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**ECONOMETRIC ANALYSIS OF LABOUR DEMAND IN THE  
SOUTH AFRICAN TEXTILES, CLOTHING AND FOOTWEAR  
MANUFACTURING SECTOR: 1990-2012**

**BY**

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**A DISSERTATION**

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## ABSTRACT

South Africa in its quest for socio-economic improvement still faces the problem of persistent unemployment. Unemployment in South Africa is very intricate and therefore makes it a complex challenge to tackle for policy makers. Differing unemployment phenomena exist in different sectors of the economy. Some sectors are facing employment growth while others are declining. This study examines the possible major determinants of labour demand (employment) in the textiles, clothing and footwear manufacturing sector in South Africa. The study is based on semi-annual time series data from 1990 to 2012. The Johansen (1991) model is used to examine the trends. The model is an error correction model imposed upon a vector autoregressive model. The results obtained showed that wages and imports both have negative relationships with the demand for workers. Based on these two important results, policy recommendations were made. The study recommended the introduction of a sector-based wage subsidy. The wage structure in South Africa is a perpetually problematic factor of the labour market and therefore a significant determinant in the viability of business and investment. Secondly, the import structure on textiles, clothing and footwear is not clearly and thoroughly setup. A complete restructuring of import tariffs on the entire sector is suggested.

**Keywords:** Labour demand, Unemployment, Vector error correction, Textiles clothing and footwear sector.

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I finally wish to give thanks to the Lord, without whom, none of this would have been possible.

## **DEDICATION**

*“To my parents, brothers, sisters, Foyet, Frank and the entire OT family”*

## LIST OF ACRONYMS

2SLS	2 Stage Least Squares
ADF	Augmented Dickey Fuller
AES	Allen Elasticity of Substitution
ARMA	Auto Regressive Moving Average
ASGISA	Accelerated Shared Growth Initiative for South Africa
ASM	Annual Survey of Manufacturers
BCEA	Basic Conditions of Employment Act
BPG	Breusch, Pagan and Godfrey
CIA	Central Intelligence Agency
COSATU	Confederation of South African Trade Unions
CPS	Current Population Survey
CTCIP	Clothing and Textiles Competitiveness Improvement Program
DA	Democratic Alliance
DCCS	Duty Credit Certificate Scheme
DF	Dickey Fuller
DTI	Department of Trade and Industry
EEA	Employment Equity Act
EPA	Economic Partnership Agreement
EU	European Union
FIFA	Federation of International Football Association
GATT	General Agreement on Tariffs and Trade
GDP	Gross Domestic Product
GEAR	Growth, Employment and Redistribution
GL	Generalised Leontieff
IMF	International Monetary Fund

ITAC	International Trade Administration Commission
LFS	Labour Force Survey
LRA	Labour Relations Act
LSDVE	Least Squares Dummy Variable Estimator
MFA	Multi Fibre Agreement
NIPF	National Industrial Policy Framework
OECD	Organisation for Economic Co-operation and Development
OHS	October Household Survey
OHSA	Occupational Health and Safety Act
OLS	Ordinary Least Squares
PP	Phillips Perron
PTA	Preferential Trade Area
QLFS	Quarterly Labour Force Survey
SACTWU	Southern African Clothing and Textiles Workers Union
SADC	Southern African Development Community
SARB	South African Reserve Bank
SEDA	Small Enterprises Development Agency
SIC	Standard Industrial Classification
StatsSA	Statistics South Africa
TPSF	Trade Policy Strategy Framework
TCF	Textiles, Clothing and Footwear
UNISA	University of South Africa
VAR	Vector Auto Regression
VECM	Vector Error Correction Model
WTO	World Trade Organisation

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# CHAPTER ONE

## INTRODUCTION

### 1.1 Background of the study

The South African economy in the decade preceding 1994 was to large extents depressed (and during some periods, negative) but improved momentarily between the periods 1994 and 2004, averaging 2.8% annual growth rate. The annual real Gross Domestic Product (GDP) reached peak growth rates of 5.1% in 2005 and 5.2% in 2006 and then slowed down for the succeeding years (SEDA, 2008). Various opinions have emerged to explain the cause of the growth. Improvements in human capital and technology have been raised as some valid reasons. The question beckons on which will be the real determinant of long term economic growth in South Africa. It also points that capital is a result of labour and could never exist if labour had not existed first thus it may not be entirely illogical to believe labour is superior to capital and deserves much higher consideration.

South Africa faces the problem of severe unemployment, even more so among specific population and demographic groups than others. The formal unemployment rates by race in South Africa were 41.2%, 23.3%, 17.1% and 6.3% among Africans, coloureds, Indians and Whites respectively by 1994 (StatsSA, 2009). Unemployment rates declined to 29%, 22.6%, 11.7%, and 5.9% by 2011 among the same racial groups respectively (StatsSA, 2011). Members of the African and Coloured races comprised the largely unskilled portion of the labour force. Albeit the marked decline in unemployment rates, the racial and skills based disparities remain considerably large.

Despite its size, the manufacturing sector typically in developing economies is a major source of modern sector employment in general (Roberts and Skoufias, 1997). Regardless of structural modifications, manufacturing remains as an important a sector in the South African economy as any other which is as large. The sector contributed averagely around 18% of the annual GDP from 2008, making it the second largest contributor behind the services industry which contributed on average 21%. The sector provides a locus for inducing growth of other industries, services and achieving specific outcomes such as employment creation and targeted economic

empowerment. South Africa's New Growth Path aims to create five million jobs by 2020 and bring the unemployment rate to 15%. The manufacturing sector has been identified as one of the "Six Priority Areas" along with infrastructural development, agriculture, mining, the green economy and tourism. The Formal unemployment rate in the country stands at 23.9% thus making the demand for labour in the manufacturing sector (largely unskilled labour) relatively elastic.

The information technology based, motor (disregarding the decline caused by the 2007-2009 recession) and food manufacturing industries have been on the rise while massive declines in textiles, clothing and footwear<sup>1</sup> manufacturing have been observed. Industry based employment (thus demand for labour) has declined from peaks of over 300 000 in 1990 to roughly over 60 000 in 2010 (DTI, 2011). The TCF manufacturing has been declining in terms of average growth in real output with 2.8% between 1996 and 2005 and employment growth of -1.5% (SEDA, 2008). Between the recessionary 2008 and 2010 the industry experienced year on year employment changes of -10,4%, -9,2% and -0,5% respectively (StatsSA, 2011).

The South African TCF manufacturing industry has been and remains a very significant source of employment, particularly for women. In the traditional geographical concentrations, the industry has existed for many decades, is rooted in the unique history and cultural traditions of these areas and provides a significant proportion of employment (Jauch and Traub-Merz, 2006). South Africa has for years been experiencing jobless growth and massive structural unemployment. The country has grown economically by improving technology, information communication systems and trade openness. The result though, has been massive substitution of labour in favour of other means of production. The liberalization of trade has also resulted in vast influxes of cheaper produced commodities from other countries thus creating long term and persistent bottlenecks in demand for locally produced commodities.

As a result of the above phenomena, unprecedented job losses have been experienced in the TCF manufacturing sector in the country. The decline in the sector, which has a long history of

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<sup>1</sup> (TCF onwards) in this study falls under Standard Industrial Classification (SIC) codes 311-317 but excludes leather manufacturing SIC 316.

employing unskilled workers, has contributed to poverty and unemployment growth among targeted demographic groups in the country.

## **1.2 Statement of the problem**

The demand for labour is said to be derived demand, in that workers are hired for the contribution they can make toward producing some good or service (Ehrenberg and Smith, 2006). The rise in unemployment, corresponding with robust economic upsurge, has elicited allegations of “jobless growth” amongst policy makers and labour unions. On the other hand, arguments have arisen that tighter labour legislation to protect the interests of the marginalized have had unintended impacts on the willingness of firms to absorb more labour (IMF, 2009). A wide range of government and private activities affect labour market outcomes by altering employers’ demand for workers. Demand policies such as minimum wages, requirements for non-wage amenities, employer taxes all alter the cost of hiring workers and can thus impact the manufacturing sector (Roberts and Skoufias, 1997).

The manufacturing industry in South Africa has not been spared from the above effects. Even more so, the clothing and textile industry in the country has declined to unprecedented levels. According to the DTI (2011), employment in the TCF manufacturing sector declined by between 50 000 and 60 000 workers for the two and a half years preceding 2006 and a further 1000 per month since. The TCF manufacturing sector in the country has been largely a source of employment for unskilled persons. Thousands of jobs have been lost over the past ten years and 35 500 were lost by 2002. Twenty four firms have closed down since July 2002 while several others are threatened with closure (Democratic Alliance, 2009). With such marked decline in the demand for labour in the sector, poverty, inequality, social distress and welfare dependence have been exacerbated.

A diversity of measures has been deliberated by the government and many stakeholders that would be fundamentally powerful in reducing the problem. Government noted specific interventions that could begin to impact the demand for unskilled labour such as: import restrictions, fixed exchange rate systems that would favour demand for South African commodities, double-tier labour markets, wage subsidies and deregulation of labour markets

(Bhorat and Jacobs, 2010). Despite the aforementioned tactics being implemented, the clothing and textile manufacturing sector continues to decline and with it the demand for workers.

### **1.3 Research objectives**

The general objective of the study is to determine the main determinants of labour demand in the South African TCF manufacturing sector. The study therefore seeks to determine the impacts of wages, imports, output, interest rates and investment on labour demand. The study also seeks to make conclusions and relevant policy recommendations.

### **1.4 Hypotheses**

The study employs the following null hypotheses:

- An inverse relationship between wages and labour demand
- Imports have negative impacts on labour demand.
- A positive relationship exists between industry output and labour demand
- Interest rates affect labour demand positively
- Investment has positive impact on labour demand.

### **1.5 Significance of the study**

Employment creation is one of government's primary macroeconomic objectives. Decrease in unemployment rates is likely to improve growth and limit poverty in the country. When proposed or current labour market activities influence the cost and/or demand for labour, it would be more prudent and vital to know by how much this influences employment, rather than just the basic consensus that it does influence employment. Thus, practically, having the estimates for the elasticities of the demand for labour is critical.

The study provides information on the extent of the impact of different phenomena on employment in the TCF manufacturing sector that may have been responsible for its decline. Policies on trade, unionism, labour and capital market liberalisation and wage formulation can therefore be formulated on the background of this information to provide a solution for the problem.

Few studies and research have been conducted in South Africa to determine influence of the array of variables on labour demand in the sector. The study adds information to the already

existing, but limited, empirical studies on the topic. The information serves as a source of up-to-date literature to future researches as it covers a new time frame.

The study also acts as a source of information to independent stakeholders such as investors and economists who may seek to invest in the sector or report articles and activities pertaining to the sector respectively.

### **1.8 Organization of study**

Chapter one is the proposal. Chapter two gives the overview of trends in employment and labour demand in South African TCF manufacturing sector. Chapter three gives review and analysis of both the theoretical and empirical literature relevant to the study of labour demand and its determinants. Chapter four discusses the methodology utilized in the study and the data analysis. Chapter five contains the estimation of the regression model and interpretation of the results thereof. The summary of the study and the recommendations follow in Chapter six.

## **CHAPTER TWO**

### **EMPLOYMENT, LABOUR DEMAND AND THE TEXTILES, CLOTHING AND FOOTWEAR MANUFACTURING SECTOR IN SOUTH AFRICA**

#### **2.1 Introduction**

The purpose of this chapter is to analyse patterns in employment/labour demand trends, related variables and their determinants thereof in South Africa, more specifically, the TCF manufacturing sector. The chapter is divided into four sections. Section 2.2 analyses and discusses the trends in employment in South Africa. The second section of the chapter analyses the changes in the patterns of the various determinants of labour demand over time specifically in the TCF manufacturing sector. Next, analyses of trends in macroeconomic variables influencing the sector are carried out. The chapter then provides insight into the various policies that have been implemented to remedy unemployment in the economy and the TCF manufacturing sector. Analyses of the policy impacts or effectiveness in the TCF manufacturing sector are also included. Lastly, a conclusion on the analyses conducted in the chapter will be given.

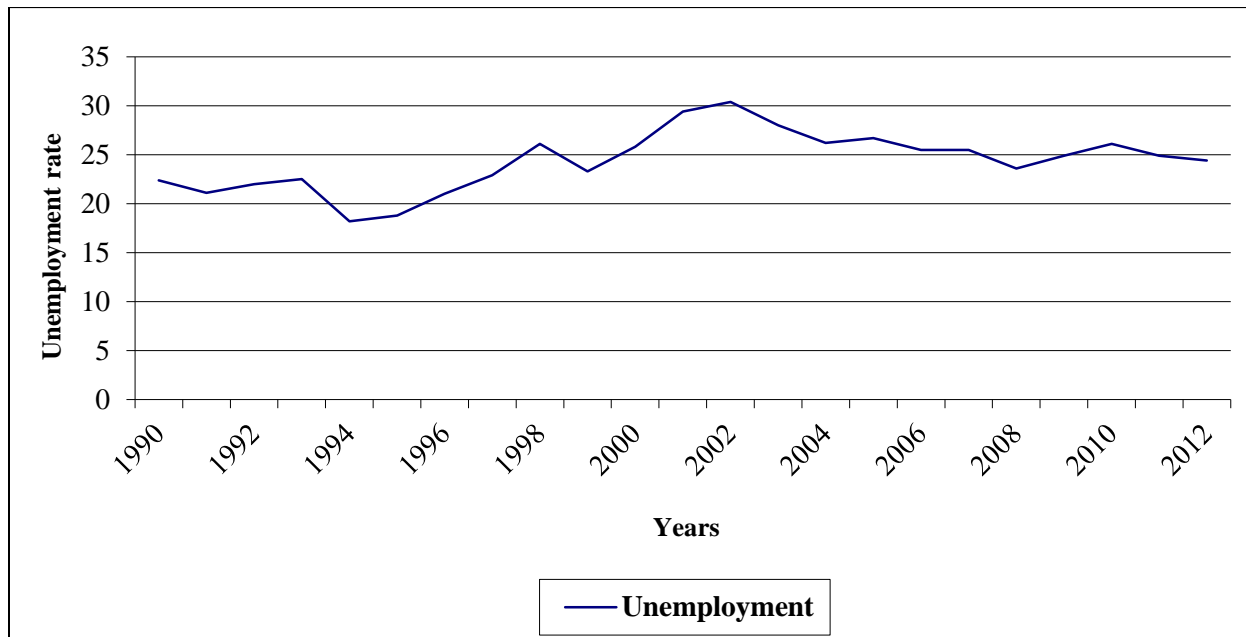
#### **2.2 Employment Trends in South Africa**

The unemployment problem still persists in South Africa. This is so despite the government implementing a sequence of policies that are directly aimed at creating an environment conducive to growth. Economic reform packages comprising fiscal prudence, trade reform and sector deregulation have been set as initiatives towards unemployment eradication (Bhorat and Cassim, 2004). Technological and structural adjustments in South Africa have, jointly with the legacy of discriminatory market policies in the workforce, created markets for workers that are grossly disaggregated along racial boundaries (Bhorat and McCord, 2003). The nature and type of work (largely unskilled) carried out by the poor majority in South Africa has persisted in the years after attaining independence.

