) in the VAR when a shock was applied on the error terms of the equations 4.4 to 4.8. This study presents the relevant results by way of a multiple graphs.

Figure 5.4: Impulse Response Function of Employment (LNEMP)

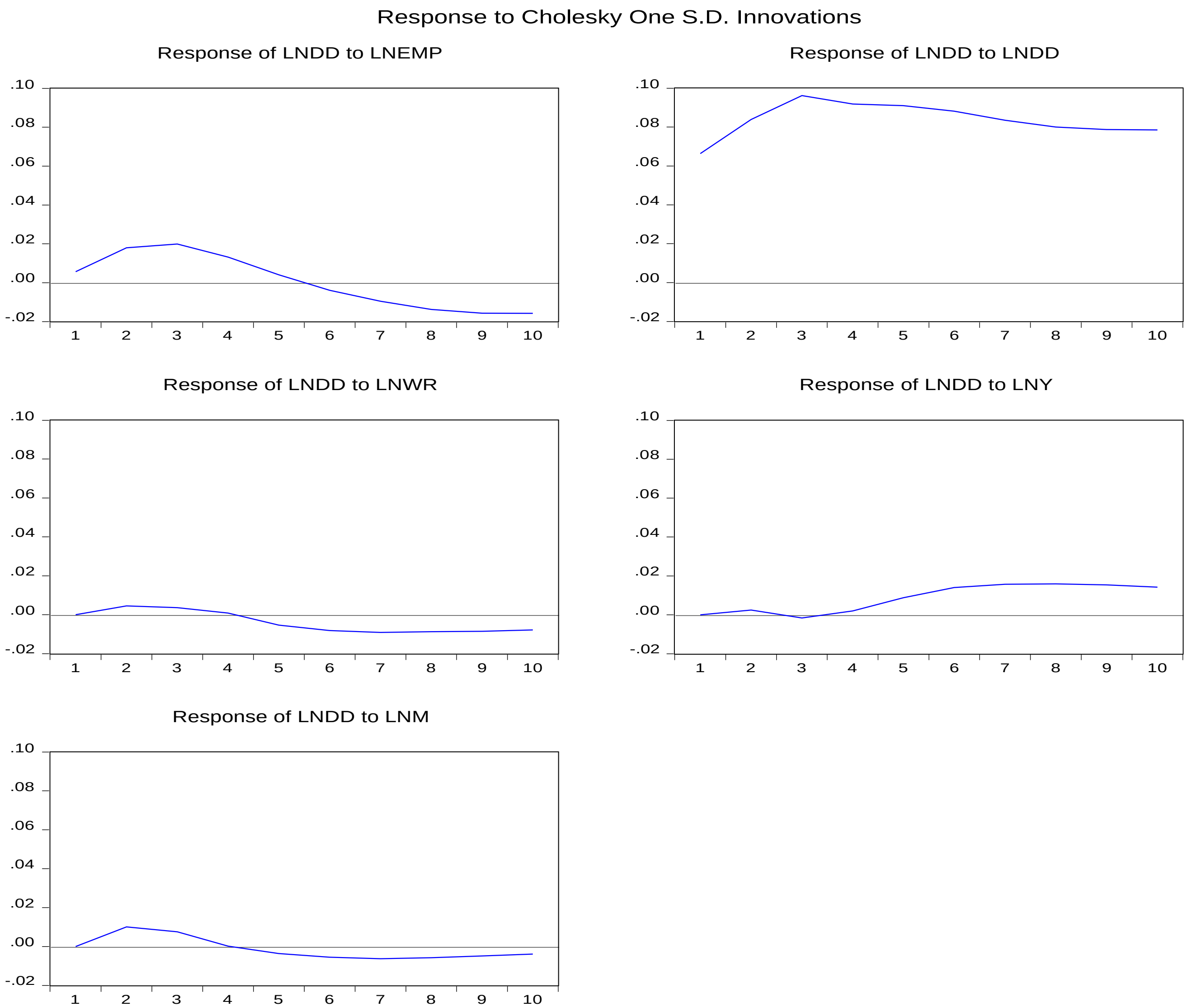


The graphs in Figure 5.4 are the results of the impulse response function of employment to shocks in all the endogenous variables. Results show that the response of employment to its own shock reacts positively in the first two years over the period of study. However, from the third year until the last observed year, employment is seen to steadily respond positively to a shock to itself. It remains consistent for the remaining seven years of the observed period. The response of employment to shocks on domestic demand, however, is seen to be insignificant in the beginning of the first two years. Afterwards, a negative response is seen half way through the second year until the third year. From the fourth year until the last observed year, this response remains consistently negative. Given that a negative effect on employment will result from this shock, policy makers should implement policies that help keep a stable balance on the domestic demand of textile and clothing goods and services in South Africa. As the industry migrates from labour intensive to capital intensive, policies and strategies should be in place to ensure that employees are not retrenched e.g. skills development programmes to help employees understand how to use the new technology and be effective in any new duty.

Shocks to the wage rate will cause an insignificant response to employment in the first year. However, a significant positive response is observed from the third year and it remains consistent until the last observed year. Policy makers should consider policies aimed at subsidising employment in the textile and clothing industry. This is to ensure that the wage rate influences employment positively. On the other hand, response of employment to output starts positively from the first year until the fourth year. From the fifth year until the tenth year a significant positive response is observed. Just as with wage rate, a positive effect on employment will result due to a shock in output. Polices aimed at ensuring an increase in output should thus be in place.

The response of employment to shocks in imports starts significantly negative from the first year to the second year of the observed period. This continues from the second year to the fourth year, and then this response remains consistently negative from the fourth year until the last observed year. Policies aimed at preventing the influx of textile and clothing goods and services into South Africa should be implemented.

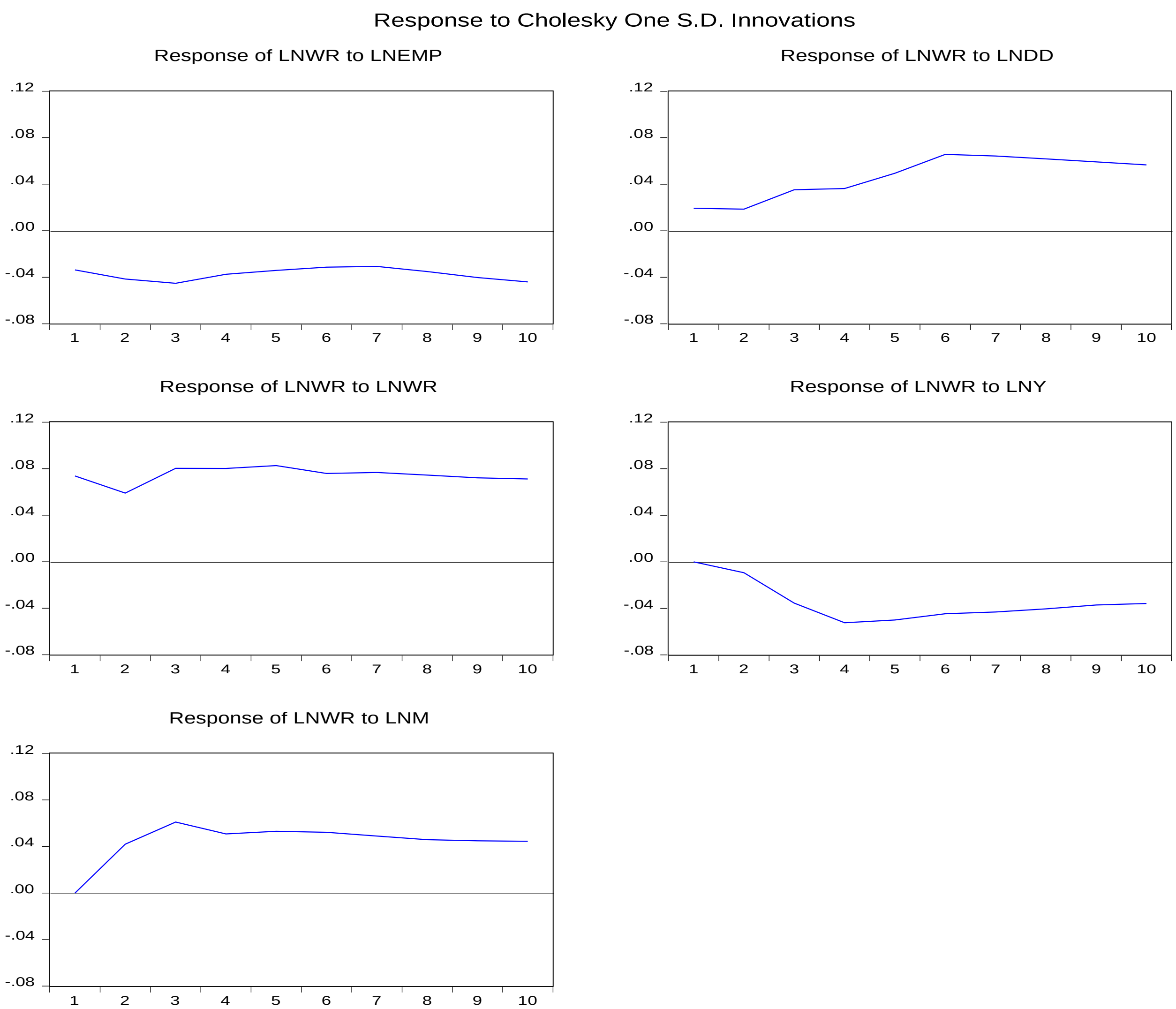
Figure 5.5: Impulse Response Function of Domestic Demand (LNDD)



The graphs in Figure 5.5 reflect the impulse response of domestic demand to innovation to all the endogenous variables. Response of employment to an innovation in domestic demand starts positively in the first year where it reaches a peak in the third year and faces a reduction in the fourth and fifth year. Response is negative in the sixth year until the last year of the observed period. Thus, shocks to employment only reflect a negative response by domestic demand in the long-run. The response of domestic demand to its own innovation shows a positive fluctuation throughout the period observed. It was, however, significantly positive in the third year.

Response of domestic demand to shocks on wage rate and imports are similar. It starts insignificant in the first year but reacts positively from then on till the fourth year. Domestic demand then reacts negatively to these shocks from the fourth year until the tenth year. Response to shocks in output shows the opposite where a significant positive response is observed in the fourth year until the tenth year.

Figure 5.6: Impulse Response Function of Wage Rate (LNWR)



The impulse response of wage rate to shocks on all the endogenous variables is seen in Figure 5.6. Wage rate responds positively to its own shock as well as to shocks to imports and domestic demand. These responses fluctuate positively throughout the observed period. However, wage rate responds negatively to shocks to employment and output. These negative responses fluctuate throughout the ten years.

Figure 5.7: Impulse Response Function of Output (LNY)

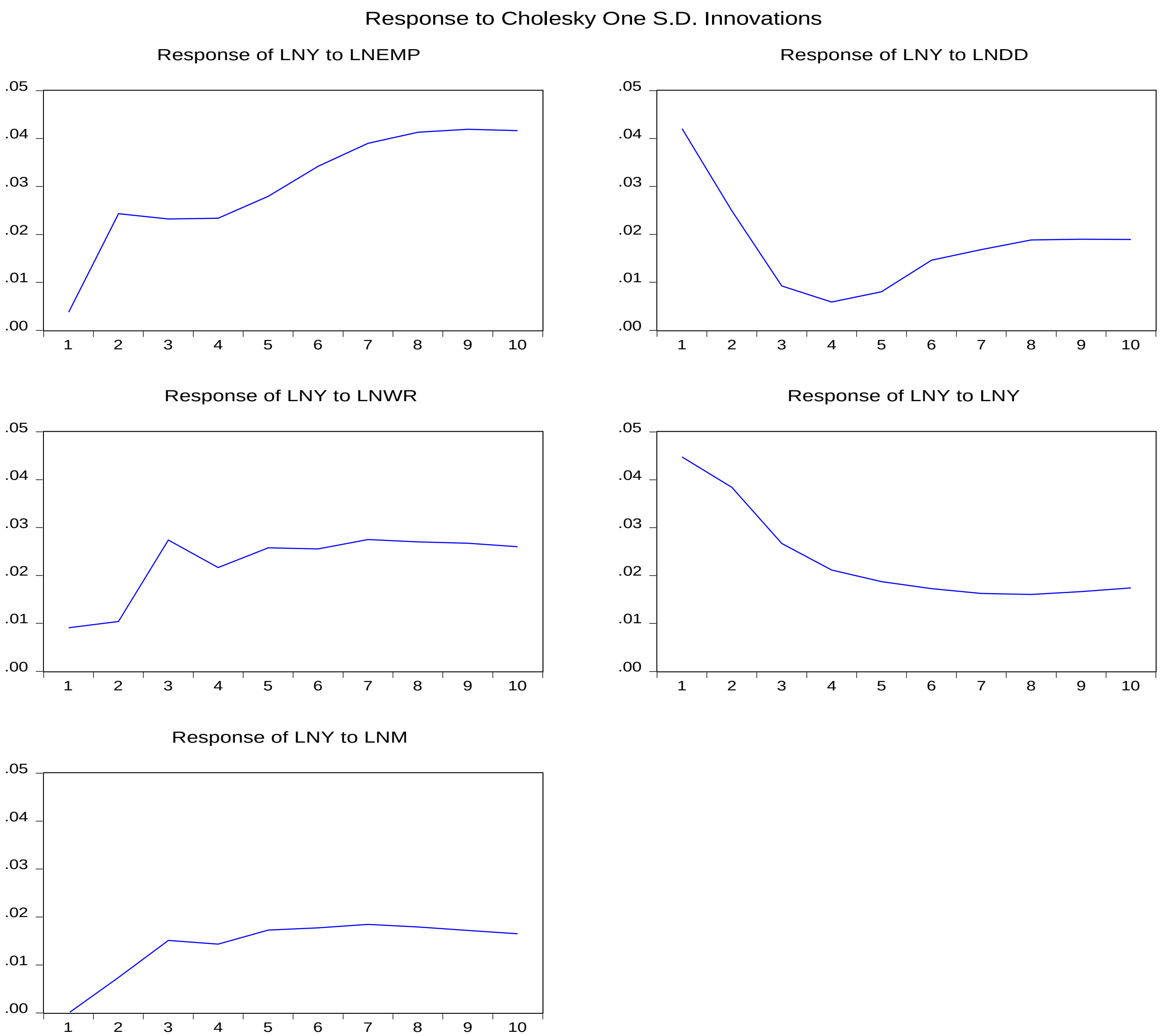
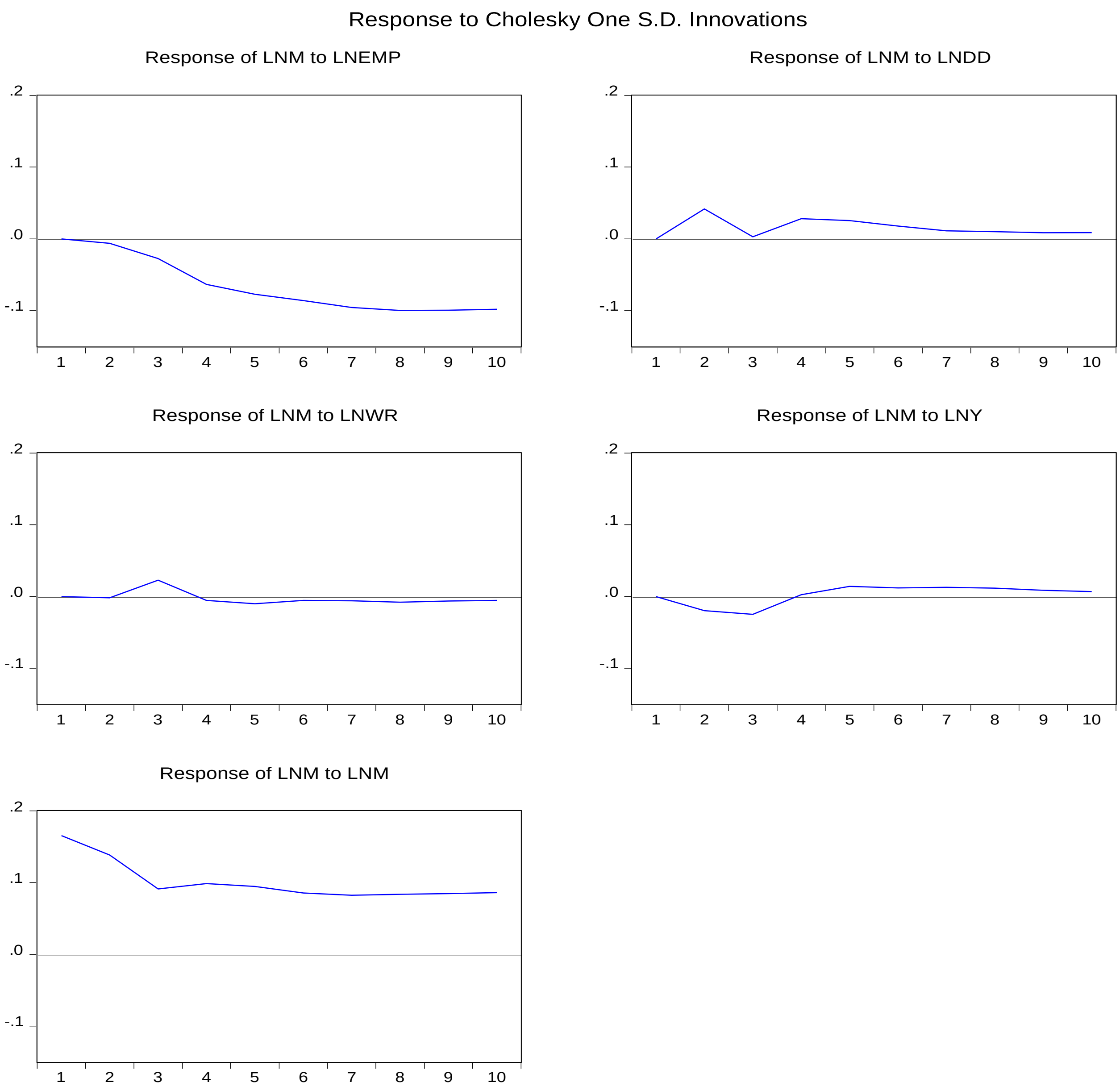


Figure 5.7 shows the impulse response of output to shocks to the endogenous variables. These graphs reflect a positive fluctuation of output in response to its own shocks and shocks to employment, domestic demand, wage rate and import. Results show that the positive response to employment shock increased throughout the observed period. However, in response to its own shock and a shock to domestic demand, output's positive response becomes insignificant over time.

Figure 5.8: Impulse Response Function of Import (LNM)



Lastly, Figure 5.8 depicts the response of imports given its own shock and shocks to employment, wage rate, domestic demand and output. Import reacts positively to shocks in domestic demand, output and import itself. However, this response starts negative to shocks in output and is only positive from the fourth year of the observed period. Results also prove to that import's response to shocks in domestic demand is insignificant but only in years one and three. However, responses to shocks in employment and wage rate are negative, although it started reacting negatively to wage rate shock in year four.

These results, from Figure 5.4 to 5.8, inform the kind of policies that should be in place. Policy implications and recommendations for employment in the South African textile and clothing industry are thus outlined in the following chapter i.e. Chapter 6.

5.9. Analysis of Variance Decomposition

Tables 5.7to 5.11 displays the analysis of the variance decomposition which shows how much in percentages does an impulse/innovation/shock to an independent variable account for the fluctuation in the dependent variable (employment). This is analysed through a period of ten years. As with the impulse reaction function, the accuracy of these results can also be used in policy considerations.

Table 5.7: Variance Decomposition of Employment

Period	S.E.	LNEMP	LNDD	LNWR	LNY	LNM
1	0.051712	100.0000	0.000000	0.000000	0.000000	0.000000
2	0.085864	93.79208	0.000415	0.804243	1.781020	3.622246
3	0.114418	89.41132	1.840969	0.455677	4.203859	4.088176
4	0.136332	86.80990	3.258506	0.320996	5.805339	3.805261
5	0.156574	84.14144	5.522483	0.243774	6.242299	3.850008
6	0.175177	82.33146	7.568680	0.215056	6.174889	3.709915
7	0.192226	81.77943	8.563400	0.197533	5.973602	3.486038
8	0.208769	81.87871	9.040790	0.209767	5.615870	3.254862
9	0.224792	82.28694	9.178158	0.233111	5.237567	3.064224
10	0.240163	82.787690.	9.129674	0.251933	4.921692	2.909012

Table 5.7reflects the variance decomposition of employment. In terms of explaining its own shock, 100% of employment variance can be explained by its own innovation in the

first year. Its contributions progressively tumble until it reaches 82.79% in the last year. However, it remains the highest contributor over ten years ahead. This brings a conclusion that employment disparities in the South African textile and clothing industry can be greatly explained by its own shock.

Results in the third year show that one standard shock stemming from domestic demand attribute to employment by 1.84% while wage rate, output and imports attribute to employment by 0.46%, 4.2% and 4.09% respectively. These collectively amount to a 100%. As observed over the years, from the first year until the tenth year, employment variance continued to lessen and could be explained less by its own innovation. This is because domestic demand, wage rate, output and imports strengthened as explanatory variables for deviations in the level of employment in the textile and clothing industry in South Africa. By the tenth year, the innovation of domestic demand, wage rate, output and import accounted9.13%, 0.25%, 4.92% and 2.9% of the fluctuations in employment respectively. The effect of these variables on employment strengthened over the period observed since year one. However, wage rate shows to be the least contributing factor and domestic demand the highest.

Table 5.8: Variance Decomposition of Domestic Demand

Period	S.E.	LNEMP	LNDD	LNWR	LNY	LNM
1	0.051712	0.000000	100.0000	0.000000	0.000000	0.000000
2	0.085864	0.965296	97.96642	0.167064	0.052468	0.848749
3	0.114418	1.154134	97.92341	0.150219	0.040355	0.731885
4	0.136332	0.918585	98.40605	0.109430	0.042344	0.523592
5	0.156574	0.753884	98.40727	0.161977	0.232680	0.444192
6	0.175177	0.902340	97.77404	0.276072	0.615857	0.431690
7	0.192226	1.291928	96.88583	0.390621	0.984845	0.446777
8	0.208769	1.833138	95.95505	0.472122	1.288693	0.450999
9	0.224792	2.384247	95.13468	0.533631	1.506875	0.440568
10	0.240163	2.845060	94.52278	0.566620	1.643883	0.421658

The variance decomposition of domestic demand is reflected in Table 5.8. While 100% of domestic demand variance can be explained by its own shock in the first year, this decreases to 94.52% by the tenth year. The innovation of employment, wage rate, output and import slightly account for the fluctuations in domestic demand. Employment being the largest contributor, the rest account for less than 2% throughout the observed period.

Table 5.9: Variance Decomposition of Wage Rate

Period	S.E.	LNEMP	LNDD	LNWR	LNY	LNM
1	0.051712	0.000000	0.000000	100.0000	0.000000	0.000000
2	0.085864	1.186984	0.058330	85.87308	0.623261	12.25835
3	0.114418	0.723884	0.674674	75.09214	4.662426	18.84687
4	0.136332	0.483944	0.947292	70.64222	9.445422	18.48112
5	0.156574	0.420250	1.907900	68.16897	11.17639	18.32649
6	0.175177	0.410782	4.112847	65.88264	11.48651	18.10722
7	0.192226	0.423000	5.440326	64.81206	11.62019	17.70443
8	0.208769	0.376111	6.289012	64.44603	11.60008	17.28877
9	0.224792	0.338244	6.834772	64.42241	11.42182	16.98276
10	0.240163	0.336354	7.160844	64.53191	11.23268	16.73821

Results in table 5.9 show the variance decomposition of the wage rate. By the tenth year, only 64.53% of the variance in wage rate can be explained by its own shock. Imports are the largest contributor to fluctuations in the wage rate while employment barely accounted for 2% over the ten year period. Employment is the lowest contributor to wage rate fluctuations where it accounted for 1.19% in the first year which decreased to 0.34% by the last year of the observed period.

Table 5.10: Variance Decomposition of Output

Period	S.E.	LNEMP	LNDD	LNWR	LNY	LNM
1	0.051712	0.000000	0.000000	0.000000	100.0000	0.000000
2	0.082864	6.872811	1.095746	0.097715	91.12389	0.809842
3	0.114418	10.15836	3.180147	5.201052	78.32493	3.135512
4	0.136332	13.03055	4.157481	7.071951	71.18482	4.555194
5	0.156574	16.30187	4.234016	9.477409	63.88737	6.099339
6	0.175177	20.33759	3.622953	10.86060	58.09559	7.083261
7	0.192226	24.32220	3.033994	12.02846	52.91155	7.703790
8	0.208769	27.67929	2.571853	12.64758	49.11994	7.981335
9	0.224792	30.28151	2.230004	13.00985	46.40237	8.076269
10	0.240163	32.25704	1.975922	13.17901	44.50578	8.082239

Table 5.10 depicts the variance decomposition of output. Although 100% of output's fluctuations were explained by its own shock in the first year, this decreased by more than half (i.e. 44.51%) by the tenth year. This means that more than half of the fluctuations in

output can be explained by innovation in employment, domestic demand, wage rate and imports. Employment and output are the largest determining factors while an import remains the least over the observed period.

Table 5.11: Variance Decomposition of Import

Period	S.E.	LNEMP	LNDD	LNWR	LNY	LNM
1	0.051712	0.000000	0.000000	0.000000	0.000000	100.0000
2	0.085864	0.080293	3.560501	0.006271	0.803351	95.54958
3	0.114418	1.350805	2.957413	0.874297	1.706540	93.11094
4	0.136332	6.549982	3.447794	0.740506	1.377584	87.88413
5	0.156574	12.04651	3.555928	0.719610	1.353478	82.32448
6	0.175177	17.34675	3.342854	0.643528	1.293826	77.37304
7	0.192226	22.57974	2.996391	0.586656	1.256659	72.58155
8	0.208769	26.95652	2.694406	0.558756	1.198503	68.59181
9	0.224792	30.33624	2.442002	0.521251	1.116038	65.58447
10	0.240163	32.89338	2.243518	0.486429	1.032404	63.34427

Lastly, the variance decomposition of imports is seen in Table 5.11. Employment, domestic demand , wage rate and output strengthened as contributing factors throughout the years as imports could only accounted 63.34% of its own fluctuations in the tenth year. Employment is the strongest contributor as it strengthened from accounting 0.08% in the second year to 32.89% in the tenth year. Wage rate, domestic demand and output could barely account for 4% individually throughout the years, with wage rate never accounting for more than 1% till the last year of the observed period. Employment remained the largest contributor and wage rate the least.

With regards to the aforementioned interpretations, over a ten year horizon, it can possibly associate disparities in the level of employment in the textile and clothing industry in South Africa to be principally explained by the contributions in domestic demand, wage rate, output and imports. Policy makers should adopt policies that would counter negative effects of a shock in any of these variables and/or policies that would encourage positive effects of any shock on employment. Policy recommendations are thus detailed in Chapter 6.

5.10. Conclusion

This chapter aimed to investigate and analyse the determinants of employment in the textile and clothing industry. The data underwent various tests in order to validate the appropriate analytical framework for the textile and clothing industry in South Africa. Stationarity and co-integration tests were applied to the data; the data was further subjected to Vector Error Correction Modelling in order to determine the long-run relationship between employment and its determinants. The model reveals results that are consistent with economic theory and some which are contrary to economic theory which can be explained by the dynamics and structure of the South African textile and clothing industry. Therefore, this highlights the drivers of employment in South Africa. Variables such as output, domestic demand, wage rate and imports reinforce the relationship suggested by economic theory such as the Keynesian Theory, Classical Theory, Neo-Classical Theory, Structuralist Theory, Okun's Law and Post- Keynesian Theory. However, some of these relationships show a contrary result to the economic view. This will be carefully explained in the next chapter i.e. Chapter 6. In order to reduce and possibly eradicate unemployment level in the textile and clothing industry, means to draw up and implement policies that will create an enabling environment for economic breakthrough.

CHAPTER 6: CONCLUSION AND POLICY RECOMMENDATIONS

6.1. Introduction

In response to the unemployment challenge facing South Africa, this study was motivated to explore the potential of the textile and clothing industry in creating jobs. Until the onset of the global economic and financial economic crisis in 2008 to 2009, this sector was one of the major employers in the country. The government intervened with a number of measures in order to enhance the capacity of the sector to contribute to growth and employment. The interventions were premised on the historical role of the sector in generating jobs. However, it is not quite clear from available literature, what factors are key in determining job creation in that sector. The study therefore aimed at ascertaining the determinants of employment in the sector.

In chapter one, the problem statement was presented, with emphasis on the unemployment challenge in the country. The rationale and significance of the study were also presented. Key concepts such as employment, unemployment, industry and decent jobs, among others, were defined. An extensive literature review was presented in chapter 2. A review of the theoretical link between industry and employment was analysed. This was followed by a discussion of the findings of some empirical studies that have been carried out by other scholars and to identify any gaps in knowledge on the subject. The study applied a quantitative research methodology, specifically in the form of an econometric analysis in which employment in the textile and clothing industry was the dependent variable and a number of identified variables were used as the independent variables. Secondary data was used for the analysis. This chapter concludes the research study and proposes a number of policy recommendations. Section 6.2 summarises the findings and section 6.3 draws policy implications and makes recommendations.

6.2. Summary of findings

The findings which are summarised below are based on a model which tests the relationship between employments in the textile and clothing industry and a number of variables i.e. domestic demand, output, wage rate and imports.

The time series data was subjected to numerous tests. Firstly, formal and informal tests of stationarity were conducted on the data. The results of the formal stationarity tests revealed that the data is integrated of order I (1), meaning that the series becomes stationary after being differenced once. The formal stationarity test result confirms the results of the informal visual analysis of the stationarity.

The Johansen co-integration test was employed in order to see if the model was co-integrated, where the results showed that the model is indeed co-integrated at 5% level of significance and that there is a long-run relationship between employment and the independent variables. The VECM test showed that employment can only return to normal at a 0.183 rate in the event of an economic shock. The model was found to converge back to equilibrium at 0.183 convergence speed. This could explain how South Africa's employment rate always struggles to recover after a drastic depreciation of the rand. In most cases, it never fully recovers. Results of the VECM granger causality showed that individually, these variables do not granger-cause employment but rather employment granger-causes domestic demand, imports, wage rate and output. This was sufficient to conclude a relationship between employment and its variables since at least one direction of granger causality was evident. The model passed all the diagnostic tests it underwent. No evidence of auto correlation, serial correlation, heteroscedasticity and instability was found in the model.

Results from the normalised long-run co-integrating equation showed a negative relationship between domestic demand and employment. This is contrary to economic theory such as the Keynesian Theory of Employment that states that aggregate demand leads to an increase in employment. However, given that the textile and clothing industry in South Africa was previously dominated by labour intensive firms and has been migrating from labour intensive to capital intensive over the past years, an increase in domestic demand could be encouragement to move from labour intensive to capital intensive. This is supported by Magwaza (2014) who mentions that the local textile production has evolved into a capital-intensive industry due to technological developments that are closing the major product gaps.

Results also showed a strong and positive relationship between output and employment in the textile and clothing industry. This is consistent with Okun's law (1962) which points out the positive relationship between employment and output. This is supported by a study by Geldenhuys and Marinkov (2006) on the robust estimates of Okun's coefficient for South Africa which prove a strong positive relationship between employment and output. The study indicated the presence of an Okun's law relationship in South Africa with some evidence of asymmetries. This study shows us that Okun's law is not only relevant in South Africa alone but its relevance narrows down to the textile and clothing industry.