Fluctuating but relatively high rates of unemployment still persist, particularly among the unskilled portion of the labour force. The trend is illustrated further by steady declines in the demand for unskilled labour and a substantial rise in the demand for highly skilled labour. This

has meant erosion of the largely unskilled workforce particularly in the primary and manufacturing sectors (Bhorat and Jacobs, 2010). Figure 2.1 shows unemployment in South Africa since 1990.

**Figure 2.1: Unemployment in South Africa (1990-2012)**



Source: StatsSA (2012)

Figure 2.1 shows that unemployment rates in South Africa generally hovered slightly above 20 percent for the period 1990 to 1993. This trend was relatively low compared to both the preceding and succeeding periods in the economy. The political stability and subsequent output growth experienced in the period resulted in a recorded decline in unemployment rates to 18.2 percent in 1994. The general trend from this stage onwards was a rising one.

Economic growth and improvement in socio-economic structures in the society resulted in improved education and labour force participation which in turn grossly elevated the unemployment rates. Output growth failed to compensate in real employment growth thus the persistent structural unemployment. From 2000 to 2002, a sharp rise in unemployment rates was experienced. This may be explained by the Rand crisis and inflation which was threatening to run out of control. The introduction of policies towards harnessing inflation, boosting economic

recovery and growth and creating jobs such as ASGISA and the inflation targeting policy were significantly responsible for the decline in unemployment (Merwe, 2004).

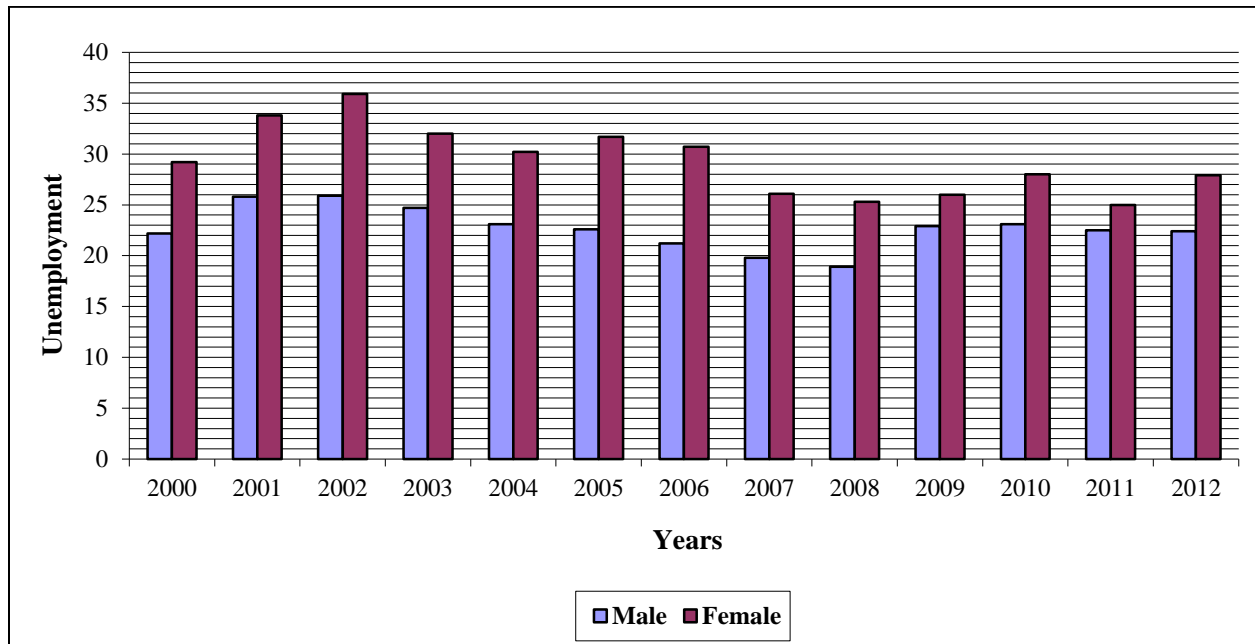
Since the mid-2000s, there has been a general decline in unemployment rates that was instigated by various economic phenomena. The announcement of South Africa as the hosts of the 2010 FIFA World Cup significantly boosted the global view of the nation. Massive infrastructure investment in roads, stadia, hotels and airport construction fired up employment. The impact of the rise in employment in the construction sector was largely diluted by the decline in employment experienced in the manufacturing sectors which were being choked by the global financial crisis. During 2009, roughly 300 000 jobs were shed (StatsSA, 2012).

From 2009 to 2010 unemployment rates rose from around 24 percent to 26 percent. This could be explained by the completion of construction work associated with the FIFA World Cup. As expected, some of the employment could not be sustained for any period surpassing this stage. According to StatsSA (2011), the majority of unskilled employment was in the manufacturing and construction industries which experienced 9 percent and 71 percent year-on-year declines from the previous 2010 period. The decline in construction employment between 2010 and 2011 was expected as the construction and activities associated with the FIFA World Cup hosted by the country passed.

The majority of workers were contract-based labour and non-permanent. The larger portion of the mentioned manufacturing industry is based in the Western Cape, which experienced the largest decline of 45% year-on-year employment. Such negative growth in industry employment has not helped resolve the complex unemployment problem in the economy. The unemployment rate in South Africa is now largely influenced by the level of job-losses and dynamics of new entrants into the labour market. Regardless of the decline in job-losers from 1451 to 1292 in the final quarter of 2009 compared to the final quarter of 2010, the aggregate losses remain high. From 2011 to 2012 the unemployment rate declined to about 24 percent. This reaction is correlated to the cut in prime interest rates from 9.5 percent to 9 percent.

Given the above analyses of aggregate unemployment trends in South Africa, the succeeding section discusses the trends in gender based unemployment in the country.

**Figure 2.2: Unemployment rate by gender in South Africa (Sept 2000- Sept 2012)**



Source: StatsSA (2012)

Economic phenomena, development and growth rarely influence identically on all populations, occupational and social groups (Bhorat and Hodge, 1999). Consequently, any dynamics that occur in the economy would have differing degrees of impacts on different economic agents. Figure 2.2 shows the trends in unemployment rates between genders in South Africa from September 2000 to September 2012.

The primary observable pattern is that female unemployment is perennially overlapping that of males. Hamermesh (1993) and Bhorat and Hodge (1999) concur that this phenomenon can be explained by a historically imposed global trend were changes in production techniques and employment structures, not only towards capital-intensive manufacturing but also away from unskilled and low-skilled workers, affects mostly women. This global trend is clearly present in the South African labour market. Secondly, the diagram shows that the general impact of the economy on unemployment was similar between males and females (Despite the varying degrees of impacts). It is seen that from 2000 when male unemployment rates were rising, the same occurred to the female unemployment rates. In 2000 when the male unemployment rate was at its peak for the relevant period, so was female unemployment. In 2008, for both groups, unemployment was at its lowest.

It can also be observed from Figure 2.2 that progressively, the gap between male and female unemployment rates was declining. At the beginning of the millennium, the variation between the genders was comparatively larger, peaking at about 10 per cent in 2002. By 2011, the gap between the two genders had been eroded to about 2.5 per cent. Female employment growth has been higher than that of males mainly because the male labour force grew slower at 16.1 per cent compared to the female rate at 29.6 per cent. Work absorption which is the rate of absorption for female workers was higher than that of males with 38.3 per cent of female labour market entrants acquiring work compared to 23.9 per cent for males (Bhorat, 2003). The situation was encouraged further by the Employment Equity Act 55 of 1998 that not only sought to even out historically biased employment opportunities based on race but also based on gender (Sparrow, Ortman, Lyne and Darroch, 2008). The enforcement of the legislation from 1998 to present has also influenced the narrowing gap between male and female employment.

It is evident that employment trends differ among gender over time. This is also true geographically. Employment characteristics differ from one province to another. The following section discusses the trends in employment by province.

**Table 2.1: Unemployment rates by province in South Africa (2000-2012)**

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
<b>L</b>	28.0	24.6	34.1	31.1	27.8	30.1	32.0	27.3	28.9	26.9	16.9	20.2	19.6
<b>MP</b>	26.7	29.2	30.1	25.3	24.8	26.9	28.0	22.0	23.1	26.6	28.7	27.7	29.4
<b>GP</b>	26.5	30.4	30.5	27.6	25.7	22.8	23.2	17.4	20.7	25.7	26.7	25.1	23.7
<b>NW</b>	28.6	28.6	30.6	28.4	28.0	28.0	27.4	29.7	24.6	27.0	24.2	24.6	23.3
<b>KZN</b>	27.8	33.8	35.0	31.6	28.7	32.8	26.6	30.0	20.8	19.2	19.8	19.3	22.5
<b>FS</b>	23.6	27.0	29.1	28.0	28.6	30.2	26.5	25.2	22.6	25.3	27.1	29.4	33.2
<b>NC</b>	18.6	25.0	24.9	26.4	24.5	24.7	28.7	26.0	21.6	24.9	24.3	26.7	28.4
<b>EC</b>	25.4	31.4	32.7	31.7	29.6	29.9	32.0	26.1	25.2	27.0	24.7	27.1	29.8
<b>WC</b>	16.6	17.7	19.6	19.5	18.6	18.9	15.0	15.7	16.9	21.5	21.9	21.6	23.9

Source: StatsSA (2009, 2010, 2011, 2012)<sup>2</sup>

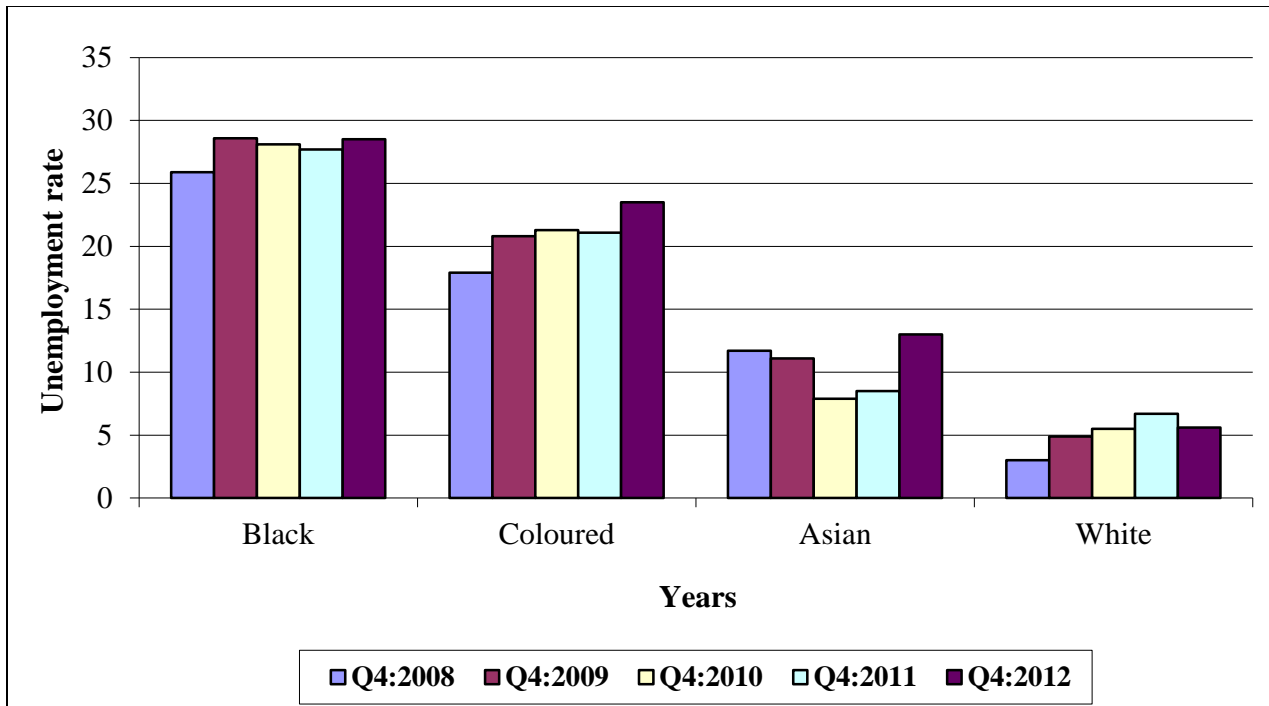
<sup>2</sup> Data were gathered and compiled from yearly publications of the Quarterly Labour Force Surveys conducted by Statistics South Africa.

As stated by Borat and Hodge (1999), labour market effects do not have symmetrical impacts over different spatial and geographical locations. In South Africa, unemployment rates differ from one province to the next. Table 2.1 shows the trends in unemployment rates from 2000 to 2012 among the nine provinces in the country. Various reasons can account for the variations in employment in the provinces.

Relatively higher unemployment rates occur in the Eastern Cape (EC), KwaZulu Natal (KZN), Gauteng (GP) and Limpopo (L) provinces. The prevalent unemployment rates in the EC and L provinces and partly KZN can be explained by the large rural setup that exists within them. The latter though, is not a thorough explanation for overall unemployment in the provinces. The EC and KZN, because of their access to the coast were historically set up with industry. A large number of TCF manufacturing firms operated in the EC, KZN and WC provinces. Gauteng also had many firms from the sector because of the higher levels of industrialisation and urbanisation in the province. SEDA (2008) describes the distribution of the sector as having 827 firms in the country. 327 of these are located in the WC, 219 in KZN, 239 in GP and parts of the North and 42 in the EC. The unprecedented decline in the sector has resulted in higher levels of unemployment in the aforementioned provinces relative to others.

Another notable trend in unemployment is the manner in which it varies across racial boundaries in South Africa. The succeeding part discusses the trends in unemployment as influenced by population group.

**Figure 2.3: Unemployment by population group (2008-2012).**



Source: StatsSA (2009, 2010, 2011, 2012)<sup>3</sup>

Data observed from StatsSA (2009) historical accumulation of labour force surveys shows that the labour market in the country, despite several policy attempts to alleviate or at least reduce the problem, remain highly skewed based on population group. The consequences have been higher levels of unemployment among the Black/African and Coloured races compared to others. Figure 2.4 shows that in the final quarter of 2008, the unemployment rates among Black/Africans and Coloureds were 25.9 and 17.9 percent respectively. The perpetual decline in the primary sector and the rapid growth of the services sector also created disproportionate impacts on the demand for workers largely skewing it away from Coloureds and Africans (Bhorat and McCord, 2003). Progressively, this scenario has been largely exacerbated by population growth thus increased members of working age and also elevated labour force participation. The improvement in socio-economic status among population groups has rendered education available.

<sup>3</sup> Data was gathered and compiled from yearly publications of the Quarterly Labour Force Surveys conducted by Statistics South Africa.

Before the turn of the century, the population of working age was below 9.5 million among the Black males and 1.226 million among their Coloured counterparts. For the females, it was 10.9 million and 1.36 million among the same population groups respectively (StatsSA, 2009). By the fourth quarter of 2007 the figures had rocketed to 11.1 million and 1.4 million among the Black and Coloured males and 12.4 million and 1.5 million for the female members respectively (StatsSA, 2009). All of this has occurred amidst “jobless growth,” with the economy failing to generate as much employment as targeted and anticipated.

The Asian and White population groups have over the period consistently endured relatively lower unemployment levels. This phenomenon can be largely attributed to the higher level of wealth and personal businesses among other historically accrued socio-economic advantages. These have grossly reduced the friction faced by these two groups in attaining employment. Furthermore, Bhorat and McCord (2003) state that these population groups were not largely employed in the declining sectors within the South African economy. The Asian and White groups between the 2008 and 2011 period averaged 9.8 percent and 4.35 percent unemployment respectively. It is noteworthy though that the progressive trend among these two population groups is divergent. The unemployment rate among the Coloured population has a general declining trend since Q4:2008 while that of the White population group has been rising. This occurrence among the White population group can be explained by the imposition and enforcement of employment equity legislation that seeks to rectify the disparities in employment, income and occupation within the labour market (Employment Equity Act, 1998).

The preceding discussions focused on trends in unemployment/employment in South Africa as a whole, by gender, province and population group. The next discussion focuses on the trends in employment specifically in the TCF manufacturing sector. Figure 2.4 and 2.5 are jointly utilised to analyse the trends. Figure 2.4 shows the employment levels in absolute terms while 2.5 shows the year-on-year percentage changes for clearer analysis.

### 2.3 Employment in TCF manufacturing in South Africa

The South African textiles, clothing and footwear manufacturing sector comprises largely semi-skilled and unskilled workers. 79 percent, 83 percent and 91 percent of employees in the textiles, clothing and footwear sectors respectively are semi-skilled and unskilled (Roberts and Thoburn, 2004). According to Figure 2.4 below, for the duration of two decades from 1990-2012, the highest level of employment in the sector was observed in 1990. From then onwards, the general trend is seen to be declining albeit sporadic fluctuations during the relevant time.

The period from 1991-1993 saw a rapid decline in employment levels from around 300000 workers to 250000 and slightly below 250000 respectively. This was a result of the perceived uncertainty generated by the pending independence of South Africa and the massive industrial action by the South African Clothing and Textiles workers union (SACTWU)<sup>4</sup>. Figure 2.5 illustrates the declines as about 7 percent, 13 percent and 1 percent respectively in the same period. This was the first perpetual drop in employment experienced in the sector for the 1990's period.

**Figure 2.4: Employment in TCF manufacturing (1990-2012)**



Source: Own graph (DTI, 2012)

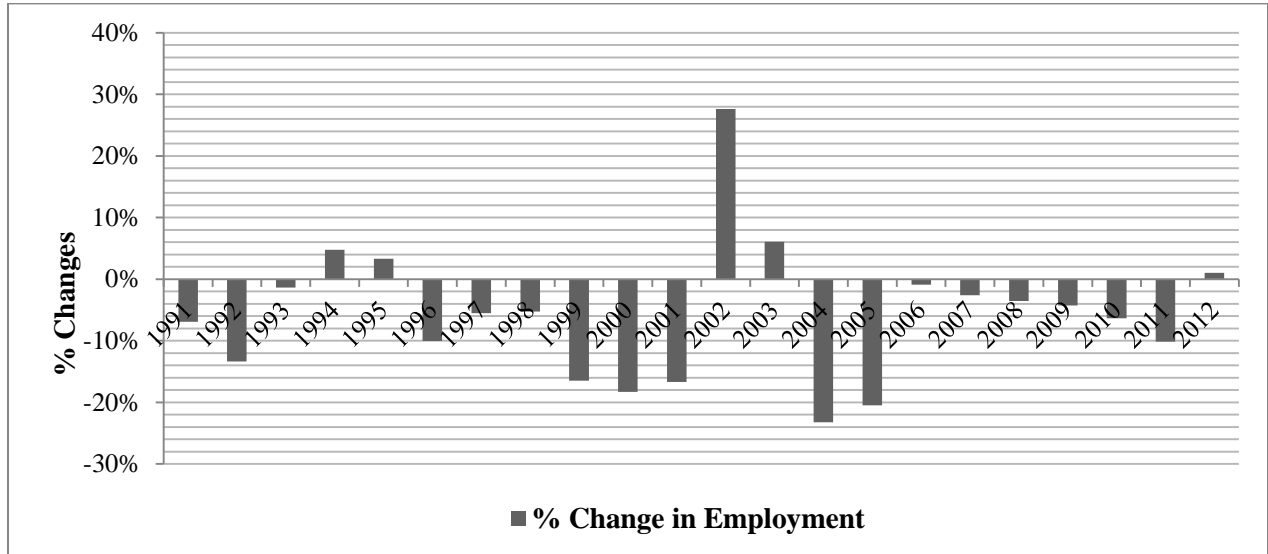
<sup>4</sup> The South African clothing and textiles workers union became the largest affiliate of COSATU and managed to boost membership by nearly 100000 and gained massive bargaining power in the sector (SACTWU, 2012).

With the then impending new government, new Acts were anticipated, billed and passed. These included major labour market law such as The Basic Conditions of Employment Act (BCEA) 104 of 1992 and The Occupational Health and Safety Act (OHSA) 85 of 1993. It is plausible that manufacturers' and industry reactions to the more rigid labour law persisted for years in realisation and anticipation of further rising labour costs (Sparrow, Ortmann, Lyne and Darroch, 2008). 1994-1995 period recorded 5 percent and 3 percent increases in employment respectively. This phenomenon was a consequence of the extensively publicized attainment of official independence in the country that resulted in relative political stability, in turn growth in investor confidence and FDI inflows.

From 1996-2001, perennial and unprecedented declines in employment were experienced. By the year 2001, the number of workers in the TCF manufacturing sector had fallen by 54.2% from the 1995 level (DTI, 2012) These declines may have been a result of the enactment of the Labour Relations Act (LRA) 66 of 1995, The BCEA 75 of 1997 and The Employment Equity Act 55 of 1998 presented radical reforms in the operations of the labour market. Such legislation prospectively surged monetary and non-monetary costs associated with employing and retaining labour (Sparrow *et al*, 2008). The BCEA and the OHSA increased the time, effort and money spent by employers on dealing with labour issues and improving work conditions. The LRA, on the other hand, increased the probability of industrial action and the strength of unions thus the Southern African footwear and leather industries association (SAFLIA) and the South African Clothing and Textiles workers union (SACTWU). Goedecke and Ortmann (1993) stated that such increases in transaction costs and risks were likely to lead to substitution of labour with own machinery or contracted machinery.

The years 2002 and 2003 recorded recoveries of about 27 percent and 6 percent in employment growth in the sector as shown in Figure 2.5 to about 160000 and 170000 respectively from the then lowest 120000 experienced in 2001, as shown in the preceding Figure 2.4. The stabilisation of the currency and employment growth initiatives may be the reasons to attribute this growth. From this period to present, a much slower and less severe declining trend has persisted in the sector. From this period to present, a much slower and less severe declining trend has persisted in the sector. This persistent decline is a result of persistent inflows of cheap textile imports from countries like China, India and Singapore.

**Figure 2.5: Year-on-year Percentage changes in employment in TCF manufacturing (1990-2012)**



Source: Own graph (DTI, 2012)

The next section provides an analysis of the trends in important economic within and beyond the TCF manufacturing sector that may have significant influence on the level of employment in the sector. Initially, the trends in wages are discussed.

**Figure 2.6: Wage trends in TCF manufacturing (1990-2012)**



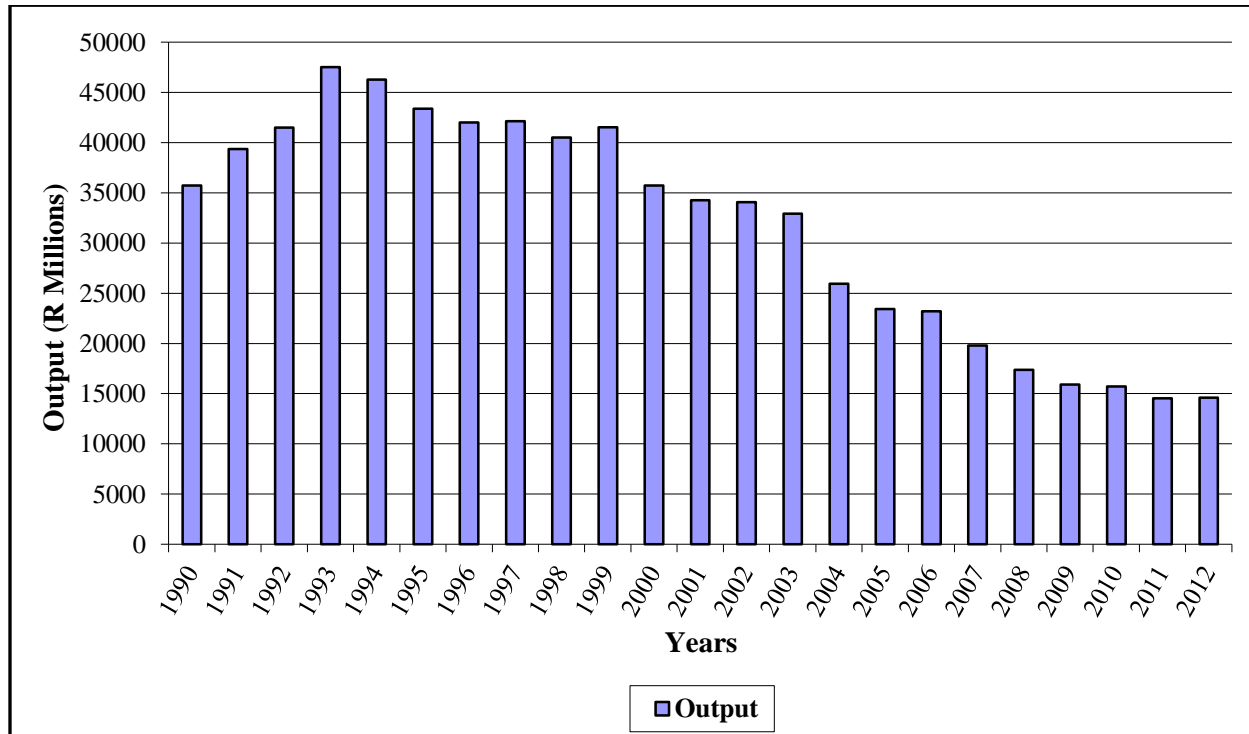
Source: Own graph (DTI, 2012)

Figure 2.6 illustrates the trends in the nominal and real wages paid out in the TCF manufacturing sector during the period 1990 to 2012. The nominal wages were adjusted for inflation as of 2000 base year to attain the real values. The general observable pattern is that as nominal wages rose, real wages also rose. This phenomenon is a result of a relatively stable inflation rate. From 1990 to 1996 there was a rise in both nominal and real wages from about R90 billion and R105 billion respectively to peaks of R130 billion and R145 billion respectively. The general rise in remuneration paid out to workers was a consequence of increase in unionism and bargaining power of employees. This phenomenon persisted in this period despite the marked declining trend in the number of workers employed during the same period.

Between 1997 and 2002 marked declines occurred in the wage structures. In 2002 the lowest wages were paid out for the entire period. The declining pattern of wages was consistent with a similar trend that occurred in employed during the period 1995-2001. The period was one in which the TCF manufacturing sector began and continuously faced operational and growth problems. From 2003 onwards, the level of wages rises and generally stabilises at relatively higher levels despite the decline in the level of employment in the sector. The general rise in wages was triggered by the massive growth in union density and the emergence of the bargaining season in South Africa. These have imposed persistent pressure on employers to keep wages on the rise.

Given the discussion on sector specific wage trends, the next part of the chapter discusses the trends in output generated from the TCF manufacturing sector from 1990 to 2012.

**Figure 2.7: Industry output in TCF manufacturing (1990-2012)**

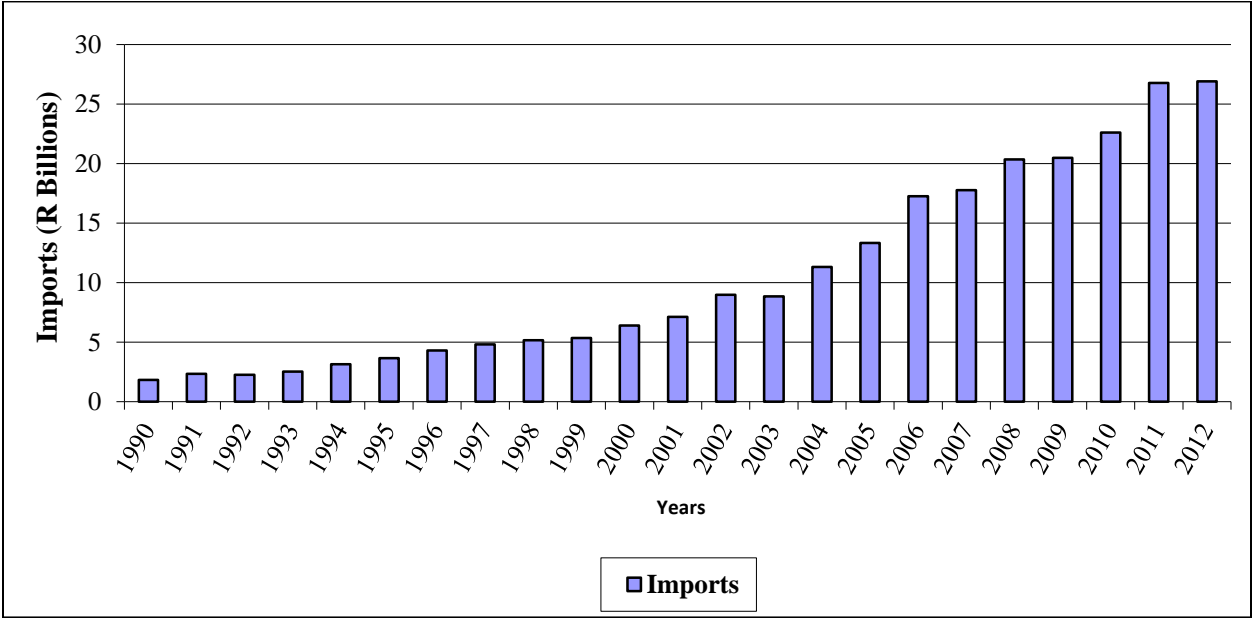


Source: Own graph (DTI, 2012)

Figure 2.7 shows the values of output generated for the TCF manufacturing sector from 1990 to 2012. The general trend is a declining one. Between 1990 and 1993, the growth rate in output is quite significant. By 1993, output peaked at over R48 Billion for the period in question. A possible cause for the observed trend was the increase in confidence in South Africa on the expectation of impending political stability. Generally, during this period, the economy performed relatively better than the preceding periods. Between 1994 and 2003 the growth had ceased and a slow but steady decline occurred. The trend that prevailed during this period was a consequence of the unprecedented deterioration of the footwear sector. Roberts and Thoburn (2004) explained the mean annual growth rates in output of 0.1 percent and 0.5 percent in textiles and clothing were less than the declines of 4.6 percent in footwear manufacturing. This resulted in a persistent, but slow decline in joint output of the sector. From 2004 to 2011, the decline in output became even more pronounced. By 2011, output had fallen to record lows of slightly over R14.4 Billion.