A negative relationship between wage rate and employment was also found from the results. This is contrary to economic theory such as the Classical theory of employment, neo-classical theory of employment as well as Structuralists theory of employment which explain how an increase in wages and/or real wages leads to an increase in employment. The contradiction could be because employees would then find it more efficient and cost effective to be capital intensive than to employ more workers if the wage rate seems too high. Chikwaha et al (2013) also conducted an econometric analysis of labour demand in the South African Textile, Clothing and Footwear Manufacturing Sector and the results show that there is a negative relationship between wages and employment. Chikwaha et al (2013) explains how the wage structure in South Africa is a perpetually problematic factor of the labour market.

Findings also show a positive relationship between imports and employment. This is contrary to Post Keynesian theory which states that the higher the demand for imports then less supply of employment will be needed. Olayiwa and Rutaihwa (2010) confirm in their study that an increase in import competition leads to a decline in labour demand. This contradiction may be due to the fact that the clothing industry is dominated by retailers who import their stock, as this study focused on the entire industry and not just the manufacturing sector. Morris and Reed (2008) emphasized this and further stated that these retailers have the power to set prices, as well as make demands on quality and delivery.

Impulse response functions and variance decomposition were also conducted to assess how shocks to economic variables reverberate through a system. The impulse response function results reflected that a positive shock to domestic demand will have a negative effect on employment and a positive shock to wage rate will result in a positive effect on employment. It also reported that employment will increase as a result of a positive shock to output and will decrease due to a positive shock to imports. Variance decomposition results reflected that all these determinants of employment will gain more influence on the fluctuations of employment over the next 10 year period. Policies should be structured and implemented accordingly.

Results display that Okun's law is the most relevant theory in the South African context with regards to the textile and clothing industry. The findings of this study demonstrate the amount of work that policy makers and the relevant authorities in South Africa need in order to increase employment level in the textile and clothing industry of South Africa.

6.3. Policy Implications and Recommendations

The study has aided in identifying some of the determinants of employment in the textile and clothing industry of South Africa highlighting a positive relationship between employment and output as well as import.

For South Africa to increase its output it has to improve its competitiveness of locally produced goods since these goods must meet local and global demand. South Africa must firstly improve its understanding and expertise within the industry. Training and skills development relevant to the textile and clothing industry in factories, colleges and universities is required. This will increase knowledge of the textile and clothing industry and encourage a wider and more skilled labour supply. Retail buyers also need to have a deep understanding of the full supply chain of both the textile and clothing industries.

Government must attract young people into textile and clothing industry. This can be done by inducing firms to create special low wage jobs for younger workers, even though such an agreement exists (i.e. learnership), a careful analysis of this existing program is required. School-to-work transition is the key. At times, 12 months experience is insufficient to smoothly transition you from an internship/learnership to a permanent job. The wage structure in the textile and clothing industry of South Africa also needs to be revisited. Policy makers should employ economic policies that are more orientated to structural changes and reform in the labour market.

To help improve output, the government could further consider the subsidisation and incentivizing of the textile and clothing industry. This strategy was successful in China by helping manufacturers keep operational costs low. Subsidies have the potential of lowering or removing taxes on manufacturing equipment. The benefits can then be passed on to the consumer in the form of quality goods at affordable prices. However, Improving on the output of the textile and clothing industry. An increase in domestic investment is also suggested. Investment in world-class machinery and equipment can improve productivity, product quality and allow industry to operate with technical and economic efficiency. This will enable local companies to provide alternatives to imports and will improve the value chain in manufactured goods.

An increase in exports is also required to increase employment in the textile and clothing industry. The government should encourage global connection through internet. This will make access into the market much easier and attainable. The importance of the internet in global commerce makes it vital that the government prioritise a rapid development of the countries broadband network to ensure firms are not excluded from the global market. The world is turning into a digital world and South Africa needs to be up to date with that. Firms will have full information before engaging into any business globally.

To further assist with the impact of imports out of South Africa, the government should also consider free trade than protective measures to encourage global participation by becoming more competitive. However, quantitative restrictions on imports and import tariffs are suggested as an influx of imports can have a negative effect on employment in the textile and clothing industry. A complete restructuring of import tariffs on the entire sector was suggested. To improve South Africa's competitiveness and to integrate it into global and regional trade, a mutual cooperation through joint ventures between South African companies and Chinese firms is suggested. South Africa may benefit from the transfer of technology and expertise, increased production capacity and job creation.

SASTAC (2014) mentions a few strategies. These include a long-term relationship between retailers and suppliers; increased production scale to improve efficiencies and drive investment in technology, capability, development and innovation; engagement with the bargaining councils to explore mutually acceptable alternatives to the current wage structures: forward thinking leaders with a passion to make sustainable and positive difference to the broader industry context; developing financial skills at operational and strategic level; as well as a strategic collaboration between industry unions and government. The fact that wages of unskilled unionized workers did not fall when the shocks in the labour market required them to go down indicates that unions play an important role in determining the equilibrium labour market (Banerjee, 2007).

6.4. Areas of further Research

There are numerous avenues that can be explored in regards to unemployment in the textile and clothing industry of South Africa. Further study can be done on the dynamics of skilled, semi-skilled and unskilled employees in the textile and clothing industry of South Africa to see the dominant and most demanded level of skills in this industry and also to ascertain whether the industry can absorb unskilled labourers.

The determinants of employment in the textile, clothing, footwear and leather industry individually. This study has examined the industry in an aggregated manner i.e. looking at textile and clothing as a whole. However, there are sub-sectors within this broad sector and analysis of the dynamics of each could yield useful policy information. This would depend on the availability of labour of which the Department of Trade and Industry collects sub-sector data for such an analysis.

Other studies can look at the employment of youth into the textile and clothing industry of South Africa. Given the high rate of youth unemployment, the textile and clothing industry can absorb them into employment. This will require a careful analysis of the relevant factors.

One can give a detailed discussion and view of the impact of globalization in the textile and clothing industry of South Africa with regards to employment. This will help show the effects of opening up the industry to the rest of the world and suggest ways on how South Africa can manoeuvre given the changes.

6.5. Conclusion

The aim of the study was to ascertain the determinants of employment in the textile and clothing industry and this was achieved through econometric analysis, i.e. Vector Error Correction Model, used to determine a long run relationship between employment in the textile and clothing industry and relevant variables. Factors such as domestic demand, output, wage rate and imports were identified as determinants but positive relationships were only found between employment and output as well as employment and imports. Negative relationships were found between employment and wage rate as well as employment and domestic demand.

In conclusion, the government has implemented a few policies to help encourage job creation in the textile and clothing industry. However, the industry continues to face major challenges. Evidence from Statistics South Africa earlier showed that this increase in jobs does not cover the loss of jobs from the previous years. The government may consider doing more. Given the policies in place, and the continuous deliberation on the success of this industry, the textile and clothing industry has proven to be important and sustainable in future. Furthermore, numerous policy implications and recommendations to be taken into consideration by the relevant authorities have been mentioned. Ultimately, policies that will help increase output and employment will result in an increase in employment in the textile and clothing industry of South Africa.

REFERENCES

Akaike, H., 1973. Information Theory as an Extension of the Maximum Likelihood Principle. *Second International Symposium on Information Theory,* pp. 267-281.

Ball, L. M., Leigh, D. & Loungani, P., 2013. *Okun's Law: Fit at Fifty.* Massachusetts: National Bereau of Economic Research, Inc.

Banerjee, A. et al., 2007. *Why has Unemployment Risen in the New South Africa Working Paper 13167.* Cambridge: National Bereau of Economic Research.

Bankole, A. S. & Fatai, B. O., 2013. Empirical Test of Okun's Law in Nigeria. *International Journal of Economic Practices and Theories,* 3(3), pp 227-231.

Bannett, M., 2003. *Organising in the Informal Economy: A Case Study of the Clothing Industry in South Africa.* South Africa: Seed Working Paper .

Barnes, J. & Kaplinsky, R., 2000. Globalisation and the Death of Local Firm: The Automobile Components Sector in South Africa. *Regional Studies,* 34(9), pp 797-812.

Barnes, M., Morris, J. & Esselaar, J., 2004. *An Identification of Strategic Interventions at the Provincial Government Level to Secure the Growth and Development of the Western Cape Clothing and Texxtiles Industries,* South Africa: Textile and Clothing Paper.

Barrientos, S., Kabeer, N. & Hossain, N., 2004. *The Gender Dimensions of the Globalisation of Production,* South Africa: ILO Working Paper No.17.

Basu, S. & Fernald, F. G., 2009. What do we Know (and not know) about Potential Output?. *Federal Reserve Bank of St. Louis, Review,* 91(4), pp. 187-213.

Bellante, D., 1984. Sticky Wages, Efficiency Wages and Market Processes. *Review of Austrian Economics,* 8(1), pp. 21-33.

Bertrand , M., Mullainathan, S. & Miller, D., 2003. Public Policy and Extended Families: Evidence from Pensions in South Africa. *World Bank Economic Review,* 17(1), pp. 27-50.

Bezuidenhout , A. et al., 2007. Globalisation and Poverty: Impacts on Households of Employment and Restructuring in the Textiles Industry of South Africa. *Journal of International Development,* 19(3), pp. 545-565.

Bhaumik, S. K., Estrin, S. & Meyer, K. E., 2004. *Determinants of Employment Growth at MNEs: Evidence from Egypt, India, South Africa and Vietnam.* UK: Comparative Economic Studies.

Bittner, E., 2004. *Basic Textile Core: Structure, Storage and Display.* Texas: Pavelka.

Blanchard, O., 2000. *Macroeconomics.* 2 ed. Upper Saddle River, N.J: Prentice Hall.

Blanchard, O. & Lawrence, F., 1999. Wage Dynamics: Reconciling Theory and Evidence. *American Economic Review,* 89(2), pp. 69-74.

Blaug, M., 1997. *Economic Theory in Retrospect.* 5th ed. Cambridge: University Press.

Brunner, K. & Meltzer, A., 1978. Public Policies in Open Economies. *Carnegie-Rochester Conference Series on Public Policy,* 9(1), pp. 1-4.

Brunner, K. & Meltzer, A., 1978. The Problem of Inflation. *Carnegie-Rochester Conference Series on Public Policy,* 8(1), pp. 1-15.

Business Partners, 2014. *The South African Textile and Clothing Industry - An Overvoew.* [Online] Available at: www.businesspartners.co.za/knowledge-hub/manufacturing-fund/south-african-textile-clothing-industry-overview-3252/
[Accessed 24th March 2015].

Cakir, M. Y. & Kabundi, A., 2011. *Trade Shocks from BRIC to South Africa: A Global VAR Analysis,* Johannesburg: Working Paper 250.

Calanese Corporation, 2001. *Complete Textile Glossary.* Calanese: Actate.

Campbell, Y. J., 1990. *A Variance Decomposition for Stock Returns.* Cambridge: Nationnal Bereau of Economic Research.

Chellasamy , P. & Anu, K. M., 2017. *Investigating the Relationship between Current Account Deficit and Capital Flows of India using ARDL Approach.* India: Bharathiar University.

Chernomas, B., 1983. Keynesian, Monetarist and Post-Keynesian Policy: A Marxist Analysis. *Studies in Political Economy,* 10(1), pp. 123-142.

Chikwaha, T. R. et al., 2013. *Econometric Analysis of Labour Demand in the South African Textiles, Clothing and Footwear Manufacturing Sector.* South Africa: Research Gate.

Collard, D., 2011. *Generations of Economists.* London: Routledge.

Davidson, P., 1998. Post Keynesian Employment Analysis and the Macroeconomics of OECD Unemployment. *The Economic Journal,* 108(448), pp. 817-831.

Dhliwayo, R., 2012. *A Continent vs A Country: China Putting Strain on Africa's Clothing and Textile Industries.* [Online] Available at: http://www.cosultancyafrica.com/index.php [Accessed 9th June 2015].

Dickey, D. A. & Fuller, W. A., 1981. Likelihood Ratio Statistics for Autoregressive Time Series with a Unit. *Econometrica 49,* pp. 1057-1071.

D'Souza, E., 2009. *Macroeconomics.* New Delhi: Doring Kindersley Pvt. Ltd.

Dunis, C. L. & Ho, R., 2005. *Co-integration Portfolios of European Equities for the Index Tracking and Market Neutral Strategies.* Liverpool: Centre for International Banking.

Dwivedi, D., 2005. *Macroeconomics: Theory and Policy.* 2nd ed. New Delhi: Tata-McGraw Hill Publishing Company Limited.

Edmonds, E., Mammen, K. & Miller, D., 2003. *Rearranging the Family: Income Support and Elderly Living Arrangements in a Low Income Country.* Mimeo: University of Dartmouth.

Eita, J. H. & Ashipala, J. M., 2010. Determinants of Unemployment in Namibia. *International Journal of Business and Management,* 5(10), pp 92-104.

Enders, W., 2010. *Applied Econometric Time Series.* 3rd ed. Alabama: Wiley.

Engle, R. & Granger , C., 1987. Co-integration and Error Corrrection: Representation, Estimation and Testing. *Econometrica 55,* pp. 251-276.

Flanagan, M., 2003. *Apparel Sourcing in the 21st Century, the lessons so far.* [Online] Available at: www.just-style.com [Accessed 17 May 2015].

Garrison, C. B., 1984. Friedman versus Keynes on the Theory of Employment. *Journal of Post Keynesian Economics,* 7(1), pp. 114-127.

Geldenhuys, J. & Marinkov, M., 2006. *Robust Estimates of Okun's Coefficients for South Africa.* South Africa: University of South Africa.

Gereffi, G., 2002. *Outsourcing and Changing Patterns of International Competition in the Apparel Commodity Chain.* [Online] Available at: http://www.colorado.edu/IBS/PEC/gadconf/papers/gereffi.pdf [Accessed 17 May 2015].

Giles, D., 2011. *VAR or VECM When Testing for Granger Causality.* Canada: University of Victoria.

Gottschalk, J., 2002. *Keynesian and Monetarist Views on the German Unemployment Problem: Theory and Evidence.* Germany: Kiel Institute of the World Economy.

Granger, C. W., 1969. Investigating Causal Relations by Econometric Models and Cross-Spectrsl Methods. *Econometrica 37,* pp. 424-438.

Green, P., 2009. *Industrialisation in South Africa: The Impact of Globalisation.* Norwich: University of East Anglia.

Gujarati, D. N., 2003. *Basic Econometrics.* 4th ed. U.S: McGraw-Hill.

Gujarati, D. N. & Porter, D. C., 2003. *Basic Econometrics.* 5th ed. U.S: McGraw-Hill.

Gupta, G. S., 2004. *Macroeconomics: Theory and Applications.* 2nd ed. New Delhi: McGraw-Hill.

Hannan, E. J. & Quin, B. G., 1978. The Determination of the Lag Length of an Autoregression. *Journal of the Royal Statistical Society,* pp. 190-195.

Hjalmarsson, E. and Österholm, P., 2010. Testing for Cointegration using the Johansen Methodology when Variables are Near-integrated: Size Distortions and Partial Remedies, *Empirical Economics*, 39(1), pp. 51–76.

ILO, 2005. *Promoting Fair Globalisation in Textiles and Clothing in a post-MFA Environment.* Geneva: International Labour Office.

Industrial Development Corporation, 2008. *Sustaining the Growth Path.* [Online] Available at: http://www.idc.co.za/AnnualReport/2008/IDC [Accessed 28 September 2015].

Jacobs, B., 2011. A Dragon and a Dove: A Comparative Overview of Chinese and European Trade Relations with Sub-Saharan Africa. *Journal of Current Chinese Affairs,* 40(4), pp. 17-60.

Jain, T. R. & Khanna, O. P., 2010. *Macroeconomics and Elementary Statistics.* New Delhi: Vilma Kumari Jain.

Joffe, A., Kaplan, D., Kaplinsky, R. & Lewis , D., 1995. *Improving Manufacturing Performance in South Africa.* Cape Town: University of Cape Town Press.