Both wages and output behaviours are likely to have strong impact on employment in the sector. Another important trend for discussion is the level of imports of textiles, clothing and footwear. These compete directly with locally produced goods.

**Figure 2.8: Textiles, clothing and footwear imports in South Africa (1990-2012)**



Source: Own graph (DTI, 2012)

Imports from low-cost countries affect the employment of highly-skilled employees positively but reduce the demand for low-skilled employees (Cuyvers, Dhyne and Soeng, 2010). This postulation seems to apply in the South African scenario as well. Figure 2.8 illustrates the trends in imports of TCF commodities into South Africa. A general rise in the value of imports into the country is seen from 1990. Between 1990 and 1993, imports were relatively lower and stable compared to the succeeding periods. During this period, South Africa was going through a transitional period in its governance, the consequence being subdued economic activity in most sectors of the economy.

From the early 2000s, more pronounced growth in imports was undertaken. These were a product of more pronounced global trade liberalisation (in particular, the removal of the Multi-Fibre Agreement (MFA) by the WTO), the availability of cheaper imports and a strengthening Rand (Morris, 2004). The domestic market for TCF commodities declined 40 percent as a

consequence of a 63.4 percent increase in import penetration (SEDA, 2008). The phenomenon was even more significant in the footwear sector and likewise its negative consequences (Ballard, 2002).

From 2002 the growth rate in imports became even more pronounced, albeit dropping in 2003, and peaked in 2011 experiencing slightly over R26 Billion. The development of China as the largest and one of the cheapest exporters of textiles and footwear commodities is largely attributed for the trends in South African imports of the goods. Nordas (2004) stated that China was to have even greater influence on the performance of trade partners in the TCF sector 2002. Nordas (2004) postulated that China's global market (excluding EU) would increase significantly from the 30 percent and 22 percent in the clothing and textiles sectors respectively. In South Africa alone, China's imports in clothing and textiles grew from 5.9 percent and 29 percent in 1995 to 18.9 percent and 56.3 percent by 2002. Other dominant forces in the sectors such as the Germans, Italians and the Korea DPR would exacerbate the situation.

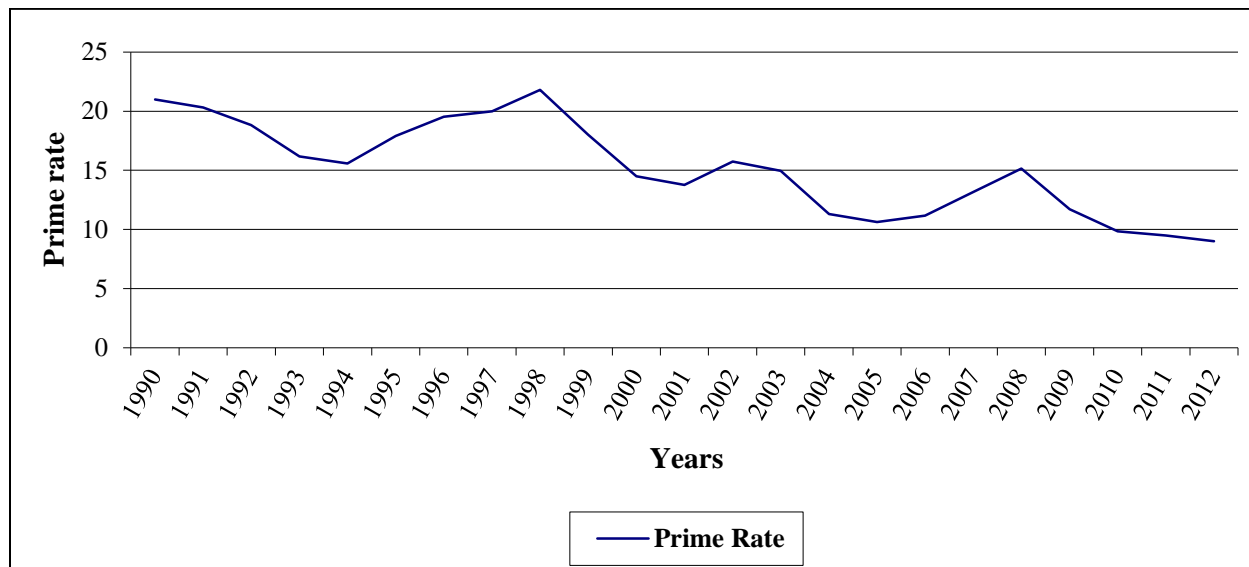
## **2.4 Review of Macroeconomic factors affecting the TCF sector**

Like all other sectors of the economy, the textiles, clothing and footwear manufacturing sector is not influenced only by microeconomic variables unique to it. The sector is also influenced by macroeconomic policies and variables. For instance the sector is affected by the level of lending rates and investment as set up by the SARB and Government's monetary and fiscal policies respectively. Initially, trends in the prime rate are discussed.

### **2.4.1 Prime Lending Rate**

Rutherford (2002) defines the lending rate as the rate of interest charged on bank loans to the public and corporations. The rate is largely influenced by a number of factors including savings rates, investment dynamics, the monetary policy framework, financial market operations, risk premiums and taxation. The prime lending rate in South Africa is strongly related to the bank rate that the SARB affords to banking institutions and the Repo rate as of 1999 (Oster, 2003). The prime rate has been known though to be adjusted (not necessarily in accordance with the monetary policy tools) to suit economic dynamics. This therefore sets up the prime rate in South Africa as a product of primarily the monetary policy, but subject to other secondary influences dependent on the short term economic demands.

**Figure 2.9: Prime Lending rate in South Africa (1990-2012)**



Source: South African Reserve Bank (2012)

Figure 2.9 above shows the trends in the prime lending rate from 1990 to 2012. During the relevant period, the general trend has been a declining one. Absent of the generalization, the prime rate has through the period undertaken various regimes of both increase and decline. During the period, the prime rate reached peak levels of 25.5 percent in the second quarter of 1998 and as low as 9 percent in 2011 (SARB, 2011).

Between 1990 and 1994, the prime rate was declining from the 1990 level of 21 percent. Prior to this period, the de Kock period of the 1980s was in effect when Gerhard de Kock was the SARB governor. For the larger parts of this period, the interest rate was relatively high because of two main reasons. De Kock (1981) had earlier prescribed that it was necessary for a well-functioning economy to adjust interest rates upwards significantly to cool down the economy from accelerated money supply growth and to arrest inflation. Liquidity in South Africa was largely subject to gold and other precious mineral market dynamics. High liquidity and inflation in the 1980s was countered by interest rate increases in an attempt to maintain conditions similar to international trade partners (Oster, 2003). Secondly, the absence of a monetary policy consultation organ such as the Monetary Policy Committee (MPC) meant the governor had higher discretion in interest manipulation. Regardless, the then highly politicized central bank meant the interest rate was sticky downwards because of an aversion towards lower interest rates

in political circles. The end of the de Kock era in 1989 induced the decline in interest rate (Oster, 2003).

Between 1995 and 1999, the prime rate rose rapidly to the peak of 1998. The SARB approach throughout the period was to be one of principled monetarism (Moll, 1993). The paramount intention was to protect the internal and external value of the currency. The monetarist influence in the central authority meant explicit management of money supply through money targeting as the pivot of the monetary policy framework (Stals, 1993). To achieve these monetary targets, the interest rate was persistently increasing and likewise the prime lending rate. During the period, the interest rate was adjusted upwards more than six times from the 15.25 percent level in 1994. These actions meant to counteract the impacts of elevated credit granting and money supply growth which rose beyond the targeted spectrum because of heated economic conditions with high GDP and financial market growth.

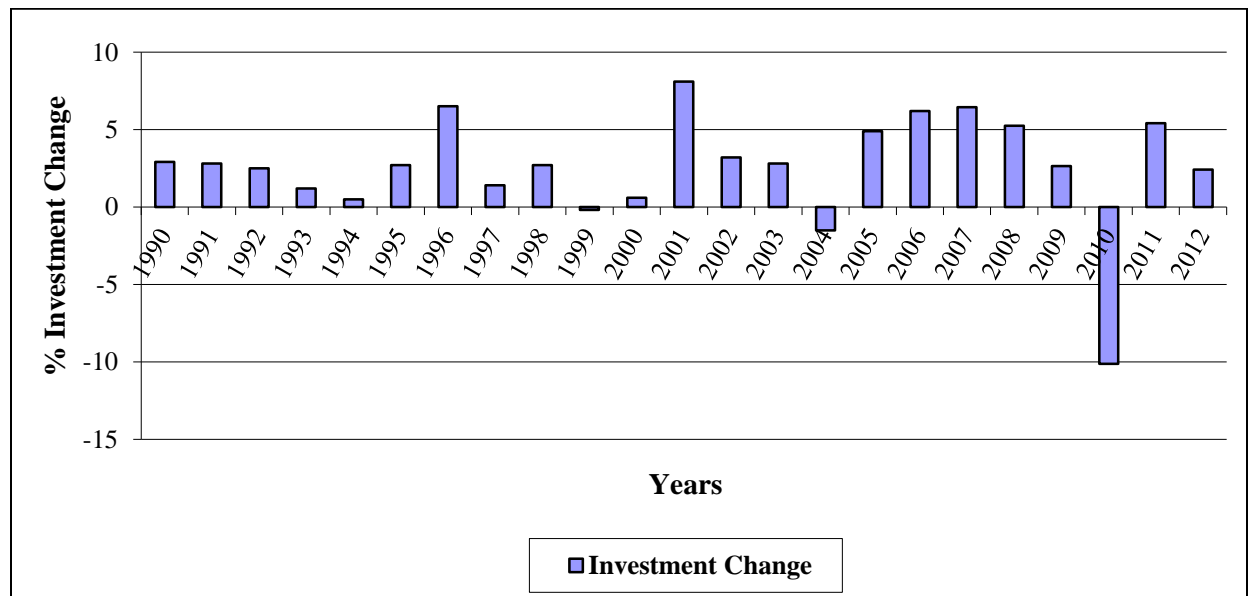
From 1999 to 2001 the prime rate declined. During this period, despite the consensus on the importance of interest rate manipulation in economic management, it was agreed that structural changes in the financial markets had distorted the previously clear interaction among liquidity, credit, spending and inflation rate (Stals, 1998). The influence of money supply on the economy was not as succinct and therefore interest rates were allowed to be lowered. The Repo rate which was based on repurchase agreements between the central bank and banks in terms of securities sold by the SARB daily with the intention of manipulating liquidity was also introduced (Oster, 2003). During this period, the returning stability in financial and international trade markets led to 11 downward adjustments of the prime rate (SARB, 2011). The uptake of capital inflows and manageable exchange rates dented the demand for liquidity. Money supply growth diminished, inflation and the balance of payments were considered sound and therefore permitted lower interest rates.

Between 2002 and 2008, the prime rate fluctuated notably attaining the lowest levels in 2005 and highest in 2008. The prime rate during this period responded to various factors of the inflation targeting framework and the daily fluctuations of the repo rate. The consistent decline in the inflation rate from 2002 to 2004 as governed by the inflation targeting policy allowed interest rates to be lower. The inflation rate took a sudden turn in 2005 and began to rise. The SARB

instigated a series of interest rate adjustments to mitigate the rising inflation rate. During this period, the interaction between inflation and interest rates determined the behavior of the other.

From 2009 to 2011, the SARB adjusted the interest rate downwards seven times. This resulted in prime rate changes from 13 percent in March 2009 to 9 percent in November 2011 (SARB, 2011). From then onwards the rate remained at that.

**Figure 2.10: Investment in textiles, clothing and footwear (1990-2012)**



Source: Own graph (DTI, 2012)

Figure 2.10 above shows the trends in the year-on-year percentage changes in investment towards the TCF manufacturing sector from 1990 to 2012. The investment involves both private and government investment. It also incorporates both domestic and foreign investment directed towards the sector. Generally, year-on-year changes in investment have been positive. This implies that there has been continuous increase (regardless of the size) in the level of investment in the sector.

Prior to 1990 and during the early 1990s, attraction of inward investment, its availability and retention was based on global-based country image building and investor targeting (Wentworth, 2012). Within these latter years of the apartheid governance, investment into the TCF sector was largely domestic and funded from government treasury. The viability of the sector was bound upon the closed nature of the then South African economy and therefore a sustained demand for

locally produced commodities. Despite, the positive year-on-year changes it is evident from 1990-1994 that investment growth was at a slower pace. The change in level of investment was triggered largely by political uncertainty during the last years towards independence. Since the majority of investment was domestic, there was massive unrest both politically and economically as to the perceived consequences post-1994.

Between 1995 and 1996 strong growth in investment was recorded. Regardless of the decline in the rate of investment growth, positive year-on-year improvement in investment was maintained until 1998. The government had embarked on investment attraction based on investor creation and generation incorporated with strong policy advocacy (Wentworth, 2012). Within this period, the government implemented the primary stages of the Export Marketing and Investment Scheme which committed over R450 million, approving 7295 projects. Although not the entirety of these were in the textiles, clothing and footwear sector, the sector did receive notable funds and growth.

From the early 2000s, investment grew after the 1999 low. This short term trend was based on the One-Stop-Shop policy instigated by investment promotion agencies. The organisations did smoothen what was normally a strenuous process, for foreigners especially, who sought to invest. The mandate of these organisations was to assist in attaining of licences and permits. On occasions, the one stop shops operated as separate entities from government such that they lobbied government departments to expedite investment chances and navigate around bureaucratic red tape. The slowed growth in 2002 and 2003 and the succeeding negative growth in 2004 were precipitated by a series of factors. Within this period, the Rand recovered from the 2001 crisis and strengthened against the Sterling and the Greenback. The consequences were growths in cost of investing in South Africa from a foreign perspective and therefore limited inward foreign investment. The Export marketing scheme which had been previously implemented suffered during this period because exports from the sector were largely limited because South African commodities were relatively expensive. 2004 also saw notable international investment commotion in textiles, clothing and footwear manufacturing due to the pending end of the Multi Fibre Agreement<sup>5</sup> (Barnes, 2005).