Johansen, S., 1991. *Testing for Cointegration Using the Johansen Methodology.* U.S: Research Gate.

Johansen, S. & Juselius, K., 1990. Maximum Likelihood Estimation and Inference on Co-integration with Applications to the Demand for Money. *Oxford Bulletin of Economics and Statistics ,* pp. 169-210.

Jonung, L., 1989. Knut Wicksell on Unemployment. *History of Political Economy,* 21(1), pp. 27-42.

Keane, J. & te Velde, W., 2008. *The Role of Textile and Clothing Industries in Growth and Development Strategies.* Britain: Overseas Development Institute.

Keynes, J. M., 1936. *The General Theory of Employment, Interest and Money.* U.S: MacMillan.

Khetsi, Q. S. & Mongale, I. P., 2014. The Impact of Capital Markets on the Economic Growth in South Africa. *Journal of Governance and Regulation,* 3(2), pp 154-163.

Khumalo, Z., 2014. *The Determinants of Unemployment in Swaziland: An Econometric Perspective and Investigative Analysis.* North West: North-West University.

Kiley, M. T., 2013. Output Gaps. *Journal of Macroeconomics,* 37(1), pp. 1-18.

Knight, K., 2014. *Pigou's the Theory of Unemployment and its Corrigenda.* Australia: University of Western Australia.

Knoetek, E. S., 2007. How Useful is Okun's Law. *Economic Review,* 92(4), pp. 73-103.

Krugman, P. & Wells, R., 2006. *Macroeconomics.* New York: Worth Publishers.

Kuper, A. & Kuper, J., 1996. *The Social Science Encyclopedia.* 2nd ed. London: Routlede.

Kwiatkowski, D., Phillips, P. C., Schmid, T. P. & Shin , Y., 1992. Testing the Null Hypothesis of Trend Stationarity. *Journal of Economic Psychology,* pp. 125-141.

Ladzani, W. & Vuuren, J., 2002. Entrepreneurship Training for Emerging SMEs in South Africa. *Journal of Small Business Management,* 40(2), pp. 154-161.

Lancaster, D. & Tulip, P., 2015. *Okun's Law and Potential Output.* Australia: Reserve Bank of Australia.

Lin, J., 2016. *Teaching Notes on Impulse Response Function and Structural VAR.* Chengchi: Academia Sinica.

Lu, C. & Xin, Z., 2010. *Impulse-Response Function Analysis: An Application to Macroeconomy Data of China.* Sweden: Hogskolan Darlana.

Magwaza, N., 2014. *Hope Returns to Clothing Textiles Sector.* [Online] Available at: http://www.jol.co.za/business/news/ [Accessed 2 March 2015].

Matume, G., 2006. *New Trade Rules Hit Hard in Africa's Textile Industry.* [Online] Available at: http://www.mg.co.za [Accessed 9 June 2015].

Meniago, C., Mukudden-Peterson, J., Peterson, M. A. & Mongale, I. P., 2013. What Causes Household Debt to Increase in South Africa. *Economic Modelling 33,* pp. 482-492.

Mohr, P. & Fourie, L., 2008. *Economics for South African Students.* 4th ed. Pretoria: Van Schaik Publishers.

Morris, M. & Edwards, L., 2006. Undressing the Numbers: The Employment Effect of Import Quotas on Clothing and Textiles. *Journal of Development Perspectives,* 2(2), pp. 121-140.

Morris, M. & Reed, L., 2008. *A Sectoral Analysis of Skills Gaps and Shortages in the Clothing and Textile Industry in South Africa.* Cape Town : University of Cape Town.

Mouhammed, A. H., 2011. Important Theories of Unemployment and Public Policies. *Journal of Applied Business and Economics,* 12(5), pp. 110-110.

Narayanan, G. B., 2003. *The Determinants of Employment in the Indian Textile Industry.* Mumbai: Indira Gandhi Institute of Development Research.

Neely, C. J., 2010. *Economic Synopses.* Missouri: Federal Reserve Bank of St. Louis.

Nishiyama, C. & Leube, K., 1984. *The Essence of Hayek.* Stanford: Hoover Insitution.

Njikam, O., 2009. *Trade Reform and Labour Market Adjustment in Cameroon.* [Online] Available at: www.upjoinist.ord/entrepriseresearch/cost/workshop/njikam.pdf [Accessed 23 March 2016].

Nordas, H., 2004. *The Global Textile and Clothing Industry Post the Agreement on Textiles and Clothing.* [Online] Available at: http://www.wto.org/english/rese/bookspe/discussionpaper5e.pdf [Accessed 16 May 2015].

Nyberg, H. & Lanne, M., 2014. *Generalised Forecast Error Variance Decomposition for Linear and Nonlinear Multivariate Models.* Finland: University of Helsinki.

O'Hara, P., 1999. *Encyclopedia of Political Economy L-Z.* London: Routledge.

Olayiwola, W. K. & Rutaihwa, J. L., 2010. Trade Liberalisation and Employment Performance of Textile and Clothing Industry in Tanzania. *International Business Research,* 3(3), pp. 47-55.

Phelps, E., 1994. *Structural Slumps.* Cambridge: Harvard University Press.

Phelps, E., 1995. *The Structuralist Theory of Employment.* New York: Colombia University.

Phelps, E., 2004. The Boom and the Slump: A Casual Account of the 1990s/2000s and the 1920s/1930s. *Policy Reform,* 7(1), pp. 3-19.

Phillips, R. C. & Perron, P., 1988. Testing for Unit Root in Time Series Regression. *Biometrika,* pp. 335-346.

Pigou, A. C., 1933. *The Theory of Unemployment.* London: MacMillan and Co. .

Prachowny, M. F., 1993. Okun's Law: Theoretical Foundations and Revised Estimates. *The Review of Economics and Statistics,* 75(2), pp. 201-208.

Roberts , S. & Thoburn, J., 2004. Globalisation and the South African Textile Industry: Impacts on Firms and Workers. *Journal of International Development,* 16(1), pp. 125-139.

Roberts, S. & Thoburn, J., 2002. *Globalisation and the South African Textiles Industry.* South Africa: John Wiley & Sons.

Rodriguez, R. A., 2015. *Classical versus Keynesian Theory of Unemployment: An Approach to the Spanish Labour Market.* Barcelona: Universitat Authonoma de Barcelona.

SASTAC, 2014. *The Material Issues Facing the South African Textile and Apparel Industry,* South Africa: The Mass Group.

Schwarz, G., 1978. Estimating the Dimension of a Model. *The Annals of Statistics,* pp. 461-464.

Seyoum, B., 2010. Trade Liberalisation in Textiles and Clothing and Developing Countries: An Analysis with Special Emphasis on the US Import Market. *International Trade Journal,* 24(2), pp. 149-181.

Sims, C., 1980. Macroeconomics and Reality. *Econometrica,* 48(1), pp. 1-48.

Statistics South Africa, 2015. Quaterly Labour Force Survey. *Statistical Release P0211*, March.

Stengg, W., 2001. *The Textile and Clothing Industry in the EU: A Survey.* Europe: Enterprise Papers.

Sweezy, P., 1934. Professor Pigou's Theory of Unemployment. *The Journal of Political Economy,* 42(6), pp. 800-811.

Textile Federation, 2007. *Current Trading Environment.* [Online] Available at: http://www.texfed.co.za/ [Accessed 16 May 2015].

Trading Economics, 2015. *South Africa Unemployment Rate.* [Online] Available at: http://www.tradingeconomics.com/south-africa/unemployment-rate [Accessed 9 June 2015].

UNCTAD, 2004. *Trade and Gender: Opportunities and Challenges for Developing Countries.* [Online] Available at: http://www.unctad.org/en/docs/edm20042en.pdf [Accessed 16 May 2015].

UNCTAD, 2005. *TNCs and the Removal of Textiles and Clothing Quota.* New York: United Nations Publications.

Vedder, R. K. & Gallaway , L. E., 1997. *Out of Work: Unemployment and Government in the Twentieth Century America.* New York: New York University Press.

Velben, T., 1997. *The Engineers and Price System.* New York: B.W. Huebsch.

Vlok, E., 2006. *The Textile and Clothing Industry in South Africa.* [Online] Available at: http://library.fes.de [Accessed 16 May 2015].

Wesgro, 2014. *Business Sector Information Updates from South Africa's Western Cape Call Centre Industry.* [Online] Available at: http://www.wesgro.org.za [Accessed 9 June 2015].

World Trade Organisation, 2003. *Dispute Settlement.* New York: United Nations Publications.

Yellen, J., 1984. Efficiency Wage Models of Unemployment. *American Economic Review Papers and Proceedings,* 74(2), pp. 200-205.

Zimmerman, G., 2007. *Austrian Elements of Structuralist Unemployment Theory.* Germany: Springer Science + Business Media.

APPENDIX

Appendix 1: Unit Root Results

Appendix 1A: Employment Unit Root Results

ADF

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

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		0.050912	0.9581
Test critical values:	1% level	-3.588509	
	5% level	-2.929734	
	10% level	-2.603064	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LNEMP)
Method: Least Squares
Date: 04/18/17 Time: 21:16
Sample (adjusted): 1972 2015
Included observations: 44 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNEMP(-1)	0.002601	0.051087	0.050912	0.9596
C	-0.036864	0.621204	-0.059342	0.9530

R-squared	0.000062	Mean dependent var	-0.005240
Adjusted R-squared	-0.023746	S.D. dependent var	0.053847
S.E. of regression	0.054482	Akaike info criterion	-2.937499
Sum squared resid	0.124669	Schwarz criterion	-2.856400
Log likelihood	66.62499	Hannan-Quinn criter.	-2.907424

F-statistic	0.002592	Durbin-Watson stat	1.452074
Prob(F-statistic)	0.959637		

Null Hypothesis: LNEMP has a unit root

Exogenous: Constant, Linear Trend

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

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.166599	0.9050
Test critical values:	1% level	-4.180911	
	5% level	-3.515523	
	10% level	-3.188259	

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

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(LNEMP)

Method: Least Squares

Date: 04/18/17 Time: 21:20

Sample (adjusted): 1972 2015

Included observations: 44 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNEMP(-1)	-0.058210	0.049897	-1.166599	0.2501
C	0.748314	0.612250	1.222236	0.2286
@TREND("1971")	-0.002035	0.000632	-3.221649	0.0025

R-squared	0.202058	Mean dependent var	-0.005240
Adjusted R-squared	0.163134	S.D. dependent var	0.053847
S.E. of regression	0.049259	Akaike info criterion	-3.117703
Sum squared resid	0.099484	Schwarz criterion	-2.996053
Log likelihood	71.58946	Hannan-Quinn criter.	-3.072589
F-statistic	5.191098	Durbin-Watson stat	1.715123
Prob(F-statistic)	0.009782		

Null Hypothesis: D(LNEMP) has a unit root

Exogenous: Constant

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

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.879176	0.0002
Test critical values:	1% level	-3.592462	
	5% level	-2.931404	
	10% level	-2.603944	

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

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(LNEMP,2)

Method: Least Squares

Date: 04/18/17 Time: 21:21

Sample (adjusted): 1973 2015

Included observations: 43 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNEMP(-1))	-0.736733	0.150995	-4.879176	0.0000
C	-0.004581	0.008107	-0.565059	0.5751

R-squared	0.367346	Mean dependent var	0.000122
Adjusted R-squared	0.351915	S.D. dependent var	0.065567
S.E. of regression	0.052784	Akaike info criterion	-2.999834
Sum squared resid	0.114231	Schwarz criterion	-2.917918
Log likelihood	66.49643	Hannan-Quinn criter.	-2.969626
F-statistic	23.80636	Durbin-Watson stat	1.997809
Prob(F-statistic)	0.000017		

Null Hypothesis: D(LNEMP) has a unit root

Exogenous: Constant, Linear Trend

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

	t-Statistic	Prob.*

Augmented Dickey-Fuller test statistic		-5.531011	0.0002
Test critical values:	1% level	-4.186481	
	5% level	-3.518090	
	10% level	-3.189732	

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

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(LNEMP,2)

Method: Least Squares

Date: 04/18/17 Time: 21:22

Sample (adjusted): 1973 2015

Included observations: 43 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNEMP(-1))	-0.908368	0.164232	-5.531011	0.0000
C	0.029940	0.017535	1.707427	0.0955
@TREND("1971")	-0.001549	0.000706	-2.194931	0.0340

R-squared	0.435354	Mean dependent var	0.000122
Adjusted R-squared	0.407121	S.D. dependent var	0.065567
S.E. of regression	0.050486	Akaike info criterion	-3.067047
Sum squared resid	0.101951	Schwarz criterion	-2.944172
Log likelihood	68.94150	Hannan-Quinn criter.	-3.021734
F-statistic	15.42041	Durbin-Watson stat	1.905686
Prob(F-statistic)	0.000011		

PP

Null Hypothesis: LNEMP has a unit root

Exogenous: Constant

Bandwidth: 2 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-0.326829	0.9124
Test critical values:	1% level	-3.588509	
	5% level	-2.929734	
	10% level	-2.603064	

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

Residual variance (no correction)	0.002833
HAC corrected variance (Bartlett kernel)	0.003962

Phillips-Perron Test Equation
Dependent Variable: D(LNEMP)
Method: Least Squares
Date: 04/18/17 Time: 21:23
Sample (adjusted): 1972 2015
Included observations: 44 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNEMP(-1)	0.002601	0.051087	0.050912	0.9596
C	-0.036864	0.621204	-0.059342	0.9530

R-squared	0.000062	Mean dependent var	-0.005240
Adjusted R-squared	-0.023746	S.D. dependent var	0.053847
S.E. of regression	0.054482	Akaike info criterion	-2.937499
Sum squared resid	0.124669	Schwarz criterion	-2.856400
Log likelihood	66.62499	Hannan-Quinn criter.	-2.907424
F-statistic	0.002592	Durbin-Watson stat	1.452074
Prob(F-statistic)	0.959637		

Null Hypothesis: LNEMP has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 5 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-1.100776	0.9174
Test critical values:	1% level	-4.180911	
	5% level	-3.515523	
	10% level	-3.188259	

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

Residual variance (no correction)	0.002261
HAC corrected variance (Bartlett kernel)	0.001957

Phillips-Perron Test Equation
Dependent Variable: D(LNEMP)
Method: Least Squares
Date: 04/18/17 Time: 21:24
Sample (adjusted): 1972 2015
Included observations: 44 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNEMP(-1)	-0.058210	0.049897	-1.166599	0.2501
C	0.748314	0.612250	1.222236	0.2286
@TREND("1971")	-0.002035	0.000632	-3.221649	0.0025

R-squared	0.202058	Mean dependent var	-0.005240
Adjusted R-squared	0.163134	S.D. dependent var	0.053847
S.E. of regression	0.049259	Akaike info criterion	-3.117703
Sum squared resid	0.099484	Schwarz criterion	-2.996053
Log likelihood	71.58946	Hannan-Quinn criter.	-3.072589
F-statistic	5.191098	Durbin-Watson stat	1.715123
Prob(F-statistic)	0.009782		

Null Hypothesis: D(LNEMP) has a unit root
Exogenous: Constant
Bandwidth: 2 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-4.867560	0.0003
Test critical values:	1% level	-3.592462	
	5% level	-2.931404	
	10% level	-2.603944	

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

Residual variance (no correction)	0.002657
HAC corrected variance (Bartlett kernel)	0.002614

Phillips-Perron Test Equation
Dependent Variable: D(LNEMP,2)
Method: Least Squares
Date: 04/18/17 Time: 21:25
Sample (adjusted): 1973 2015
Included observations: 43 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNEMP(-1))	-0.736733	0.150995	-4.879176	0.0000
C	-0.004581	0.008107	-0.565059	0.5751