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<sup>5</sup> Analysis of the Multi Fibre Agreement is covered in the next section on Policies.

Between 2005-2007 rejuvenation in investment occurred. This growth may have been caused by the introduction and implementation of the R1 billion Clothing and Textiles Competitiveness Improvement Program (CTCIP)<sup>6</sup> which provided massive incentive for investors and potential investors in the sector (SEDA, 2008). In 2008 and 2009 growth occurred, but at a slower rate. The growth could have been a result of the former, coupled with Enterprise Investment Programme (which included the Manufacturing Investment Programme) which was initiated in 2008 with a commitment of over R2 billion to be used until 2011. The benefits of these programs were largely marred by the financial crisis which persisted within this period. The period was marred with demand deficiencies and stunted investment.

In 2010, the year-on-year change in investment in the sector was negative. During this period inward foreign investment plummeted by more than 70 percent from over R54 billion in 2009 to a mere R16 billion in 2010. The drop was even more acute if measured from 2008 at 80 percent (Wentworth, 2012). Combined with the above cause, during this period, South Africa started to score unremarkably and in other instances unattractively in global indices that are used by investors to assess the economic environment. South Africa began to display signals of a severely unstable labour force (World Economic Forum, 2011).

The next section of this chapter provides analysis and reviews of economic policies that were set up by the government to thwart the problems in textiles, clothing and footwear manufacturing sector.

## **2.5 Review of Economic policies**

The textiles, clothing and footwear manufacturing sector has been of late of particular concern to government and stakeholders. Various economic policies have been drawn up with the particular mission of addressing the sector. Historically the sector borne from blanket manufacturing in the early 20<sup>th</sup> century was stable and shielded from international competition and labour volatility by restrictive import and labour market policies imposed by the National Party's government. The restrictive and unaccommodating nature of the South African economy then, afforded the sector relative success.

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<sup>6</sup> Analysis of the Clothing and Textiles Competitiveness Improvement Program is covered in the next section on Policies.

Post-Independence South Africa, trade and labour market liberalisation and influential organisations like the WTO have jointly brought up the need for more attentive economic policies to facilitate the activities linked with the sector.

### **2.5.1 Labour Policy**

Since independence, the Government's participation and influence in the labour market has been largely indirect through the enforcement of certain legislation. Manipulation of labour market outcomes by government has been achieved through legislative interventions primarily through the Labour Relations Act, the Basic Conditions of Employment Act and the Employment Equity Act. The purpose of the aforementioned supposedly being to help the poor and improve employment (Jeffery, 2011). The ideals behind most labour policy interventions for a while, has been triggered mainly by COSATU's drive towards permanent and well-paying jobs for work seekers. Being the country's foremost workers' union, COSATU has advocated against atypical employment.<sup>7</sup>

The Labour Relations and Basic Conditions of Employment Acts have rendered South Africa's market for workers very rigid. South Africa was ranked 135 out of 139 countries surveyed for hiring and firing practices, 131 for flexibility in determination of wages and 112 in pay and productivity according to the Global Competitiveness Index (World Economic Forum, 2011). The 1996 Growth, Employment and Redistribution (GEAR), advocated for labour legislation that promoted more flexibility in employment. This has been contradicted by both COSATU and the implemented legislation.

Currently proposed labour policy has introduced various key provisions that seek to improve the workings of the labour market. Labour broking is to be banned. This would be achieved through three mechanisms. These include confining employment agencies to work placement, repulsion of Labour Relations Act, Basic Conditions of Employment Act and Employment Equity Act provisions that recognise brokers as employers and thirdly, new definitions of employer and employee. The labour policy also seeks to make all jobs permanent unless the employer can provide justification of employment on a non-fixed term. Various other strategies are within the

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<sup>7</sup> It has been argued that COSATU's dislike for atypical unemployment is primarily self-serving as temporary workers erode union power and weaken the strength of industrial action (Jeffery, 2011).

new labour policy frameworks which include similar benefits for fixed and non-fixed workers, new rules on sub-contracting, criminalisation of excessive overtime, vacancy notifications and restrictions on private employment agencies among many others (Jeffery, 2011). The likely impacts of the policies on business might be increased employment costs, pressure to even wages, greater compliance burden, worsened disputes, and higher unionisation. The combination of these will likely reduce employment further.

### **2.5.2 Trade Policy**

Through the DTI, government reviewed the country's trade policy in 2007. It was considered vital to assess the experiences and consequences of the trade policy reforms undertaken by South Africa since 1994. This process was necessitated by the need to elaborate the contribution the trade policy made to the government's economic targets. They include growth, poverty reduction and work creation (DTI, 2011). The introduction of the National Industrial Policy Framework (NIPF) in 2007 also dictated the need for a thorough assessment of the country's approach towards trade.

The NIPF emphasised the need for tariff policies that were sector based rather than universal. The drive behind this was the growth of strategic sectors and the decline of other sectors. To achieve the goals of the NIPF, South Africa's trade policy framework advocates the upgrading and diversification of the economy to produce value-added commodities that create employment rather than substitute local goods. South Africa had applied rapid structural trade reform which included uniform and universal liberalisation across sectors. The perceived benefits of this strategy have been inconsistent. This policy framework led to gains in other sectors such as motor vehicle manufacturing and mining and by contrast significant failures in clothing and textiles sector. Trade policy in South Africa has been largely affected by the need to resolve the dilemma caused by Economic Partnership Agreements (EPA) within SADC and the clashes with the European Union (EU).

The average growth in South Africa averaged 3 percent between 1994 and 2002 and then 5 percent ending 2008. The growth has been said to be a consequence of positive domestic approach and a favourable international scenario. This meant that the trade policy and integration approach adopted by the country was largely influential in growth. This was evident by the

inherent decline caused by the global crisis in 2008 that exposed vulnerabilities in the system. To mitigate the losses already faced and possible repetitions of such economic phenomenon in the future, new approaches towards tariffs and trade need investigation.

Trade remains a vital tool of the country's economy as exports are viewed as a means to marked growth. Numerous factors have affected the country's ability to depend on trade. These include volatile exchange rates, a widening trade deficit and political uncertainty within trade partner countries. Trade policy is important because of its connection to other industrial policies in the country. Deliberation is still common as to the means with which to approach trade. Others have argued for free trade supposedly leading to increased competition and efficiency in the economy. Conversely, there are proponents for increased state intervention. The basis for state inclusion is to protect the vulnerable local industry from the more dominant global market.

Formation of the WTO in 1995 recorded an important shift in the multilateral trade system. Consequently, it has become more complex for South Africa with the proliferation of preferential trade areas (PTA) and complicated non-tariff barriers. At the expense of South Africa and other Sub-Saharan countries, OECD countries (mainly from East Asia) have exponentially improved their trade/GDP ratios and real incomes/Capita by reducing tariffs by over a third since the 1980s (Gonzalez-Nunez, 2008). As a result, South Africa has to continuously review and amend its trade policy to achieve the best for the economy from trade.

#### **2.5.2.1 The Multi Fibre Agreement (MFA)**

The MFA was a policy tool that both directly and indirectly influenced the operations and the very existence of textiles and clothing manufacturing in South Africa. It administered the trade in textiles from 1974. The MFA imposed quotas on the quantities of textiles developing countries could export to developed countries. The MFA was installed as a temporary remedy to permit developed economies to adjust to the low cost labour imports from developing countries. The underlying principle was that developing countries have low cost labour and factor abundance thus their textile industries held advantages over those of developed countries. The MFA is said to have cost the developing world 27 million jobs and \$40 Billion in annual exports from 1974 (Chandrasekhar, 2003).

The General Agreement on Tariffs and Trade (GATT) in Uruguay shifted trade in textiles and garments to the WTO governance and thus the progressive removal of the MFA. The MFA officially ended in December 2004 (Barnes, 2005). With its end came radical changes in the global textiles trade and South Africa was not spared the impacts. By 2005 a growing concern was the realisation of the potential growth in Chinese and Indian textiles, clothing and footwear exports. Indian textiles and clothing exports escalated 33 percent by the end of January 2005 while the Chinese had an astonishing 546 percent growth (SEDA, 2008). To this day, the impacts of tariff and barrier removal in the textiles, clothing and footwear sector have not ceased to affect South Africa.

#### **2.5.4 Investment Policies**

South Africa like any other economy has to continuously review its approach towards investment vis-a-vis the domestic and international prevailing trends. The South African government implemented a fresh policy framework in 2010. The framework aims at modernising and making the investment regime stronger by instituting measures that promote investment, investment security while maintaining the benefits for the economy (DTI, 2011). Traditionally, the investment policy framework covers the economy as a whole but is also disaggregated to provide policy tools relevant industries and sectors.

##### **2.5.4.1 The Duty Credit Certificate Scheme (DCCS)**

The DCCS was an export based program meant to provide incentive to potential investors to invest more in the textiles, clothing and footwear sector with the hope of gaining if they export. The program was terminated officially as of March 2005 (SEDA, 2008). The DCCS was largely created to promote outward orientation of textiles, clothing and footwear production by making it possible for firms to receive rebates for proven exports. These rebates were considered to be the incentive to investors to pay more attention towards textiles, clothing and footwear manufacturing and export and thus in turn boosting employment.

An interesting characteristic of the DCCS rebate was that it was disposable by sale to domestic importers of textiles, clothing and footwear commodities. Herein lay the detriment of the policy that was not predicted before implementation. The majority of DCCS rebates were sold to local importers for as much as 30-40 percent discount values (SEDA, 2008). Consequently, not only

did this export and investment promotion strategy not contribute much to the sector, it is targeted as a root cause of decline in the sector. DTI (2011) reports that large importers such as Mr Price benefited significantly from acquiring DCCS rebates rendering imports from China and Asia more lucrative to them. The result was a loss of competitiveness by firm who had pledged to acquire locally and thus also had to follow suit and in so doing destroyed the sector.

#### **2.5.4.2 The Clothing and Textiles Competitiveness Improvement Program (CTCIP)**

The Clothing and Textiles Competitiveness Improvement Program (CTCIP) was introduced after the DCCS. The program is a R1 Billion incentive scheme for textiles, clothing and footwear manufacturers to innovate, raise competitiveness and invest more. The program is meant to achieve higher quality commodities, produced using more efficient techniques. This would in turn raise the competitiveness of the entire sector both domestically and internationally. The CTCIP allocates funds on the bases of largely employment and value addition. The program was instigated to reserve the destructive mentality and low confidence in textiles, clothing and footwear manufacturing. Asset stripping, closures and employee lay-offs have become the norm in the sector and the program targets eradicating these. As of 2012, the CTCIP had benefited 100 firms. Ultimately, the program has achieved a level of success but has failed to improve the conditions for firms that were and are already struggling. The lack of resources in the latter make it impossible for them to achieve the required investment and competitiveness targets for eligibility for the CTCIP.

## **2.6 Conclusion**

General unemployment in South Africa has been one of government's foremost concerns since 1994. Of particular concern has been the structural level of unemployment that has caused hindrances in policy makers' attempts towards at least balancing and reducing historically biased unemployment rates. Government has through its fiscal policy attempted to reduce the prevalent unemployment rates that have hovered around 23 percent averagely for the past two decades. Of particular interest have been the higher levels of unemployment among the African and Coloured women who comprise the particularly unskilled demographic groups. The textiles, clothing and footwear manufacturing sector was and still remains a notable employer of semi-skilled and unskilled women. Unfortunately, this sector has perennially declining employment levels

because of various reasons. The continuously high levels of cheap imports from China and other more efficient producers have been identified as the major cause in decline in this sector. The government and other stakeholders have through various policies on trade, investment and labour tried to mitigate the decline of the sector. Unfortunately, so far, none of the measures taken through policies have been sufficient in significantly solving or at least reducing the degradation of the manufacturing sector.

# **CHAPTER THREE**

## **LITERATURE REVIEW**

### **3.1 Introduction**

This chapter presents theoretical and empirical literature on the demand for labour and employment. The initial section of the chapter deals with the review of theoretical literature. The succeeding empirical literature section analyses studies conducted by various researchers on the demand for labour in manufacturing. This section is subsequently split into four parts where studies will be analysed according to the geographical area/economy to which they focus. The empirical literature section is therefore divided into literature from developed economies, developing economies and then specifically, from South Africa. A general assessment of the empirical literature reviewed in context will also be carried out. Lastly, the chapter will provide a conclusion or summary to both the theoretical and empirical literature reviewed.

### **3.2 Theoretical Literature Review**

This section presents the views of various theories regarding the demand for labour. The theories in discussion are the Theory of a perfectly competitive labour market (The Classical Approach), Labour demand theories, which are the Marginal revenue productivity theory of labour demand (Neoclassical short run demand for labour theory) and the Demand for labour in the Long run approach. The Union wages theory is presented lastly.