R-squared	0.367346	Mean dependent var	0.000122
Adjusted R-squared	0.351915	S.D. dependent var	0.065567
S.E. of regression	0.052784	Akaike info criterion	-2.999834
Sum squared resid	0.114231	Schwarz criterion	-2.917918
Log likelihood	66.49643	Hannan-Quinn criter.	-2.969626
F-statistic	23.80636	Durbin-Watson stat	1.997809
Prob(F-statistic)	0.000017		

Null Hypothesis: D(LNEMP) has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 11 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-5.500191	0.0003
Test critical values:	1% level	-4.186481	
	5% level	-3.518090	
	10% level	-3.189732	

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

Residual variance (no correction)	0.002371
HAC corrected variance (Bartlett kernel)	0.000972

Phillips-Perron Test Equation
Dependent Variable: D(LNEMP,2)
Method: Least Squares
Date: 04/18/17 Time: 21:26
Sample (adjusted): 1973 2015
Included observations: 43 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNEMP(-1))	-0.908368	0.164232	-5.531011	0.0000
C	0.029940	0.017535	1.707427	0.0955
@TREND("1971")	-0.001549	0.000706	-2.194931	0.0340

R-squared	0.435354	Mean dependent var	0.000122
Adjusted R-squared	0.407121	S.D. dependent var	0.065567
S.E. of regression	0.050486	Akaike info criterion	-3.067047
Sum squared resid	0.101951	Schwarz criterion	-2.944172
Log likelihood	68.94150	Hannan-Quinn criter.	-3.021734
F-statistic	15.42041	Durbin-Watson stat	1.905686
Prob(F-statistic)	0.000011		

Appendix 1B: Domestic Demand Unit Root Results

ADF

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

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		0.290368	0.9751
Test critical values:	1% level	-3.592462	
	5% level	-2.931404	
	10% level	-2.603944	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LNDD)
Method: Least Squares
Date: 04/18/17 Time: 21:28
Sample (adjusted): 1973 2015
Included observations: 43 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNDD(-1)	0.005333	0.018367	0.290368	0.7730
D(LNDD(-1))	0.257859	0.155914	1.653850	0.1060
C	-0.020475	0.178247	-0.114871	0.9091

R-squared	0.075091	Mean dependent var	0.042202
Adjusted R-squared	0.028846	S.D. dependent var	0.066638
S.E. of regression	0.065670	Akaike info criterion	-2.541124
Sum squared resid	0.172504	Schwarz criterion	-2.418250
Log likelihood	57.63417	Hannan-Quinn criter.	-2.495812
F-statistic	1.623752	Durbin-Watson stat	1.920597
Prob(F-statistic)	0.209884		

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

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.347047	0.8622
Test critical values:	1% level	-4.186481	
	5% level	-3.518090	
	10% level	-3.189732	

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

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

Method: Least Squares

Date: 04/18/17 Time: 21:29

Sample (adjusted): 1973 2015

Included observations: 43 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNDD(-1)	-0.066062	0.049042	-1.347047	0.1857
D(LNDD(-1))	0.273751	0.153497	1.783427	0.0823
C	0.597018	0.431532	1.383484	0.1744
@TREND("1971")	0.003446	0.002201	1.565607	0.1255

R-squared	0.129784	Mean dependent var	0.042202
Adjusted R-squared	0.062844	S.D. dependent var	0.066638
S.E. of regression	0.064511	Akaike info criterion	-2.555566
Sum squared resid	0.162303	Schwarz criterion	-2.391734
Log likelihood	58.94467	Hannan-Quinn criter.	-2.495150
F-statistic	1.938815	Durbin-Watson stat	1.934322
Prob(F-statistic)	0.139268		

Null Hypothesis: D(LNDD) has a unit root

Exogenous: Constant

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

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.890237	0.0002
Test critical values:	1% level	-3.592462	
	5% level	-2.931404	
	10% level	-2.603944	

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

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(LNDD,2)

Method: Least Squares

Date: 04/18/17 Time: 21:30

Sample (adjusted): 1973 2015

Included observations: 43 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNDD(-1))	-0.731089	0.149500	-4.890237	0.0000
C	0.031169	0.011648	2.675833	0.0107

R-squared	0.368399	Mean dependent var	0.001171
Adjusted R-squared	0.352994	S.D. dependent var	0.080725
S.E. of regression	0.064933	Akaike info criterion	-2.585530
Sum squared resid	0.172867	Schwarz criterion	-2.503614
Log likelihood	57.58890	Hannan-Quinn criter.	-2.555322
F-statistic	23.91441	Durbin-Watson stat	1.929223
Prob(F-statistic)	0.000016		

Null Hypothesis: D(LNDD) has a unit root

Exogenous: Constant, Linear Trend

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

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.942155	0.0013
Test critical values:	1% level	-4.186481	
	5% level	-3.518090	
	10% level	-3.189732	

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

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(LNDD,2)

Method: Least Squares

Date: 04/18/17 Time: 21:31

Sample (adjusted): 1973 2015

Included observations: 43 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNDD(-1))	-0.757493	0.153272	-4.942155	0.0000
C	0.016403	0.021070	0.778511	0.4408
@TREND("1971")	0.000689	0.000818	0.842326	0.4046

R-squared	0.379407	Mean dependent var	0.001171
Adjusted R-squared	0.348377	S.D. dependent var	0.080725
S.E. of regression	0.065164	Akaike info criterion	-2.556601
Sum squared resid	0.169855	Schwarz criterion	-2.433727
Log likelihood	57.96692	Hannan-Quinn criter.	-2.511289
F-statistic	12.22725	Durbin-Watson stat	1.908485
Prob(F-statistic)	0.000072		

PP

Null Hypothesis: LNDD has a unit root

Exogenous: Constant

Bandwidth: 1 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		0.657350	0.9898
Test critical values:	1% level	-3.588509	
	5% level	-2.929734	
	10% level	-2.603064	

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

Residual variance (no correction)	0.004219
HAC corrected variance (Bartlett kernel)	0.005265

Phillips-Perron Test Equation

Dependent Variable: D(LNDD)

Method: Least Squares

Date: 04/18/17 Time: 21:32

Sample (adjusted): 1972 2015

Included observations: 44 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNDD(-1)	0.014661	0.017692	0.828700	0.4120
C	-0.101837	0.172815	-0.589281	0.5588

R-squared	0.016088	Mean dependent var	0.041134
Adjusted R-squared	-0.007339	S.D. dependent var	0.066239
S.E. of regression	0.066482	Akaike info criterion	-2.539397
Sum squared resid	0.185631	Schwarz criterion	-2.458297
Log likelihood	57.86673	Hannan-Quinn criter.	-2.509321
F-statistic	0.686743	Durbin-Watson stat	1.496493
Prob(F-statistic)	0.411959		

Null Hypothesis: LNDD has a unit root

Exogenous: Constant, Linear Trend

Bandwidth: 1 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-1.234843	0.8906
Test critical values:	1% level	-4.180911	
	5% level	-3.515523	
	10% level	-3.188259	

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

Residual variance (no correction)	0.003995
HAC corrected variance (Bartlett kernel)	0.005040

Phillips-Perron Test Equation

Dependent Variable: D(LNDD)

Method: Least Squares

Date: 04/18/17 Time: 21:32

Sample (adjusted): 1972 2015

Included observations: 44 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNDD(-1)	-0.054392	0.048728	-1.116247	0.2708
C	0.497327	0.429968	1.156663	0.2541
@TREND("1971")	0.003299	0.002174	1.517453	0.1368

R-squared	0.068409	Mean dependent var	0.041134
Adjusted R-squared	0.022965	S.D. dependent var	0.066239
S.E. of regression	0.065474	Akaike info criterion	-2.548584
Sum squared resid	0.175760	Schwarz criterion	-2.426935
Log likelihood	59.06886	Hannan-Quinn criter.	-2.503471
F-statistic	1.505354	Durbin-Watson stat	1.475036
Prob(F-statistic)	0.233950		

Null Hypothesis: D(LNDD) has a unit root

Exogenous: Constant

Bandwidth: 1 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-4.892593	0.0002
Test critical values:	1% level	-3.592462	
	5% level	-2.931404	
	10% level	-2.603944	

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

Residual variance (no correction)	0.004020
HAC corrected variance (Bartlett kernel)	0.004034

Phillips-Perron Test Equation

Dependent Variable: D(LNDD,2)

Method: Least Squares

Date: 04/18/17 Time: 21:34

Sample (adjusted): 1973 2015

Included observations: 43 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNDD(-1))	-0.731089	0.149500	-4.890237	0.0000
C	0.031169	0.011648	2.675833	0.0107

R-squared	0.368399	Mean dependent var	0.001171
Adjusted R-squared	0.352994	S.D. dependent var	0.080725

S.E. of regression	0.064933	Akaike info criterion	-2.585530
Sum squared resid	0.172867	Schwarz criterion	-2.503614
Log likelihood	57.58890	Hannan-Quinn criter.	-2.555322
F-statistic	23.91441	Durbin-Watson stat	1.929223
Prob(F-statistic)	0.000016		

Null Hypothesis: D(LNDD) has a unit root

Exogenous: Constant, Linear Trend

Bandwidth: 2 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-4.988818	0.0011
Test critical values:	1% level	-4.186481	
	5% level	-3.518090	
	10% level	-3.189732	

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

Residual variance (no correction)	0.003950
HAC corrected variance (Bartlett kernel)	0.004205

Phillips-Perron Test Equation

Dependent Variable: D(LNDD,2)

Method: Least Squares

Date: 04/18/17 Time: 21:34

Sample (adjusted): 1973 2015

Included observations: 43 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNDD(-1))	-0.757493	0.153272	-4.942155	0.0000
C	0.016403	0.021070	0.778511	0.4408
@TREND("1971")	0.000689	0.000818	0.842326	0.4046

R-squared	0.379407	Mean dependent var	0.001171
Adjusted R-squared	0.348377	S.D. dependent var	0.080725

S.E. of regression	0.065164	Akaike info criterion	-2.556601
Sum squared resid	0.169855	Schwarz criterion	-2.433727
Log likelihood	57.96692	Hannan-Quinn criter.	-2.511289
F-statistic	12.22725	Durbin-Watson stat	1.908485
Prob(F-statistic)	0.000072		

APPENDIX 1C: Output Unit Root Test

ADF

Null Hypothesis: LNY has a unit root

Exogenous: Constant

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

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.054131	0.2636
Test critical values:	1% level	-3.588509	
	5% level	-2.929734	
	10% level	-2.603064	

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

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(LNY)

Method: Least Squares

Date: 04/18/17 Time: 21:37

Sample (adjusted): 1972 2015

Included observations: 44 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNY(-1)	-0.092278	0.044923	-2.054131	0.0462
C	0.975336	0.467468	2.086421	0.0431

R-squared	0.091292	Mean dependent var	0.015288
Adjusted R-squared	0.069656	S.D. dependent var	0.064472
S.E. of regression	0.062186	Akaike info criterion	-2.672996
Sum squared resid	0.162416	Schwarz criterion	-2.591897
Log likelihood	60.80592	Hannan-Quinn criter.	-2.642921

F-statistic	4.219452	Durbin-Watson stat	2.102372
Prob(F-statistic)	0.046221		

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

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.478773	0.3366
Test critical values:	1% level	-4.180911	
	5% level	-3.515523	
	10% level	-3.188259	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LNY)
Method: Least Squares
Date: 04/18/17 Time: 21:38
Sample (adjusted): 1972 2015
Included observations: 44 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNY(-1)	-0.245104	0.098881	-2.478773	0.0174
C	2.502253	0.996161	2.511897	0.0160
@TREND("1971")	0.002803	0.001625	1.724889	0.0921

R-squared	0.152772	Mean dependent var	0.015288
Adjusted R-squared	0.111444	S.D. dependent var	0.064472
S.E. of regression	0.060773	Akaike info criterion	-2.697597
Sum squared resid	0.151428	Schwarz criterion	-2.575947
Log likelihood	62.34712	Hannan-Quinn criter.	-2.652483
F-statistic	3.696567	Durbin-Watson stat	1.936634
Prob(F-statistic)	0.033420		

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

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.797506	0.0000
Test critical values:	1% level	-3.592462	
	5% level	-2.931404	
	10% level	-2.603944	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LNY,2)
Method: Least Squares
Date: 04/18/17 Time: 21:39
Sample (adjusted): 1973 2015
Included observations: 43 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNY(-1))	-1.058466	0.155714	-6.797506	0.0000
C	0.017287	0.010307	1.677238	0.1011

R-squared	0.529849	Mean dependent var	0.000116
Adjusted R-squared	0.518382	S.D. dependent var	0.094419
S.E. of regression	0.065526	Akaike info criterion	-2.567348
Sum squared resid	0.176039	Schwarz criterion	-2.485431
Log likelihood	57.19798	Hannan-Quinn criter.	-2.537140
F-statistic	46.20609	Durbin-Watson stat	1.982695
Prob(F-statistic)	0.000000		

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

	t-Statistic	Prob.*

Augmented Dickey-Fuller test statistic		-6.982978	0.0000
Test critical values:	1% level	-4.186481	
	5% level	-3.518090	
	10% level	-3.189732	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LNY,2)
Method: Least Squares
Date: 04/18/17 Time: 21:40
Sample (adjusted): 1973 2015
Included observations: 43 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNY(-1))	-1.087913	0.155795	-6.982978	0.0000
C	0.042563	0.021469	1.982486	0.0543
@TREND("1971")	-0.001078	0.000806	-1.338264	0.1884

R-squared	0.549998	Mean dependent var	0.000116
Adjusted R-squared	0.527498	S.D. dependent var	0.094419
S.E. of regression	0.064903	Akaike info criterion	-2.564637
Sum squared resid	0.168495	Schwarz criterion	-2.441762
Log likelihood	58.13969	Hannan-Quinn criter.	-2.519324
F-statistic	24.44421	Durbin-Watson stat	2.020198
Prob(F-statistic)	0.000000		

PP

Null Hypothesis: LNY has a unit root
Exogenous: Constant
Bandwidth: 9 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-2.226156	0.2003
Test critical values:	1% level	-3.588509	
	5% level	-2.929734	

	10% level	-2.603064	

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

Residual variance (no correction)	0.003691
HAC corrected variance (Bartlett kernel)	0.001829

Phillips-Perron Test Equation
Dependent Variable: D(LNY)
Method: Least Squares
Date: 04/18/17 Time: 21:41
Sample (adjusted): 1972 2015
Included observations: 44 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNY(-1)	-0.092278	0.044923	-2.054131	0.0462
C	0.975336	0.467468	2.086421	0.0431

R-squared	0.091292	Mean dependent var	0.015288
Adjusted R-squared	0.069656	S.D. dependent var	0.064472
S.E. of regression	0.062186	Akaike info criterion	-2.672996
Sum squared resid	0.162416	Schwarz criterion	-2.591897
Log likelihood	60.80592	Hannan-Quinn criter.	-2.642921
F-statistic	4.219452	Durbin-Watson stat	2.102372
Prob(F-statistic)	0.046221		

Null Hypothesis: LNY has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 5 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-2.254289	0.4490
Test critical values:	1% level	-4.180911	
	5% level	-3.515523	
	10% level	-3.188259	

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

Residual variance (no correction)	0.003442
HAC corrected variance (Bartlett kernel)	0.002575

Phillips-Perron Test

Equation

Dependent Variable: D(LNY)

Method: Least Squares

Date: 04/18/17 Time: 21:42

Sample (adjusted): 1972 2015

Included observations: 44 after adjustments

		Std. Error	t-Statistic	Prob.
C	2.502253	0.098881	-2.478773	0.0174
@TREND("1971")	0.002803	0.996161	2.511897	0.0160
		0.001625	1.724889	0.0921

Adjusted R-squared	0.111444	Mean dependent var	0.015288
S.E. of regression	0.060773	S.D. dependent var	0.064472
Sum squared resid	0.151428	Akaike info criterion	-2.697597
Log likelihood	62.34712	Schwarz criterion	-2.575947
F-statistic	3.696567	Hannan-Quinn criter.	-2.652483
Prob(F-statistic)	0.033420	Durbin-Watson stat	1.936634

Null Hypothesis: D(LNY) has a unit root

Exogenous: Constant

Bandwidth: 5 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-6.893055	0.0000
Test critical values:	1% level	-3.592462	
	5% level	-2.931404	
	10% level	-2.603944	

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

Residual variance (no correction)	0.004094
HAC corrected variance (Bartlett kernel)	0.003134

Phillips-Perron Test Equation
Dependent Variable: D(LNY,2)
Method: Least Squares
Date: 04/18/17 Time: 21:42
Sample (adjusted): 1973 2015
Included observations: 43 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNY(-1))	-1.058466	0.155714	-6.797506	0.0000
C	0.017287	0.010307	1.677238	0.1011

R-squared	0.529849	Mean dependent var	0.000116
Adjusted R-squared	0.518382	S.D. dependent var	0.094419
S.E. of regression	0.065526	Akaike info criterion	-2.567348
Sum squared resid	0.176039	Schwarz criterion	-2.485431
Log likelihood	57.19798	Hannan-Quinn criter.	-2.537140
F-statistic	46.20609	Durbin-Watson stat	1.982695
Prob(F-statistic)	0.000000		

Null Hypothesis: D(LNY) has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 8 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-7.350214	0.0000
Test critical values:	1% level	-4.186481	
	5% level	-3.518090	
	10% level	-3.189732	

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

Residual variance (no correction)	0.003918
HAC corrected variance (Bartlett kernel)	0.002344

Phillips-Perron Test Equation
Dependent Variable: D(LNY,2)
Method: Least Squares
Date: 04/18/17 Time: 21:43
Sample (adjusted): 1973 2015
Included observations: 43 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNY(-1))	-1.087913	0.155795	-6.982978	0.0000
C	0.042563	0.021469	1.982486	0.0543
@TREND("1971")	-0.001078	0.000806	-1.338264	0.1884

R-squared	0.549998	Mean dependent var	0.000116
Adjusted R-squared	0.527498	S.D. dependent var	0.094419
S.E. of regression	0.064903	Akaike info criterion	-2.564637
Sum squared resid	0.168495	Schwarz criterion	-2.441762
Log likelihood	58.13969	Hannan-Quinn criter.	-2.519324
F-statistic	24.44421	Durbin-Watson stat	2.020198
Prob(F-statistic)	0.000000		

APPENDIX 1D: Wage Rate Unit Root Test

ADF

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

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		0.089187	0.9613
Test critical values:	1% level	-3.588509	
	5% level	-2.929734	

	10% level	-2.603064	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LNWR)
Method: Least Squares
Date: 04/18/17 Time: 21:48
Sample (adjusted): 1972 2015
Included observations: 44 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNWR(-1)	0.004525	0.050731	0.089187	0.9294
C	-0.028787	0.557719	-0.051615	0.9591

R-squared	0.000189	Mean dependent var	0.020939
Adjusted R-squared	-0.023616	S.D. dependent var	0.092569
S.E. of regression	0.093656	Akaike info criterion	-1.853998
Sum squared resid	0.368397	Schwarz criterion	-1.772898
Log likelihood	42.78795	Hannan-Quinn criter.	-1.823922
F-statistic	0.007954	Durbin-Watson stat	1.902529
Prob(F-statistic)	0.929357		

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

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.040713	0.9274
Test critical values:	1% level	-4.180911	
	5% level	-3.515523	
	10% level	-3.188259	

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

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(LNWR)

Method: Least Squares

Date: 04/18/17 Time: 21:49

Sample (adjusted): 1972 2015

Included observations: 44 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNWR(-1)	-0.071367	0.068575	-1.040713	0.3041
C	0.750827	0.730935	1.027215	0.3103
@TREND("1971")	0.002419	0.001503	1.609698	0.1151

R-squared	0.059620	Mean dependent var	0.020939
Adjusted R-squared	0.013748	S.D. dependent var	0.092569
S.E. of regression	0.091930	Akaike info criterion	-1.869825
Sum squared resid	0.346499	Schwarz criterion	-1.748176
Log likelihood	44.13615	Hannan-Quinn criter.	-1.824711
F-statistic	1.299692	Durbin-Watson stat	1.874839
Prob(F-statistic)	0.283610		

Null Hypothesis: D(LNWR) has a unit root

Exogenous: Constant

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

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.129434	0.0000
Test critical values:	1% level	-3.592462	
	5% level	-2.931404	
	10% level	-2.603944	

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

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(LNWR,2)

Method: Least Squares

Date: 04/18/17 Time: 21:50

Sample (adjusted): 1973 2015

Included observations: 43 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNWR(-1))	-0.953347	0.155536	-6.129434	0.0000
C	0.021299	0.014765	1.442502	0.1568

R-squared	0.478172	Mean dependent var	0.000519
Adjusted R-squared	0.465445	S.D. dependent var	0.128888
S.E. of regression	0.094234	Akaike info criterion	-1.840677
Sum squared resid	0.364082	Schwarz criterion	-1.758761
Log likelihood	41.57456	Hannan-Quinn criter.	-1.810469
F-statistic	37.56996	Durbin-Watson stat	2.020232
Prob(F-statistic)	0.000000		

Null Hypothesis: D(LNWR) has a unit root

Exogenous: Constant, Linear Trend

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

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.215187	0.0000
Test critical values:	1% level	-4.186481	
	5% level	-3.518090	
	10% level	-3.189732	

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

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(LNWR,2)

Method: Least Squares

Date: 04/18/17 Time: 21:50

Sample (adjusted): 1973 2015

Included observations: 43 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNWR(-1))	-0.987856	0.158942	-6.215187	0.0000
C	-0.006107	0.030321	-0.201421	0.8414
@TREND("1971")	0.001224	0.001183	1.034556	0.3071

R-squared	0.491771	Mean dependent var	0.000519
Adjusted R-squared	0.466360	S.D. dependent var	0.128888
S.E. of regression	0.094153	Akaike info criterion	-1.820572
Sum squared resid	0.354593	Schwarz criterion	-1.697697
Log likelihood	42.14229	Hannan-Quinn criter.	-1.775259
F-statistic	19.35235	Durbin-Watson stat	1.994615
Prob(F-statistic)	0.000001		

PP

Null Hypothesis: LNWR has a unit root

Exogenous: Constant

Bandwidth: 2 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-0.074499	0.9458
Test critical values:	1% level	-3.588509	
	5% level	-2.929734	
	10% level	-2.603064	

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

Residual variance (no correction)	0.008373
HAC corrected variance (Bartlett kernel)	0.009672

Phillips-Perron Test Equation

Dependent Variable: D(LNWR)

Method: Least Squares

Date: 04/18/17 Time: 21:51

Sample (adjusted): 1972 2015

Included observations: 44 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNWR(-1)	0.004525	0.050731	0.089187	0.9294
C	-0.028787	0.557719	-0.051615	0.9591

R-squared	0.000189	Mean dependent var	0.020939
Adjusted R-squared	-0.023616	S.D. dependent var	0.092569
S.E. of regression	0.093656	Akaike info criterion	-1.853998
Sum squared resid	0.368397	Schwarz criterion	-1.772898
Log likelihood	42.78795	Hannan-Quinn criter.	-1.823922
F-statistic	0.007954	Durbin-Watson stat	1.902529
Prob(F-statistic)	0.929357		

Null Hypothesis: LNWR has a unit root

Exogenous: Constant, Linear Trend

Bandwidth: 2 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-1.207845	0.8965
Test critical values:	1% level	-4.180911	
	5% level	-3.515523	
	10% level	-3.188259	

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

Residual variance (no correction)	0.007875
HAC corrected variance (Bartlett kernel)	0.009373

Phillips-Perron Test Equation

Dependent Variable: D(LNWR)

Method: Least Squares

Date: 04/18/17 Time: 21:53

Sample (adjusted): 1972 2015

Included observations: 44 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNWR(-1)	-0.071367	0.068575	-1.040713	0.3041
C	0.750827	0.730935	1.027215	0.3103
@TREND("1971")	0.002419	0.001503	1.609698	0.1151

R-squared	0.059620	Mean dependent var	0.020939
Adjusted R-squared	0.013748	S.D. dependent var	0.092569
S.E. of regression	0.091930	Akaike info criterion	-1.869825
Sum squared resid	0.346499	Schwarz criterion	-1.748176
Log likelihood	44.13615	Hannan-Quinn criter.	-1.824711
F-statistic	1.299692	Durbin-Watson stat	1.874839
Prob(F-statistic)	0.283610		

Null Hypothesis: D(LNWR) has a unit root

Exogenous: Constant

Bandwidth: 2 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-6.148730	0.0000
Test critical values:	1% level	-3.592462	
	5% level	-2.931404	
	10% level	-2.603944	

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

Residual variance (no correction)	0.008467
HAC corrected variance (Bartlett kernel)	0.009125

Phillips-Perron Test Equation

Dependent Variable: D(LNWR,2)

Method: Least Squares

Date: 04/18/17 Time: 21:53

Sample (adjusted): 1973 2015

Included observations: 43 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNWR(-1))	-0.953347	0.155536	-6.129434	0.0000
C	0.021299	0.014765	1.442502	0.1568

R-squared	0.478172	Mean dependent var	0.000519

Adjusted R-squared	0.465445	S.D. dependent var	0.128888
S.E. of regression	0.094234	Akaike info criterion	-1.840677
Sum squared resid	0.364082	Schwarz criterion	-1.758761
Log likelihood	41.57456	Hannan-Quinn criter.	-1.810469
F-statistic	37.56996	Durbin-Watson stat	2.020232
Prob(F-statistic)	0.000000		

Null Hypothesis: D(LNWR) has a unit root

Exogenous: Constant, Linear Trend

Bandwidth: 1 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-6.214365	0.0000
Test critical values:	1% level	-4.186481	
	5% level	-3.518090	
	10% level	-3.189732	

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

Residual variance (no correction)	0.008246
HAC corrected variance (Bartlett kernel)	0.008210

Phillips-Perron Test Equation

Dependent Variable: D(LNWR,2)

Method: Least Squares

Date: 04/18/17 Time: 21:54

Sample (adjusted): 1973 2015

Included observations: 43 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNWR(-1))	-0.987856	0.158942	-6.215187	0.0000
C	-0.006107	0.030321	-0.201421	0.8414
@TREND("1971")	0.001224	0.001183	1.034556	0.3071

R-squared	0.491771	Mean dependent var	0.000519

Adjusted R-squared	0.466360	S.D. dependent var	0.128888
S.E. of regression	0.094153	Akaike info criterion	-1.820572
Sum squared resid	0.354593	Schwarz criterion	-1.697697
Log likelihood	42.14229	Hannan-Quinn criter.	-1.775259
F-statistic	19.35235	Durbin-Watson stat	1.994615
Prob(F-statistic)	0.000001		

APPENDIX 1E: Imports Unit Root Results

ADF

Null Hypothesis: LNM has a unit root

Exogenous: Constant

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

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-0.558809	0.8692
Test critical values:	1% level	-3.588509	
	5% level	-2.929734	
	10% level	-2.603064	

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

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(LNM)

Method: Least Squares

Date: 04/18/17 Time: 21:56

Sample (adjusted): 1972 2015

Included observations: 44 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNM(-1)	-0.035014	0.062659	-0.558809	0.5793
C	0.335161	0.573388	0.584528	0.5620

R-squared	0.007380	Mean dependent var	0.015095
Adjusted R-squared	-0.016254	S.D. dependent var	0.175788
S.E. of regression	0.177211	Akaike info criterion	-0.578560

Sum squared resid	1.318960	Schwarz criterion	-0.497461
Log likelihood	14.72832	Hannan-Quinn criter.	-0.548484
F-statistic	0.312268	Durbin-Watson stat	2.088209
Prob(F-statistic)	0.579260		

Null Hypothesis: LNM has a unit root

Exogenous: Constant, Linear Trend

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

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.449272	0.3506
Test critical values:	1% level	-4.180911	
	5% level	-3.515523	
	10% level	-3.188259	

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

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(LNM)

Method: Least Squares

Date: 04/18/17 Time: 21:56

Sample (adjusted): 1972 2015

Included observations: 44 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNM(-1)	-0.187062	0.076375	-2.449272	0.0187
C	1.551004	0.661927	2.343166	0.0241
@TREND("1971")	0.007734	0.002564	3.016051	0.0044

R-squared	0.187621	Mean dependent var	0.015095
Adjusted R-squared	0.147992	S.D. dependent var	0.175788
S.E. of regression	0.162260	Akaike info criterion	-0.733486
Sum squared resid	1.079462	Schwarz criterion	-0.611837
Log likelihood	19.13669	Hannan-Quinn criter.	-0.688372
F-statistic	4.734513	Durbin-Watson stat	2.184672
Prob(F-statistic)	0.014127		

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

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-7.098112	0.0000
Test critical values:	1% level	-3.592462	
	5% level	-2.931404	
	10% level	-2.603944	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LNM,2)
Method: Least Squares
Date: 04/18/17 Time: 21:57
Sample (adjusted): 1973 2015
Included observations: 43 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNM(-1))	-1.088866	0.153402	-7.098112	0.0000
C	0.020855	0.027026	0.771641	0.4448

R-squared	0.551340	Mean dependent var	0.005661
Adjusted R-squared	0.540397	S.D. dependent var	0.260592
S.E. of regression	0.176666	Akaike info criterion	-0.583718
Sum squared resid	1.279644	Schwarz criterion	-0.501802
Log likelihood	14.54994	Hannan-Quinn criter.	-0.553510
F-statistic	50.38319	Durbin-Watson stat	2.049379
Prob(F-statistic)	0.000000		

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

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.887185	0.0001
Test critical values:	1% level	-4.192337	
	5% level	-3.520787	
	10% level	-3.191277	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LNM,2)
Method: Least Squares
Date: 04/18/17 Time: 21:58
Sample (adjusted): 1974 2015
Included observations: 42 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNM(-1))	-1.412670	0.239957	-5.887185	0.0000
D(LNM(-1),2)	0.204144	0.157572	1.295563	0.2029
C	-0.068008	0.060118	-1.131243	0.2650
@TREND("1971")	0.004242	0.002358	1.798686	0.0800

R-squared	0.609633	Mean dependent var	0.006061
Adjusted R-squared	0.578815	S.D. dependent var	0.263737
S.E. of regression	0.171162	Akaike info criterion	-0.602015
Sum squared resid	1.113270	Schwarz criterion	-0.436522
Log likelihood	16.64231	Hannan-Quinn criter.	-0.541355
F-statistic	19.78145	Durbin-Watson stat	2.006752
Prob(F-statistic)	0.000000		

PP

Null Hypothesis: LNM has a unit root
Exogenous: Constant
Bandwidth: 0 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*

Phillips-Perron test statistic		-0.558809	0.8692
Test critical values:	1% level	-3.588509	
	5% level	-2.929734	
	10% level	-2.603064	

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

Residual variance (no correction)	0.029976
HAC corrected variance (Bartlett kernel)	0.029976

Phillips-Perron Test Equation
Dependent Variable: D(LNM)
Method: Least Squares
Date: 04/18/17 Time: 21:59
Sample (adjusted): 1972 2015
Included observations: 44 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNM(-1)	-0.035014	0.062659	-0.558809	0.5793
C	0.335161	0.573388	0.584528	0.5620

R-squared	0.007380	Mean dependent var	0.015095
Adjusted R-squared	-0.016254	S.D. dependent var	0.175788
S.E. of regression	0.177211	Akaike info criterion	-0.578560
Sum squared resid	1.318960	Schwarz criterion	-0.497461
Log likelihood	14.72832	Hannan-Quinn criter.	-0.548484
F-statistic	0.312268	Durbin-Watson stat	2.088209
Prob(F-statistic)	0.579260		

Null Hypothesis: LNM has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 2 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	-2.379497	0.3847

Test critical values:	1% level	-4.180911
	5% level	-3.515523
	10% level	-3.188259