#### **3.2.1 The Classical Approach (Perfectly Competitive labour market)**

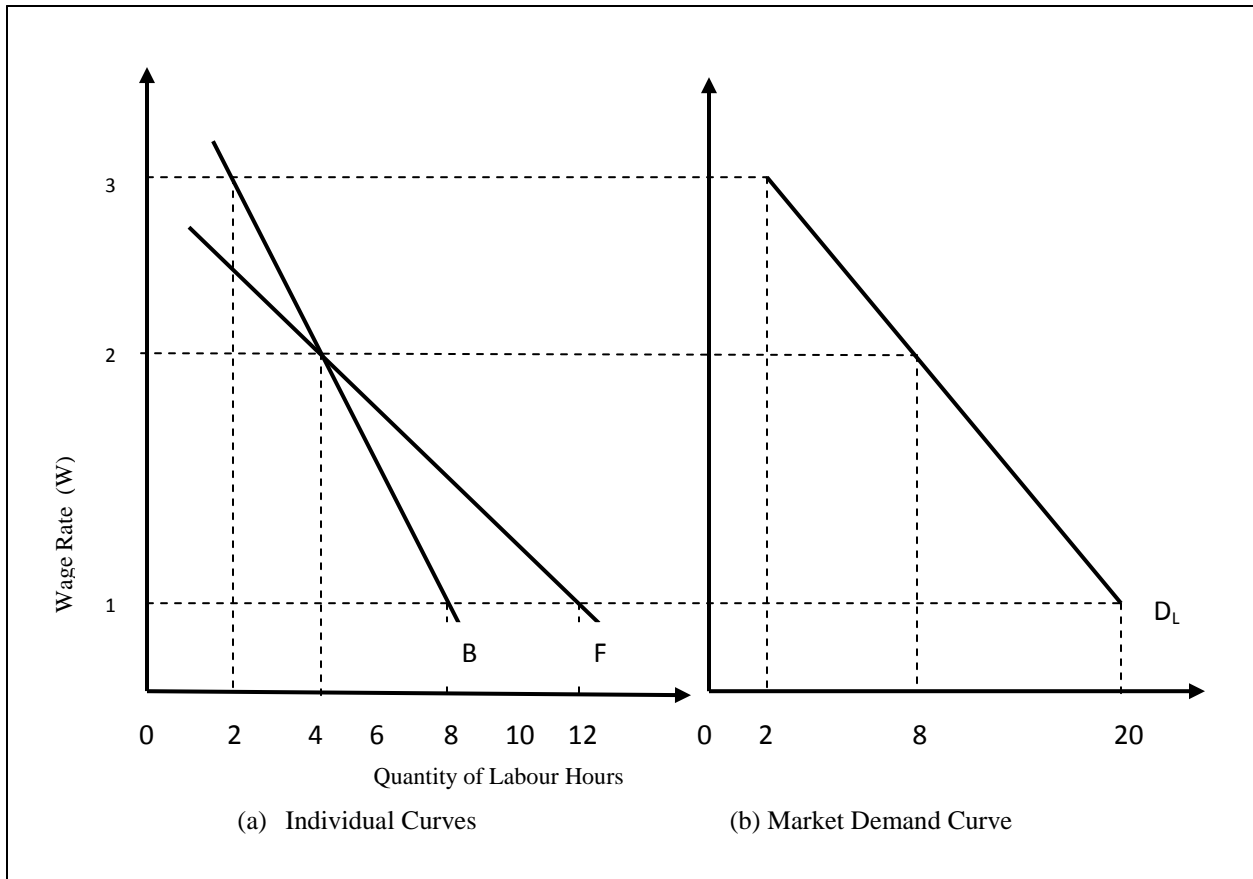
The classical labour markets are said to have various characteristics that distinguish them from other labour markets. These characteristics are the assumptions that govern the operations of the classical theory. The market is assumed to have: (1) a large number of firms competing with one another to hire a specific type of worker to fill identical jobs; (2) numerous number of qualified individuals having homogenous skills and independently supplying their work services; (3) “wage-taking”- neither the firms nor workers impose any influence over the prevailing market wage rate. Each firm can alter the amount of labour it hires without significantly affecting the market wage. Each firm must passively accept the existing market wage; (4) perfect and costless information. Buyers of labour are completely informed about the characteristics of the workers

they are hiring and the amount they will be charged; and (5) perfect mobility of labour- absence of barriers to movement.

The functions of the perfectly competitive labour market are divided into two distinct activities conducted that determine the levels of employment and remuneration that prevail in the market. (1) Labour demand, which is the sum of labour hours/number of workers that employers are willing and able to hire at the prevailing market determined wage rate, reflects the behaviour of firms. (2) Labour supply reflects the behaviour of workers. It is defined as the amount of work hours that employees are willing and able to supply given the wage rate offered by the market.

In Classical economics, the view is that *ceteris paribus*, the demand for employees is largely influenced by the price of labour/wages. To deduce the market demand for labour, individual demand schedules for firms at each wage rate have to be summed. The market demand curve is therefore the horizontal summation of all the firms' individual demand curves. The market demand for a particular form of workers is established by summing over a spectrum of wage rates the price-adjusted quantities of employees that employers wish to hire (McConnell, Brue and MacPherson, 2009).

**Figure 3.1: Derivation of Market Labour Demand Curve**



Source: Lipsey and Chrystal (2009)

Graph (a) in Figure 3.1 shows a map of individual labour demand curves for firms Busby Limited and Ferguson Limited denoted as B and F respectively while (b) shows the summation of the curves horizontally to produce the market demand curve (assuming Busby and Ferguson are the only firms in the market). At wage  $W_1$ , B and F will demand 8 and 12 hours of work respectively, such that total market demand for labour is 20 hours. Supposing the wage rate rises to  $W_2$ , *ceteris paribus*, Both B and F will reduce the employment they are willing to hire to 4 hours each such that total labour demanded becomes 8 man-hours. If the wage were to rise again to  $W_3$ , F would no longer be willing to hire any workers at all (pulls out of the market for labour completely) while B will choose to pay for only 2 hours of work. It can be concluded that, with higher wages, market demand for labour will decline.

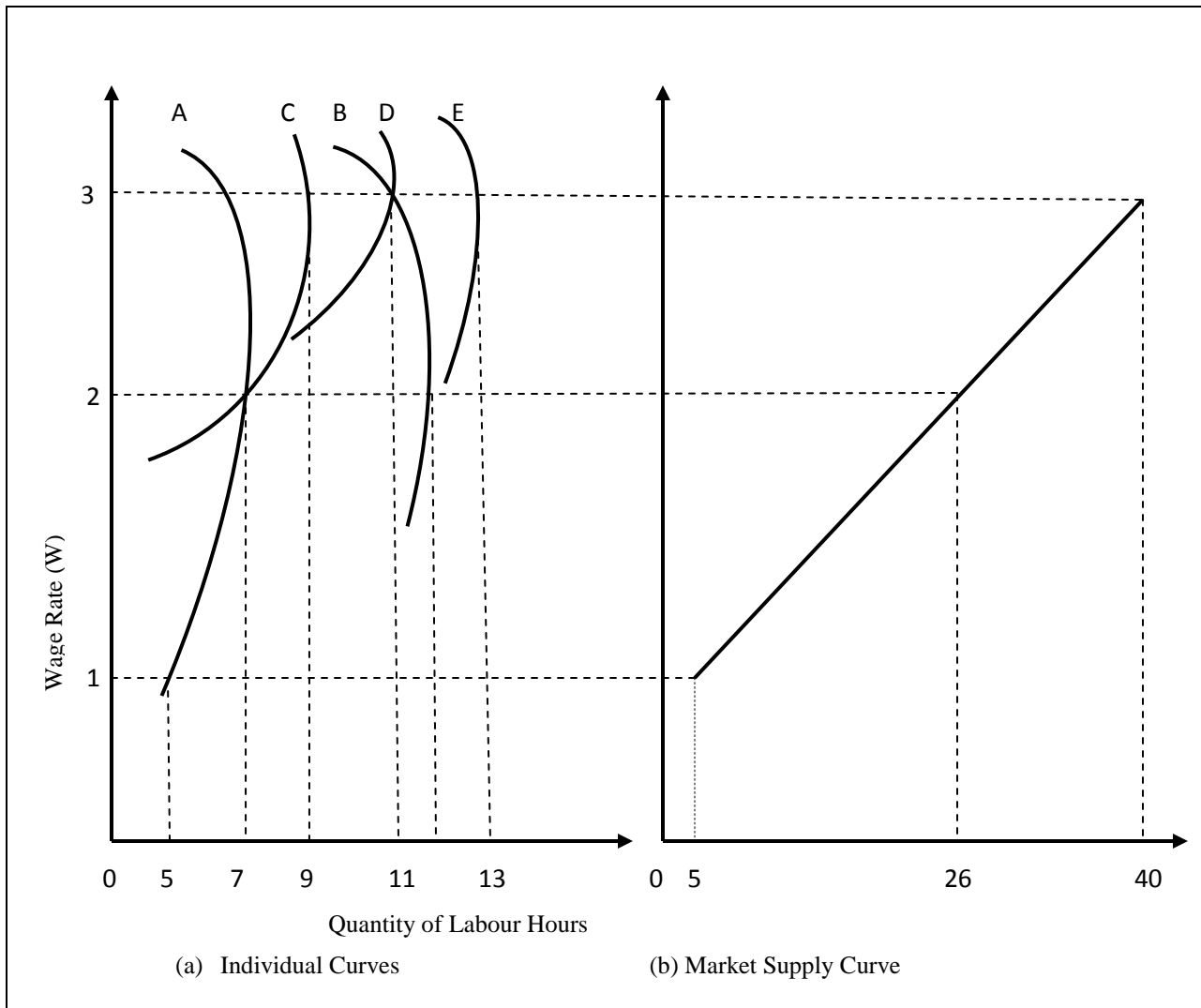
The theory states that most individual labour supply curves are backward-bending but market labour supply curves generally are positively sloped over realistic wage ranges (McConnell *et al*, 2009). Higher comparative wages draw workers away from households, leisure and previous employment. The height of the market labour supply gauges the opportunity cost of utilising the marginal hour in the current employment.

Graph (a) in Figure 3.2 shows a map of backward-bending individual labour supply curves for different workers in a market while (b) shows the summation of the curves horizontally to produce the market labour supply curve, assuming these are all the workers in the labour market.<sup>8</sup> At wage  $W_1$ , workers A and B will offer 6 and 11 hours of work respectively, such that total market supply of labour is 17 man-hours. Supposing the wage rate rises to  $W_2$ , *ceteris paribus*, worker A will increase work hours from 6 hours to 7 hours and worker B will provide 13 rather than 11 hours. At the same wage, a third worker, C, becomes willing to provide 7 hours of labour (enters the labour market). Thus the total amounts of work hours at  $W_2$  become 27 man-hours. If the wage were to rise again to  $W_3$ , A and B will choose to work less hours than before, (indicating a developing preference for leisure) while C increases labour hours to 9 hours. Workers D and E decide, at this wage rate, to join the workforce offering 12 and 14 hours respectively. The total labour supply is 54 man-hours at the third wage rate. Conclusively it can be noted that, despite higher wages causing backward-bending individual labour supply curves, the market supply curve is generally positively sloped.

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<sup>8</sup> Despite assuming that all workers are identical, it is concurred that they have varying preferences for leisure, non-wage income such that their reservation wages and individual labour supply curves differ (McConnell *et al*, 2009).

**Figure 3.2: Derivation of Market Labour Supply Curve**

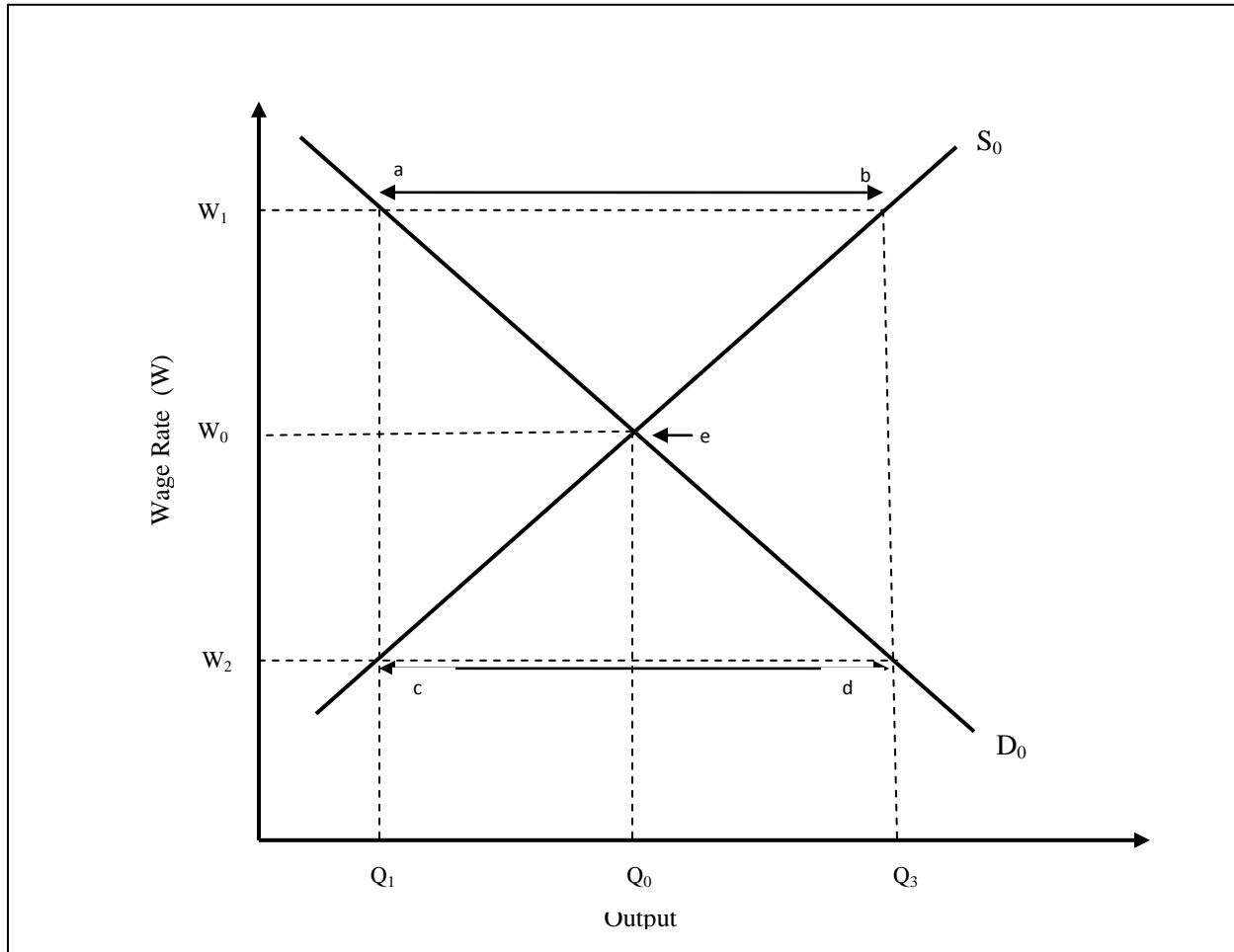


Source: McConnell *et al* (2009)

Figure 3.3 shows how the number of workers employed/quantity of labour is determined in the Classical model. The employment level in the market is determined at the intersection of the positively sloped supply curve and the inversely sloped demand curve. Employment level  $Q_0$ , which is the equilibrium employment level, occurs at market wage rate  $W_0$ . At this point, the market is assumed to be at its optimum, with neither excess supply of nor excess demand for labour. Supposing the prevailing market wage rate was to rise to  $W_1$ , it would render hiring workers more expensive such that firms will only want  $Q_1$  of labour while  $Q_2$  is supplied. The difference between  $Q_1$  and  $Q_2$  is excess labour supply. The amount actually employed at the new wage rate declines from  $Q_0$  to  $Q_1$ . Alternatively, if the wage rate were to decline to  $W_2$ , firms

will have an incentive to hire more workers, while the market reduces its supply. The quantity of labour demanded at the new wage becomes  $Q_2$ , while only  $Q_1$  quantities of labour are available.

**Figure 3.3: Employment determination**



Source: McConnell *et al* (2009)

The Classical model is criticised for having various significant shortcomings. According to Keynes (1936), contrary to the Classical view that wages and employment readily adjust to achieve equilibrium in the market *laissez faire*, workers resist wage cuts and thus wages are sticky downwards. Keynesian economics and their proponents argue that despite excess supply of labour in the market, workers who are already employed hold influence over the wages they receive and will resist any change to wages that they deem detrimental to their welfare or utility. Keynes (1936) also argued against the *Laissez faire* principle. The model stated that for

equilibrium to be achieved there was at least the need for intervention by government to offer fiscal stimuli that provide incentive to boost employment.