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

Residual variance (no correction)	0.024533
HAC corrected variance (Bartlett kernel)	0.019908

Phillips-Perron Test Equation
Dependent Variable: D(LNM)
Method: Least Squares
Date: 04/18/17 Time: 22:00
Sample (adjusted): 1972 2015
Included observations: 44 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNM(-1)	-0.187062	0.076375	-2.449272	0.0187
C	1.551004	0.661927	2.343166	0.0241
@TREND("1971")	0.007734	0.002564	3.016051	0.0044

R-squared	0.187621	Mean dependent var	0.015095
Adjusted R-squared	0.147992	S.D. dependent var	0.175788
S.E. of regression	0.162260	Akaike info criterion	-0.733486
Sum squared resid	1.079462	Schwarz criterion	-0.611837
Log likelihood	19.13669	Hannan-Quinn criter.	-0.688372
F-statistic	4.734513	Durbin-Watson stat	2.184672
Prob(F-statistic)	0.014127		

Null Hypothesis: D(LNM) has a unit root
Exogenous: Constant
Bandwidth: 2 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	-7.161317	0.0000

Test critical values:	1% level	-3.592462
	5% level	-2.931404
	10% level	-2.603944

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

Residual variance (no correction)	0.029759
HAC corrected variance (Bartlett kernel)	0.025881

Phillips-Perron Test Equation
Dependent Variable: D(LNM,2)
Method: Least Squares
Date: 04/18/17 Time: 22:00
Sample (adjusted): 1973 2015
Included observations: 43 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNM(-1))	-1.088866	0.153402	-7.098112	0.0000
C	0.020855	0.027026	0.771641	0.4448

R-squared	0.551340	Mean dependent var	0.005661
Adjusted R-squared	0.540397	S.D. dependent var	0.260592
S.E. of regression	0.176666	Akaike info criterion	-0.583718
Sum squared resid	1.279644	Schwarz criterion	-0.501802
Log likelihood	14.54994	Hannan-Quinn criter.	-0.553510
F-statistic	50.38319	Durbin-Watson stat	2.049379
Prob(F-statistic)	0.000000		

Null Hypothesis: D(LNM) has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 7 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-8.812429	0.0000
Test critical values:	1% level	-4.186481	

5% level	-3.518090
10% level	-3.189732

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

Residual variance (no correction)	0.027705
HAC corrected variance (Bartlett kernel)	0.010788

Phillips-Perron Test Equation
Dependent Variable: D(LNM,2)
Method: Least Squares
Date: 04/18/17 Time: 22:01
Sample (adjusted): 1973 2015
Included observations: 43 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNM(-1))	-1.158391	0.155196	-7.464048	0.0000
C	-0.065167	0.056501	-1.153380	0.2556
@TREND("1971")	0.003782	0.002196	1.722035	0.0928

R-squared	0.582306	Mean dependent var	0.005661
Adjusted R-squared	0.561421	S.D. dependent var	0.260592
S.E. of regression	0.172578	Akaike info criterion	-0.608722
Sum squared resid	1.191325	Schwarz criterion	-0.485848
Log likelihood	16.08753	Hannan-Quinn criter.	-0.563410
F-statistic	27.88190	Durbin-Watson stat	2.074667
Prob(F-statistic)	0.000000		

APPENDIX 2: VAR Lag Order Selection Criteria

VAR Lag Order Selection Criteria
Endogenous variables: LNEMP LNDD LNWR LNY LNM
Exogenous variables: C
Date: 04/19/17 Time: 10:53
Sample: 1971 2015
Included observations: 39

Lag	LogL	LR	FPE	AIC	SC	HQ
0	104.4990	NA	4.18e-09	-5.102514	-4.889237	-5.025992
1	282.4790	301.1969*	1.66e-12*	-12.94764	-11.66798*	-12.48851
2	296.8593	20.64863	3.06e-12	-12.40304	-10.05699	-11.56130
3	316.7765	23.49214	4.74e-12	-12.14239	-8.729953	-10.91803
4	352.8476	33.29632	3.92e-12	-12.71013	-8.231311	-11.10317
5	387.9955	23.43198	4.91e-12	-13.23054	-7.685334	-11.24097
6	461.2113	30.03723	1.89e-12	-15.70314*	-9.091551	-13.33096*

* indicates lag order selected by the criterion

LR: sequential modified LR test statistic (each test at 5% level)

FPE: Final prediction error

AIC: Akaike information criterion

SC: Schwarz information criterion

HQ: Hannan-Quinn information criterion

APPENDIX 3: Johansen Co-Integration Test

Date: 04/19/17 Time: 10:59

Sample (adjusted): 1973 2015

Included observations: 43 after adjustments

Trend assumption: Linear deterministic trend

Series: LNEMP LNDD LNWR LNY LNM

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 *	0.631720	86.85500	69.81889	0.0012
At most 1	0.400284	43.90181	47.85613	0.1120
At most 2	0.260217	21.91592	29.79707	0.3032
At most 3	0.185511	8.955810	15.49471	0.3695
At most 4	0.003076	0.132473	3.841466	0.7159

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 *	0.631720	42.95319	33.87687	0.0032
At most 1	0.400284	21.98589	27.58434	0.2211
At most 2	0.260217	12.96011	21.13162	0.4559
At most 3	0.185511	8.823338	14.26460	0.3012
At most 4	0.003076	0.132473	3.841466	0.7159

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

Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):

LNEMP	LNDD	LNWR	LNY	LNM
-0.796416	-4.895109	-8.110932	9.237271	8.646088
20.68338	4.642486	11.22609	-19.77856	-0.055928
5.375480	1.550612	-0.281727	2.597797	0.755913
-6.597876	4.733870	-5.494193	-3.452862	-3.289407
3.291689	-0.099136	-2.298275	1.322609	-0.224925

Unrestricted Adjustment Coefficients (alpha):

D(LNEMP)	-0.010563	-0.016932	-0.018601	-0.000170	0.000406
D(LNDD)	0.011170	-0.011483	0.002850	0.016240	0.002222
D(LNWR)	0.033035	0.023224	0.004599	0.024128	-0.002112
D(LNY)	-0.007129	0.018749	-0.005107	0.018977	0.001317
D(LNM)	-0.071882	-0.030207	0.021553	0.054275	-7.82E-05

1 Cointegrating Equation(s): Log likelihood 297.2358

Normalized cointegrating coefficients (standard error in parentheses)

LNEMP	LNDD	LNWR	LNY	LNM
1.000000	6.146421	10.18429	-11.59855	-10.85624
	(1.22570)	(1.50967)	(2.37867)	(1.47865)

Adjustment coefficients (standard error in parentheses)

D(LNEMP)	0.008412
	(0.00618)
D(LNDD)	-0.008896
	(0.00781)
D(LNWR)	-0.026309
	(0.01083)
D(LNY)	0.005678
	(0.00787)
D(LNM)	0.057248
	(0.02011)

2 Cointegrating Equation(s): Log likelihood 308.2287

Normalized cointegrating coefficients (standard error in parentheses)

LNEMP	LNDD	LNWR	LNY	LNM
1.000000	0.000000	0.177325	-0.552889	0.408668
		(0.10504)	(0.10225)	(0.06002)
0.000000	1.000000	1.628096	-1.797088	-1.832759
		(0.23873)	(0.23240)	(0.13640)

Adjustment coefficients (standard error in parentheses)

D(LNEMP)	-0.341791	-0.026898
	(0.14949)	(0.04873)
D(LNDD)	-0.246407	-0.107989
	(0.19904)	(0.06488)
D(LNWR)	0.454050	-0.053890
	(0.26975)	(0.08792)
D(LNY)	0.393468	0.121940
	(0.19398)	(0.06323)
D(LNM)	-0.567543	0.211634
	(0.51222)	(0.16695)

3 Cointegrating Equation(s): Log likelihood 314.7088

Normalized cointegrating coefficients (standard error in parentheses)

LNEMP	LNDD	LNWR	LNY	LNM
1.000000	0.000000	0.000000	-0.158738	0.474751
			(0.11412)	(0.05172)
0.000000	1.000000	0.000000	1.821783	-1.226025

			(0.86371)	(0.39142)
0.000000	0.000000	1.000000	-2.222762	-0.372665
			(0.52059)	(0.23593)

Adjustment coefficients (standard error in parentheses)

D(LNEMP)	-0.441780	-0.055741	-0.099161
	(0.13950)	(0.04516)	(0.09036)
D(LNDD)	-0.231086	-0.103570	-0.220314
	(0.20539)	(0.06649)	(0.13305)
D(LNWR)	0.478772	-0.046758	-0.008519
	(0.27821)	(0.09006)	(0.18021)
D(LNY)	0.366017	0.114022	0.269741
	(0.19959)	(0.06461)	(0.12929)
D(LNM)	-0.451687	0.245054	0.237850
	(0.52360)	(0.16949)	(0.33917)

4 Cointegrating Equation(s): Log likelihood 319.1205

Normalized cointegrating coefficients (standard error in parentheses)

LNEMP	LNDD	LNWR	LNY	LNM
1.000000	0.000000	0.000000	0.000000	0.452200
				(0.05902)
0.000000	1.000000	0.000000	0.000000	-0.967224
				(0.18179)
0.000000	0.000000	1.000000	0.000000	-0.688429
				(0.09927)
0.000000	0.000000	0.000000	1.000000	-0.142059
				(0.11255)

Adjustment coefficients (standard error in parentheses)

D(LNEMP)	-0.440660	-0.056545	-0.098228	0.189576
	(0.14599)	(0.05470)	(0.09721)	(0.14516)
D(LNDD)	-0.338234	-0.026693	-0.309539	0.281633
	(0.20624)	(0.07728)	(0.13733)	(0.20506)
D(LNWR)	0.319576	0.067462	-0.141085	-0.225559
	(0.27689)	(0.10376)	(0.18438)	(0.27532)
D(LNY)	0.240810	0.203856	0.165478	-0.515473
	(0.19651)	(0.07364)	(0.13085)	(0.19540)
D(LNM)	-0.809785	0.501983	-0.060345	-0.197951
	(0.50919)	(0.19080)	(0.33905)	(0.50629)

APPENDIX 4: Vector Error Correction Model

Vector Error Correction Estimates
Date: 04/19/17 Time: 11:01
Sample (adjusted): 1974 2015
Included observations: 42 after adjustments
Standard errors in ( ) & t-statistics in [ ]

Cointegrating Eq:	CointEq1
LNEMP(-1)	1.000000
LNDD(-1)	0.058447
	(0.11257)
	[0.51920]
LNWR(-1)	0.132053
	(0.15266)
	[0.86504]
LNY(-1)	-0.842566
	(0.21547)
	[-3.91029]
LNM(-1)	0.405734
	(0.15980)
	[2.53904]
C	-9.111443

Error Correction:	D(LNEMP)	D(LNDD)	D(LNWR)	D(LNY)	D(LNM)
CointEq1	-0.183422	-0.105540	0.667530	0.282746	-0.656183
	(0.11894)	(0.15321)	(0.19127)	(0.14305)	(0.38089)
	[-1.54212]	[-0.68886]	[3.48998]	[1.97654]	[-1.72274]
D(LNEMP(-1))	0.547333	0.322623	-1.051222	0.147559	0.466638
	(0.23878)	(0.30758)	(0.38399)	(0.28718)	(0.76467)
	[2.29218]	[1.04891]	[-2.73765]	[0.51381]	[0.61025]

D(LNEMP(-2))	-0.014889	0.034304	-0.301862	-0.137817	0.535980
	(0.25267)	(0.32547)	(0.40632)	(0.30389)	(0.80914)
	[-0.05893]	[0.10540]	[-0.74292]	[-0.45352]	[0.66241]
D(LNDD(-1))	0.051788	0.114165	-0.305875	-0.272492	1.092077
	(0.16748)	(0.21574)	(0.26933)	(0.20143)	(0.53634)
	[0.30921]	[0.52919]	[-1.13569]	[-1.35278]	[2.03617]
D(LNDD(-2))	-0.024551	0.164608	-0.274975	-0.349023	-0.496880
	(0.16932)	(0.21810)	(0.27228)	(0.20364)	(0.54221)
	[-0.14500]	[0.75474]	[-1.00991]	[-1.71395]	[-0.91639]
D(LNWR(-1))	0.209317	0.009668	-0.502485	-0.044351	0.095348
	(0.13658)	(0.17594)	(0.21964)	(0.16427)	(0.43739)
	[1.53252]	[0.05495]	[-2.28776]	[-0.26999]	[0.21799]
D(LNWR(-2))	-0.091579	-0.014976	0.055806	0.095646	0.502408
	(0.13066)	(0.16831)	(0.21012)	(0.15715)	(0.41843)
	[-0.70087]	[-0.08898]	[0.26559]	[0.60863]	[1.20069]
D(LNY(-1))	0.105062	-0.071142	0.193073	0.068348	-1.001228
	(0.19021)	(0.24501)	(0.30587)	(0.22876)	(0.60911)
	[0.55236]	[-0.29036]	[0.63122]	[0.29877]	[-1.64375]
D(LNY(-2))	-0.005027	-0.187253	-0.037098	-0.161942	-0.863629
	(0.16495)	(0.21248)	(0.26526)	(0.19839)	(0.52824)
	[-0.03047]	[-0.88128]	[-0.13986]	[-0.81629]	[-1.63493]
D(LNM(-1))	-0.085959	0.132335	0.101611	-0.049095	-0.079724
	(0.05616)	(0.07234)	(0.09031)	(0.06754)	(0.17984)
	[-1.53063]	[1.82936]	[1.12514]	[-0.72688]	[-0.44330]
D(LNM(-2))	-0.026043	0.077180	0.168527	0.082627	-0.112600
	(0.06045)	(0.07787)	(0.09721)	(0.07270)	(0.19358)
	[-0.43083]	[0.99118]	[1.73365]	[1.13650]	[-0.58166]
C	-0.007482	0.031657	0.041861	0.042161	0.027971
	(0.01162)	(0.01497)	(0.01868)	(0.01397)	(0.03721)
	[-0.64396]	[2.11530]	[2.24055]	[3.01726]	[0.75180]

R-squared	0.324151	0.252095	0.426082	0.338457	0.339171
Adj. R-squared	0.076339	-0.022137	0.215646	0.095891	0.096868
Sum sq. resids	0.080225	0.133113	0.207461	0.116044	0.822715
S.E. equation	0.051712	0.066611	0.083159	0.062194	0.165601
F-statistic	1.308053	0.919275	2.024754	1.395320	1.399778
Log likelihood	71.87709	61.24341	51.92473	64.12514	22.99370
Akaike AIC	-2.851290	-2.344924	-1.901178	-2.482150	-0.523510
Schwarz SC	-2.354813	-1.848447	-1.404701	-1.985673	-0.027033
Mean dependent	-0.007749	0.040029	0.023687	0.015513	0.024614
S.D. dependent	0.053807	0.065886	0.093897	0.065409	0.174256

Determinant resid covariance (dof adj.)	1.61E-12
Determinant resid covariance	3.00E-13
Log likelihood	307.5660
Akaike information criterion	-11.55076
Schwarz criterion	-8.861512

APPENDIX 5: VECM Granger Causality Test

VAR Granger Causality/Block Exogeneity Wald Tests
Date: 04/19/17 Time: 11:02
Sample: 1971 2015
Included observations: 44

Dependent variable: LNEMP

Excluded	Chi-sq	df	Prob.
LNDD	1.480717	1	0.2237
LNWR	2.840935	1	0.0919
LNY	0.043343	1	0.8351
LNM	0.076191	1	0.7825
All	13.21115	4	0.0103

Dependent variable: LNDD

Excluded	Chi-sq	df	Prob.

LNEMP	0.017819	1	0.8938
LNWR	7.499785	1	0.0062
LNY	1.030078	1	0.3101
LNM	2.622931	1	0.1053
All	8.678157	4	0.0697

Dependent variable: LNWR

Excluded	Chi-sq	df	Prob.
LNEMP	1.547098	1	0.2136
LNDD	1.654414	1	0.1984
LNY	0.691038	1	0.4058
LNM	1.077484	1	0.2993
All	11.54670	4	0.0211

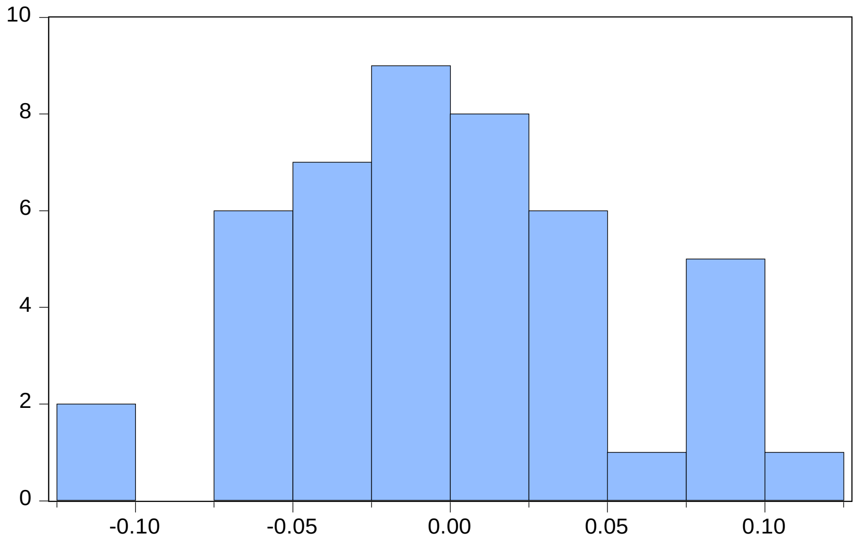
Dependent variable: LNY

Excluded	Chi-sq	df	Prob.
LNEMP	12.75208	1	0.0004
LNDD	8.818071	1	0.0030
LNWR	6.090663	1	0.0136
LNM	5.670469	1	0.0173
All	14.73338	4	0.0053

Dependent variable: LNM

Excluded	Chi-sq	df	Prob.
LNEMP	0.907763	1	0.3407
LNDD	6.227789	1	0.0126
LNWR	0.596694	1	0.4398
LNY	0.907547	1	0.3408
All	12.85831	4	0.0120

APPENDIX 6: Jarque-Bera



Series: Residuals
Sample 1971 2015
Observations 45

Mean	-6.27e-16
Median	-0.000757
Maximum	0.121735
Minimum	-0.110456
Std. Dev.	0.053024
Skewness	0.166209
Kurtosis	2.690292
Jarque-Bera	0.387040
Probability	0.824053

APPENDIX 7: Breusch-Godfrey LM Test

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.748940	Prob. F(2,36)	0.4801
Obs*R-squared	1.757612	Prob. Chi-Square(2)	0.4153

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 04/19/17 Time: 11:07
Sample: 1972 2015
Included observations: 44
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNDD	0.000199	0.040198	0.004956	0.9961
LNWR	-0.018932	0.065027	-0.291141	0.7726
LNY	0.020918	0.096991	0.215671	0.8305
LNM	-0.008933	0.042679	-0.209300	0.8354
LAGLNEMP	-0.054983	0.121689	-0.451833	0.6541

C	0.739103	1.625924	0.454574	0.6521
RESID(-1)	0.229974	0.190319	1.208360	0.2348
RESID(-2)	-0.037816	0.182782	-0.206889	0.8373

R-squared	0.039946	Mean dependent var	7.07E-16
Adjusted R-squared	-0.146731	S.D. dependent var	0.038935
S.E. of regression	0.041694	Akaike info criterion	-3.353972
Sum squared resid	0.062581	Schwarz criterion	-3.029574
Log likelihood	81.78738	Hannan-Quinn criter.	-3.233669
F-statistic	0.213983	Durbin-Watson stat	1.944160
Prob(F-statistic)	0.979894		

APPENDIX 8: LJUNG-Box Q

Date: 04/19/17 Time: 11:06

Sample: 1971 2015

Included observations: 45

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
. |** |	. |** |	1	0.327	0.327	5.1528	0.023
. | . |	.*| . |	2	0.006	-0.113	5.1545	0.076
. |*. |	. |*. |	3	0.126	0.183	5.9564	0.114

APPENDIX 9: ARCH LM

Heteroscedasticity Test: ARCH

F-statistic	2.847641	Prob. F(2,40)	0.0698
Obs*R-squared	5.359353	Prob. Chi-Square(2)	0.0686

Test Equation:

Dependent Variable: RESID^2

Method: Least Squares

Date: 04/19/17 Time: 11:10

Sample (adjusted): 1973 2015

Included observations: 43 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.002046	0.000738	2.772309	0.0084
RESID^2(-1)	0.377651	0.158269	2.386137	0.0218
RESID^2(-2)	-0.124107	0.158730	-0.781870	0.4389

R-squared	0.124636	Mean dependent var	0.002755
Adjusted R-squared	0.080868	S.D. dependent var	0.003689
S.E. of regression	0.003537	Akaike info criterion	-8.383917
Sum squared resid	0.000500	Schwarz criterion	-8.261043
Log likelihood	183.2542	Hannan-Quinn criter.	-8.338605
F-statistic	2.847641	Durbin-Watson stat	1.931393
Prob(F-statistic)	0.069787		

APPENDIX 10: White (with cross terms)

Heteroscedasticity Test: White

F-statistic	1.751552	Prob. F(14,30)	0.0967
Obs*R-squared	20.23923	Prob. Chi-Square(14)	0.1228
Scaled explained SS	13.51514	Prob. Chi-Square(14)	0.4864

Test Equation:

Dependent Variable: RESID^2

Method: Least Squares

Date: 04/19/17 Time: 11:08

Sample: 1971 2015

Included observations: 45

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-10.66993	4.316146	-2.472096	0.0193
LNDD^2	-0.029752	0.017599	-1.690488	0.1013
LNDD*LNWR	0.068823	0.038822	1.772789	0.0864
LNDD*LNY	0.039950	0.044424	0.899299	0.3757
LNDD*LNM	0.014399	0.025368	0.567606	0.5745
LNDD	-0.721544	0.451418	-1.598395	0.1204
LNWR^2	0.012626	0.019288	0.654585	0.5177
LNWR*LNY	-0.158611	0.079256	-2.001266	0.0545
LNWR*LNM	-0.043113	0.040760	-1.057722	0.2986

LNWR	1.086509	0.629407	1.726242	0.0946
LNY^2	0.003536	0.056449	0.062639	0.9505
LNY*LNM	-0.000717	0.036504	-0.019641	0.9845
LNY	1.284573	0.733118	1.752205	0.0900
LNM^2	0.000422	0.012636	0.033380	0.9736
LNM	0.340807	0.315515	1.080162	0.2887

R-squared	0.449761	Mean dependent var	0.002749
Adjusted R-squared	0.192982	S.D. dependent var	0.003615
S.E. of regression	0.003247	Akaike info criterion	-8.360934
Sum squared resid	0.000316	Schwarz criterion	-7.758713
Log likelihood	203.1210	Hannan-Quinn criter.	-8.136432
F-statistic	1.751552	Durbin-Watson stat	2.237811
Prob(F-statistic)	0.096740		

APPENDIX 11: White (without cross terms)

Heteroscedasticity Test: White

F-statistic	2.437886	Prob. F(4,40)	0.0627
Obs*R-squared	8.820218	Prob. Chi-Square(4)	0.0658
Scaled explained SS	5.889874	Prob. Chi-Square(4)	0.2075

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 04/19/17 Time: 11:09
Sample: 1971 2015
Included observations: 45

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.001801	0.023063	-0.078112	0.9381
LNDD^2	3.01E-05	0.000158	0.190828	0.8496
LNWR^2	-0.000385	0.000142	-2.710565	0.0098
LNY^2	0.000358	0.000266	1.347573	0.1854
LNM^2	0.000114	0.000171	0.664810	0.5100

R-squared	0.196005	Mean dependent var	0.002749
Adjusted R-squared	0.115605	S.D. dependent var	0.003615

S.E. of regression	0.003399	Akaike info criterion	-8.426139
Sum squared resid	0.000462	Schwarz criterion	-8.225398
Log likelihood	194.5881	Hannan-Quinn criter.	-8.351305
F-statistic	2.437886	Durbin-Watson stat	1.669020
Prob(F-statistic)	0.062667		

APPENDIX 12: Variance Decomposition of Employment

Period	S.E.	LNEMP	LNDD	LNWR	LNY	LNM
1	0.051712	100.0000	0.000000	0.000000	0.000000	0.000000
2	0.085864	93.79208	0.000415	0.804243	1.781020	3.622246
3	0.114418	89.41132	1.840969	0.455677	4.203859	4.088176
4	0.136332	86.80990	3.258506	0.320996	5.805339	3.805261
5	0.156574	84.14144	5.522483	0.243774	6.242299	3.850008
6	0.175177	82.33146	7.568680	0.215056	6.174889	3.709915
7	0.192226	81.77943	8.563400	0.197533	5.973602	3.486038
8	0.208769	81.87871	9.040790	0.209767	5.615870	3.254862
9	0.224792	82.28694	9.178158	0.233111	5.237567	3.064224
10	0.240163	82.78769	9.129674	0.251933	4.921692	2.909012

Cholesky Ordering: LNEMP LNDD LNWR LNM LNY

APPENDIX 13: Variance Decomposition of Domestic Demand

Period	S.E.	LNEMP	LNDD	LNWR	LNY	LNM
1	0.051712	0.000000	100.0000	0.000000	0.000000	0.000000
2	0.085864	0.965296	97.96642	0.167064	0.052468	0.848749
3	0.114418	1.154134	97.92341	0.150219	0.040355	0.731885
4	0.136332	0.918585	98.40605	0.109430	0.042344	0.523592
5	0.156574	0.753884	98.40727	0.161977	0.232680	0.444192
6	0.175177	0.902340	97.77404	0.276072	0.615857	0.431690
7	0.192226	1.291928	96.88583	0.390621	0.984845	0.446777
8	0.208769	1.833138	95.95505	0.472122	1.288693	0.450999
9	0.224792	2.384247	95.13468	0.533631	1.506875	0.440568
10	0.240163	2.845060	94.52278	0.566620	1.643883	0.421658

Cholesky Ordering: LNDD LNEMP LNWR LNY LNM

APPENDIX 14: Variance Decomposition of Wage Rate

Period	S.E.	LNEMP	LNDD	LNWR	LNY	LNM
1	0.051712	0.000000	0.000000	100.0000	0.000000	0.000000
2	0.085864	1.186984	0.058330	85.87308	0.623261	12.25835
3	0.114418	0.723884	0.674674	75.09214	4.662426	18.84687
4	0.136332	0.483944	0.947292	70.64222	9.445422	18.48112
5	0.156574	0.420250	1.907900	68.16897	11.17639	18.32649
6	0.175177	0.410782	4.112847	65.88264	11.48651	18.10722
7	0.192226	0.423000	5.440326	64.81206	11.62019	17.70443
8	0.208769	0.376111	6.289012	64.44603	11.60008	17.28877
9	0.224792	0.338244	6.834772	64.42241	11.42182	16.98276
10	0.240163	0.336354	7.160844	64.53191	11.23268	16.73821

Cholesky Ordering: LNWR LNEMP LNDD LNY LNM

APPENDIX 15: Variance Decomposition of Output

Period	S.E.	LNEMP	LNDD	LNWR	LNY	LNM
1	0.051712	0.000000	0.000000	0.000000	100.0000	0.000000
2	0.085864	6.872811	1.095746	0.097715	91.12389	0.809842
3	0.114418	10.15836	3.180147	5.201052	78.32493	3.135512
4	0.136332	13.03055	4.157481	7.071951	71.18482	4.555194
5	0.156574	16.30187	4.234016	9.477409	63.88737	6.099339
6	0.175177	20.33759	3.622953	10.86060	58.09559	7.083261
7	0.192226	24.32220	3.033994	12.02846	52.91155	7.703790
8	0.208769	27.67929	2.571853	12.64758	49.11994	7.981335
9	0.224792	30.28151	2.230004	13.00985	46.40237	8.076269
10	0.240163	32.25704	1.975922	13.17901	44.50578	8.082239

Cholesky Ordering: LNY LNEMP LNDD LNWR LNM

APPENDIX 16: Variance Decomposition of Import

Period	S.E.	LNEMP	LNDD	LNWR	LNY	LNM
1	0.051712	0.000000	0.000000	0.000000	0.000000	100.0000
2	0.085864	0.080293	3.560501	0.006271	0.803351	95.54958
3	0.114418	1.350805	2.957413	0.874297	1.706540	93.11094
4	0.136332	6.549982	3.447794	0.740506	1.377584	87.88413
5	0.156574	12.04651	3.555928	0.719610	1.353478	82.32448
6	0.175177	17.34675	3.342854	0.643528	1.293826	77.37304
7	0.192226	22.57974	2.996391	0.585656	1.256659	72.58155
8	0.208769	26.95652	2.694406	0.558756	1.198503	68.59181
9	0.224792	30.33624	2.442002	0.521251	1.116038	65.58447
10	0.240163	32.89338	2.243518	0.486426	1.032404	63.34427

Cholesky Ordering: LNM LNEMP LNDD LNWR LNY

APPENDIX 17: Data in a Table

	Output	Employment	Wage Rate	Imports	Domestic Demand
1971	20,851	160,839	46,937	12,029	8,381
1972	20,237	167,186	45,175	10,055	8,341
1973	21,296	176,857	43,608	8,312	9,532
1974	20,807	184,089	43,610	8,946	9,270
1975	23,755	188,711	47,691	7,744	10,792
1976	26,467	194,678	49,454	8,865	11,834
1977	24,424	190,195	48,963	5,468	10,906
1978	25,334	191,061	51,483	5,942	9,823
1979	27,895	195,467	54,784	6,886	9,848
1980	32,277	205,430	55,345	7,850	10,535
1981	37,181	215,332	58,900	9,119	12,299
1982	32,768	217,609	60,069	8,238	12,235
1983	32,386	206,384	58,782	7,222	13,196
1984	34,756	204,392	60,515	9,800	12,864
1985	31,299	200,948	58,493	5,812	11,723
1986	30,994	207,275	57,572	4,520	10,874
1987	32,873	217,724	55,497	5,943	10831
1988	32,820	224,124	52,728	6,382	11249
1989	33,672	220,708	53,033	5,981	11623
1990	32,044	214,245	48,857	5,322	11205
1991	31,550	205,513	48,498	6,680	11456
1992	30,434	196,243	50,494	6,450	11931
1993	32,025	192,771	53,924	7,123	12645
1994	33,117	200,597	54,180	7,982	13916
1995	35,100	209,240	58,757	7,968	14946
1996	33,041	239,881	49,232	8,252	15824
1997	34,693	232,541	50,546	9,549	16713

1998	34,541	204,835	63,538	9,194	18832
1999	34,806	210,627	61,670	7,901	18612
2000	37,821	210,034	57,875	7,850	20151
2001	36,928	226,815	50,760	7,568	20859
2002	41,688	208,512	49,891	8,336	23037
2003	41,236	207,088	49,213	8,735	25498
2004	40,210	202,968	54,034	11,140	29853
2005	37,629	201,993	44,536	13,430	34156
2006	37,360	190,342	59,429	16,827	37811
2007	38,605	186,501	67,480	16,201	39831
2008	43,037	171,851	81,265	16,000	42326
2009	41,756	149,194	92,340	16,358	41138
2010	42,658	146,803	104,063	20,268	42566
2011	42,001	140,956	111,107	23,054	45967
2012	43,156	127,328	124,706	21,093	46539
2013	42,085	126,650	117,906	23,194	49615
2014	41,887	122,231	119,829	21,918	48925
2015	40,857	127,723	117,932	23,371	51207