Neoclassical economists such as Alfred Marshall also questioned the *Laissez faire* as an ideal government policy. The Neoclassical economists disregarded the original classical cost of production theory and integrated it with utility to explain factor prices using marginal analysis. They introduced concepts such as price-elasticity and marginal concepts of utility, output and return as better determinants of the demand and supply of employment. Hence the Neoclassicals view individuals' capabilities in maximizing output value as a determinant of productivity and therefore allocation of resources and income distribution. On the other hand, the neoclassical economists concur that the market will ensure just allocation of resources eventually (Economics, 2012).

The classical model emphasizes theoretical concepts that have little significance to the labour market for clothing and textile employees in South Africa. Firstly, the labour market is a highly regulated one consisting of various agents such as government and labour unions whom are exogenous to the model. The classical economists also explain the existence of volatile wage and employment levels. In the South African scenario, wages are not as volatile as postulated by the theory neither do they diminish nominally. It can be concluded that in the operations of the labour market in South Africa, the classical approach is too simplistic and barely applicable.

### **3.2.2 Theories of Labour Demand**

The demand for labour is “derived demand”. In other words, it hinges critically on the level and nature of the demand for the final product or service. By implication, the technology of production is important in linking factor inputs, including labour, to output via the production function (Bosworth, Dawkins and Stromback, 1996). Labour demand can be viewed in the short run, long run and very long run, depending on whether capital and technology are considered to be fixed or variable. Given that the market structure has an important impact on the behaviour of a firm; it inherently becomes a strong determinant of the demand for labour.

### 3.2.2.1 The Neoclassical Marginal Revenue Productivity theory of labour demand.

The Neoclassical theory of labour demand is a short run labour demand theory. The short run is defined as a period too short for the quantity of the fixed factor of production to be changed. According to the theory, capital (K) is the constant factor input in the short run. The model also assumes that production takes place under conditions of variable proportions, meaning that labour and capital can be used in diverse ratios in the production process to yield identical output. In other words, in the short run, the firm can only alter its level of output by manipulating employment of labour. The model states that employers decisions to hire are based on costs and revenues rather than output and that the profit maximizing firm will unceasingly appoint labour up to the point at which the accumulation to total revenue (TR) attributable to the last unit of labour is just equal to its cost (Kreps, Martin, Perlman and Somers, 1980). The profit-maximising employment of labour occurs when

$$MR_L = MC_L \dots\dots\dots 3.0$$

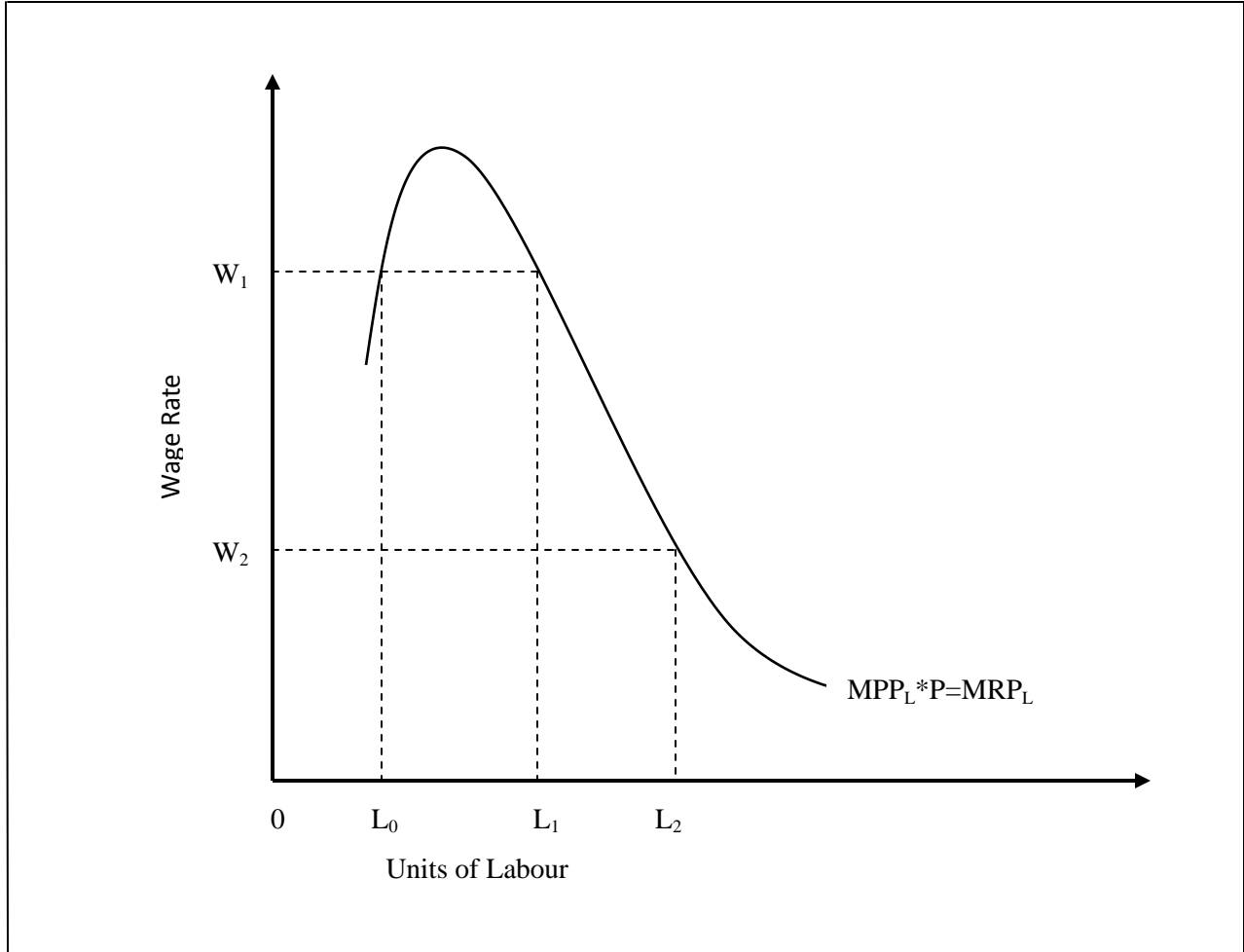
Where  $MR_L$  is the marginal revenue of labour and  $MC_L$  is the marginal cost of labour. The additional value contributed by the last work worker hired ( $MR_L$ ) equals the additional output, or marginal physical product ( $MPP_L$ ) resulting from the worker's labour multiplied by the marginal revenue from each of these added units of output (MR). The relationship is expressed as

$$MR_L = MPP_L \times MR \dots\dots\dots 3.1$$

Figure 3.4 shows the Law of diminishing marginal returns/variable proportions. As additional units of labour are added to the fixed amount of capital, total product (TP) increases initially by incremental amounts. This circumstance emanates from the element that a given portion of capital equipment is strategised to operate most efficiently with some precise volume of labour. Once this most proficient level has been attained, output will continue to increase, albeit by increasingly smaller margins as more workers are added. Finally a point will be reached beyond which further employment would cause a decrease in output. As a consequence, a bell-shaped production function is formed. From this production function the average physical product (APP) and marginal physical product (MPP) curves can be derived. The average physical product is defined as the total output divided by the number of workers employed. The marginal physical

product is defined as the change in the total physical product resulting from a change in the employment level.

**Figure 3.4: The Law of Diminishing Marginal Returns/ Law of Variable proportions**



Source: Sapsford, (1981)

Mathematically, the APP is the slope of the ray from the origin to a certain point on the total physical product curve. Similarly, the MPP at any point is the slope of the tangent to the total physical product curve. Initially, the rise in MPP occurs not because of the second employee outperforming the first one or being of higher pedigree<sup>9</sup>. Eventually however, as more workers

<sup>9</sup> This is ruled out by the inherent assumption of homogenous labour units.

are hired, the MPP will decline. For convenience purposes, it is assumed that the MPP of labour is always declining.<sup>10</sup>

From the profit-maximising decision rule, it is clear that the firm should keep increasing its employment of labour as long as labour’s marginal revenue product exceeds its marginal expense (Ehrenberg *et al*, 2006). Conversely, it should keep reducing its employment of labour as long as the expense saved is greater than the income lost. Profits are maximized, then, only when employment is such that any further one-unit change in labour would have a marginal revenue product of labour equals its marginal expense:

$$MRP_L = ME_L \dots\dots\dots 3.2$$

The amount incurred for each added employee by the firm is the marginal expense or marginal wage cost (MWC), defined as the change in total wage costs resulting from employing one more unit of labour (McConnell *et al*, 2009). Under the current assumption of competitive product and labour markets, the profit maximising level of labour can be symbolically represented as in equations 3.3 and 3.4:

$$MRP = MWC \dots\dots\dots 3.3$$

$$MP_L \cdot P = W \dots\dots\dots 3.4$$

Alternatively, both sides can be divided by product price, P, and the condition changes in terms of physical quantities to:

$$MP_L = W/P \dots\dots\dots 3.5$$

Where the physical dimension of marginal product of labour is equated to the wage rate divided by product price. Therefore the wage rate also includes a physical dimension.

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<sup>10</sup> Nothing is lost based on this assumption because a firm will never operate at points where the marginal product of labour is rising (Ehrenberg *et al* 2006).

Two main criticisms are brought up against the above labour demand theory. Primarily, no employers are ever heard mentioning the term “marginal revenue product of labour” within their organizational frameworks. Thus the theory assumes a degree of sophistication in employers that in reality the vast majority of them lack. Employers are unable, in most situations, to gauge accurately the output of individual employees. Therefore, the point emphasized is that employers (even those that understand the concepts of the theory) may still not be able to realistically apply it to their organizations (Ehrenberg *et al*, 2006).

The secondary criticism antagonizes the Law of variable proportions. It assumes that at a certain point, adding labour while holding capital constant would not add to output at all. It is in reality thought that even with fixed capital technology that seems to require one machine-worker; labour will generally have a marginal product greater than zero. An additional worker will always be able to expedite work when the primary worker is fatigued or temporarily absent from performing duties for example during lunch breaks.

Further criticism of the Marginal revenue productivity theory arises in its assumption of perfectly competitive labour and product markets. Rarely in reality are markets of such a nature for both commodities. Situations would arise were the product markets are non-competitive for instance, were the firm holds a degree of monopoly power in its product market. This would translate to a negatively sloped demand curve for its product, indicating that in order to sell additional units of output it must, in the absence of price discrimination, decrease the price that is charged such that marginal revenue (MR) becomes less than product price at each level of output. The firm’s MR curve is more steeply sloped than its average revenue (AR) or demand curve (Sapsford, 1981).

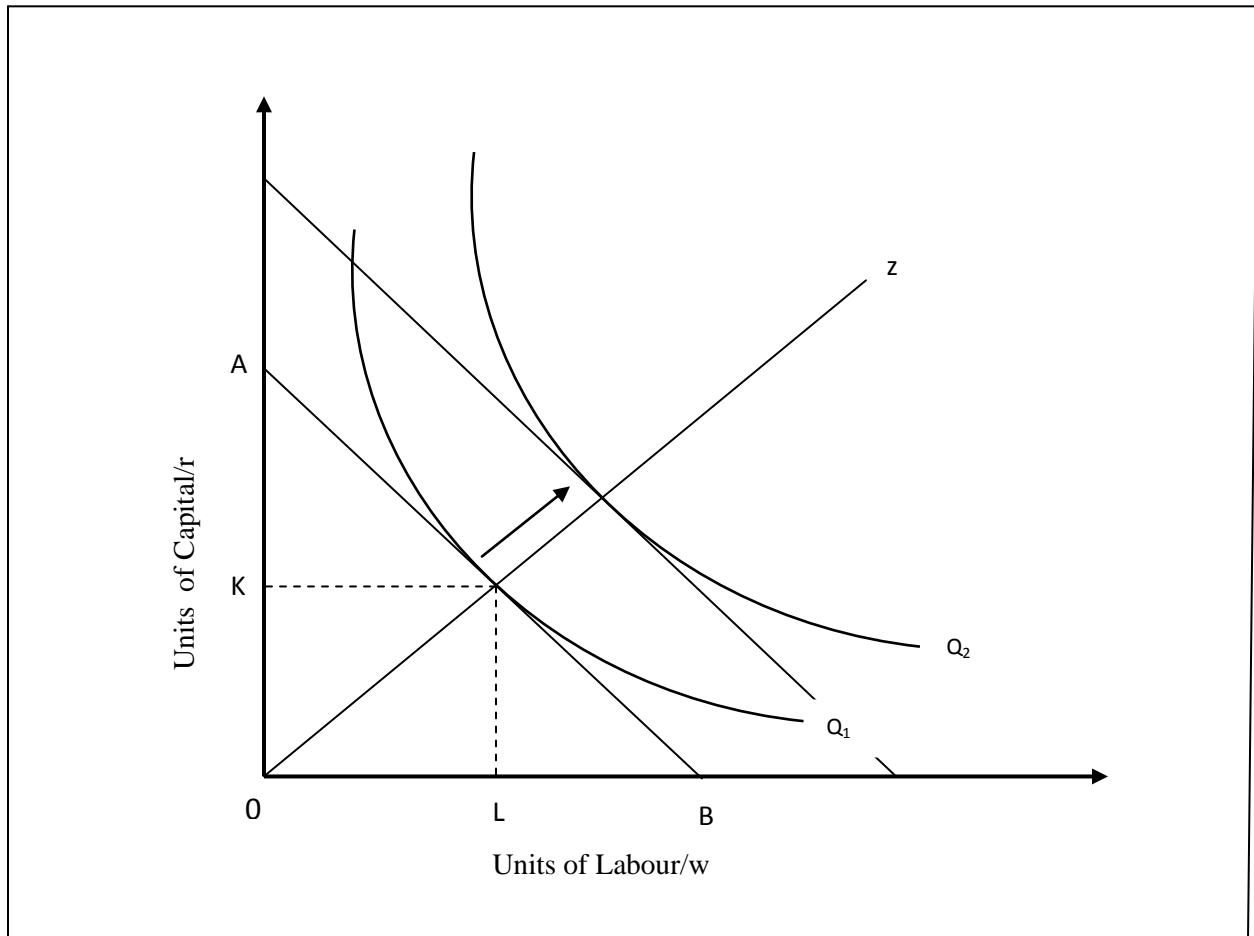
In the South African labour market, the productivity-based remuneration system is very rare. It is often associated with the agriculture sector but not many others. As a result of the existence of influential labour unions and the significantly volatile labour market, it is very difficult if not impractical for employers to implement the suggestions of the theory. In a sector where the output per employee is as complex to deduce as in clothing and textile manufacturing, the MRP theory would not apply to a large extent.

### 3.2.2.2 Demand for Labour in the Long run

In the long run the firm is, by definition, able to alter its inputs of capital stock as well as labour services. A firm in the long run is no longer constrained to changing output levels by merely altering the amount of workers used. To maximize its profits in the long run, the firm must consider both factors (assuming that capital and labour are purchased in perfectly competitive markets). The profit-maximising condition is shown on its isocost lines, which show the various combinations of capital and labour that can be purchased given the prices of the two inputs, will be linear of slope equal to minus one the marginal revenue product of each factor equated to its price (Sapsford, 1981). The argument here is that if the marginal revenue product of either factor of production were greater than its price, the firm could increase profits by increasing the employment of the factor in question. This is so because the increased employment and output would add more to revenue than to costs. Only when the marginal revenue product of each factor is equal to its price would it no longer be possible for the firm to increase profits by employing additional units of inputs.

If the firm were a cost-minimiser rather than a profit-maximiser, it would produce its output with the input combination represented by the point of tangency between its relevant isocost line and isoquant. Since the firm purchases both capital and labour in perfectly competitive markets, its isocost lines will be linear of slope equal to minus one the input price ratio. The negative of the slope of the isoquant is the marginal rate of technical substitution, which is the growth in one input per unit decrease in the other that is adequate to maintain a certain level of output (Sapsford, 1981). This can be shown to equal the ratio of the marginal physical product of labour to that of capital at the point. The first order condition for cost minimization is therefore that the ratio of price of labour to that of capital equal the ratio of marginal physical product of labour to that of capital.

**Figure 3.5 Long run expansion path (Least-Cost combination of Capital and Labour)**



Source: Sapsford (1981)

In figure 3.5 AB is the isocost line, and the firm minimizes costs of producing level of output represented by isoquant  $Q_1$  by using the input combination K units of capital and L units of labour. The locus of tangency points OZ shows the firm's cost-minimizing input combinations, given prevailing input prices for each output level. This is known as the Long run expansion path. At each point on the long run expansion path, the input price ratio equals the ratio of the inputs' marginal products or the Marginal rate of technical substitution (MRTS) of capital and labour (McConnell *et al*, 2009). At equilibrium, the slope of the isocost line is the same as that of the isoquant curve.

The slope of the isoquant at any point being the MRTS which can be defined as:

$$MRTS = \frac{-\Delta K/\Delta Q}{\Delta L/\Delta Q} \dots\dots\dots 3.6$$

The equation directly infers that the MRTS is the fraction reflecting the reduction of capital required to lessen output by one unit if enough extra labour is hired so that output is tending to increase by one unit (Ehrenberg *et al*, 2006). The equation can be rearranged to be:

$$MRTS = \frac{-\Delta K/\Delta Q}{\Delta L/\Delta Q} = -\frac{\Delta Q/\Delta L}{\Delta Q/\Delta K} = -\frac{MP_L}{MP_K} \dots\dots\dots 3.7$$

Where  $MP_L$  and  $MP_K$  are the marginal productivities of labour and capital respectively. At equilibrium (cost minimization point), it therefore holds that:

$$MRTS = -\frac{MP_L}{MP_K} = -\frac{w}{r} \dots\dots\dots 3.8$$

The economic logic behind the cost minimization characteristics can be stated as:

$$\frac{\Delta K}{\Delta Q} r = \frac{\Delta L}{\Delta Q} w \dots\dots\dots 3.9$$

The equation simplifies the cost minimising scenario by deducing that, the cost of producing an extra unit of output by adding labour must equal the cost of producing an additional unit of output by employing more capital. If these costs are varied, the firm can reduce total costs by expanding employment of labour or capital. At any point where costs can still be minimised, then employment is not optimal (Ehrenberg *et al*, 2006).

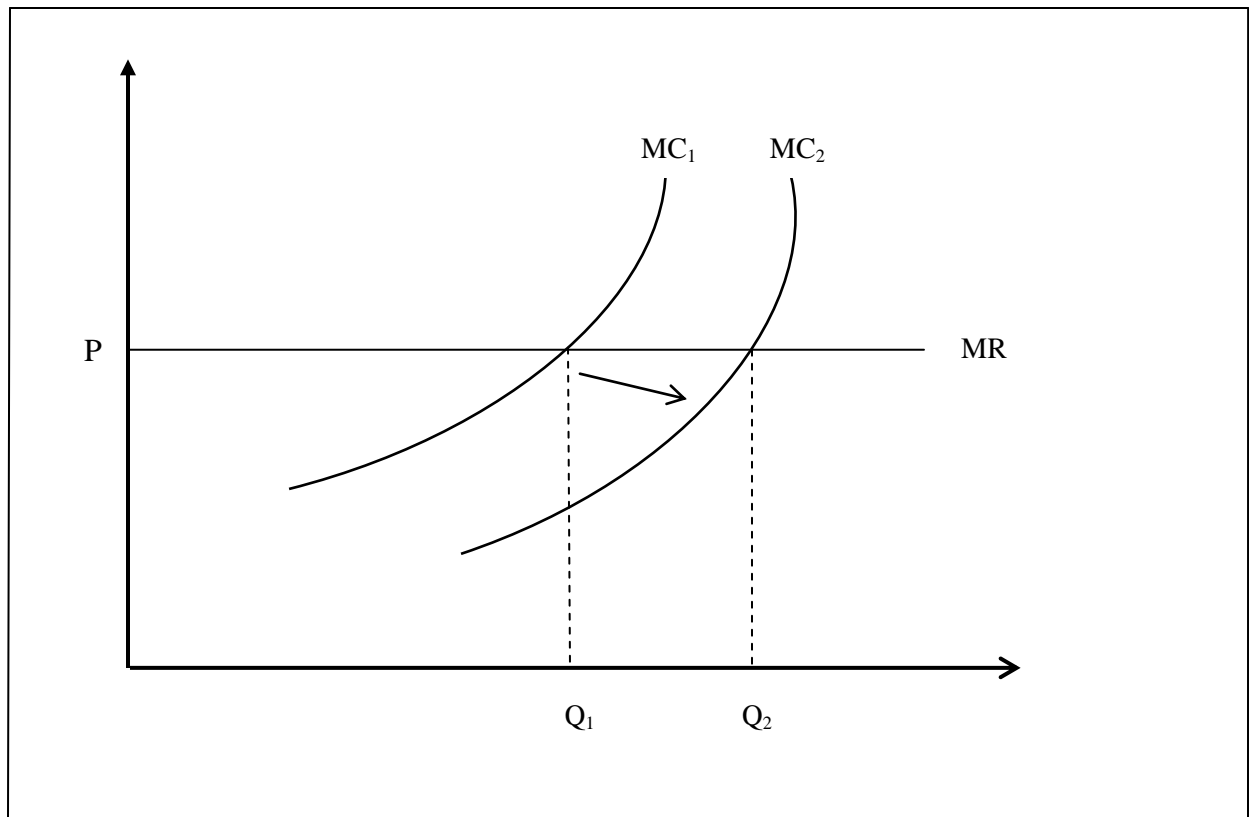
The long run demand curve is derived from the long run production function assuming labour and capital are the only factors of production:

$$TP = f(L, K) \dots\dots\dots 3.10$$

The long run labour demand curve is defined as a schedule indicating the amount of labour that firms employ at each possible wage when both capital and labour can be varied. It is inversely inclined because the wage change causes a short run output effect and a long run substitution effect, which together alter the firm's level of optimal employment (McConnell *et al*, 2009).

Long run effects of changes in factor input costs can be studied further by disaggregating long run movements into scale and substitution effects. In the Figure 3.7, OX is the firm's expansion path. The movement along the firm's expansion path is known as the output or scale effect of a wage change. It can be defined as change in employment resulting solely from the effect of the wage change on employer's costs of production (Barker, 2007). This is a short run phenomenon. It represents the increase in labour hired, with relative prices fixed. Under normal scenarios, a drop in the wage rate moves a firm's marginal cost curve downwards like  $MC_1$  to  $MC_2$  in Figure 3.6. This means the firm can produce additional output at less cost than before. The reduced  $MC_2$  relative to the firm's marginal revenue (MR) means that MR now exceeds MC for all quantities between  $Q_1$  and  $Q_2$ . Applying the profit maximizing condition, it becomes more reasonable and profitable to increase output to  $Q_2$ . Since this is the short run, it can only be achieved by increasing labour (McConnell *et al*, 2009). As seen in Figure 3.7, the scale effect of the decline from  $W$  to  $W_1$  results in more labour employed from  $L_Y$  to  $L''$ .

**Figure 3.6 The Output Effect of a wage fall**



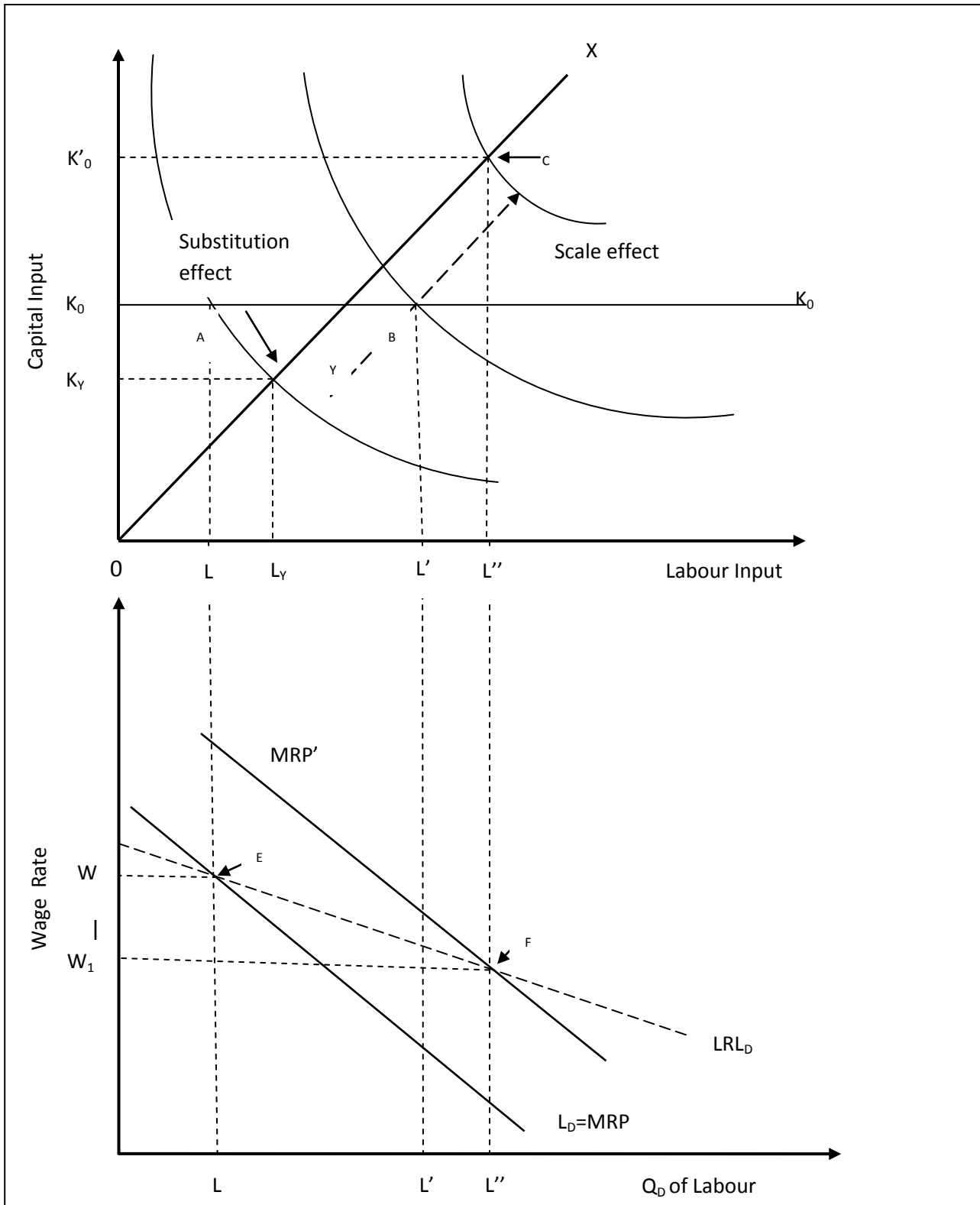
Source: McConnell *et al* (2009)

In figure 3.7, if the firm were a cost minimiser, then as a consequence of reduction in wage costs, it would move down the lowest lying isoquant to the new cost minimizing position at Y. At this point there is intersection of the relevant isoquant curve and the firm's expansion path. The movement occurs because labour has become relatively cheaper compared to capital and will be used in greater proportion. This shift is called the substitution effect because it replaces capital usage with labour. It can also be defined as the change in employment resulting solely from change in the relative price of labour, output being held constant (McConnell *et al*, 2009). The substitution effect of a wage decrease will always result in greater employment of labour (Sapsford, 1981). In the short run, capital is fixed, and therefore substitution cannot occur. This implies that the short run reaction to a change in labour costs will be less than the long run reaction. This indicates that the long run demand curve is relatively more elastic compared to the short run demand curve. The greater the ease of substitution, the greater will be the elasticity for the input (Lipsey and Chrystal, 2009). In the long run, it is therefore possible, as a result of a decrease in labour costs, to increase the usage of both capital and labour factors.

To derive the firm's long run labour demand curve, it is assumed the firm is a perfect competitor in its product market and that initially; equilibrium is at point A in figure 3.7. Thus at A, the MRTS equals the price ratio of capital and labour ( $w$  and  $r$ ) respectively. If the wage rate fell from  $W$  to  $W_1$ , the firm would maximize profits in the short run by expanding employment of labour, with capital fixed along  $K_0K_0$  to  $L'$  hours at point B, where the new wage equals labour's MRP. The increase in labour results in increase in marginal product of capital. With the given price of capital ( $r$ ), the firm finds its self in the position where the  $MRP_K > r$ . Therefore, in the long run it will seek to increase its employment of capital inputs in order to reach the new long run equilibrium.

The increase in capital inputs results in increase in labour's MPP with the consequence of shifting its MRP curve outwards, such that at each wage rate the firm tends to expand its employment of labour. However, the increase in labour in turn raises the  $MRP_K$  which results in further employment of capital and a further outward shift in labour's MRP curve. When all these effects have been accounted for, the  $MRP_L$  will have shifted to  $MRP'$  and the long run equilibrium will be attained at point C. Points E and F are both on the firm's long run demand curve for labour to create the  $LRL_D$ . It can be noted that the firm's long run demand for labour curve is not the  $MRP_L$  curve as in the short run instance.

**Figure 3.7 Derivation of Long-run labour demand curve**



Source: Sapsford (1981)

### 3.2.3 The Theory of union wage effects

Unionism causes a surge in wage differentials between unionized and non-unionised sectors, thus causing differentials in employment demand (Barker, 2007). Presuming there are two groups of employees matching in every respect except that one group is unionized and the other are not. Let  $W_u$  denote the wage paid to unionized workers and  $W_n$  paid to non-union workers. If the inconsistency between the two could be attributed solely to the existence of the union, then the *relative wage advantage* ( $R$ ) that unions would have achieved for their members would be given in percentage terms, by

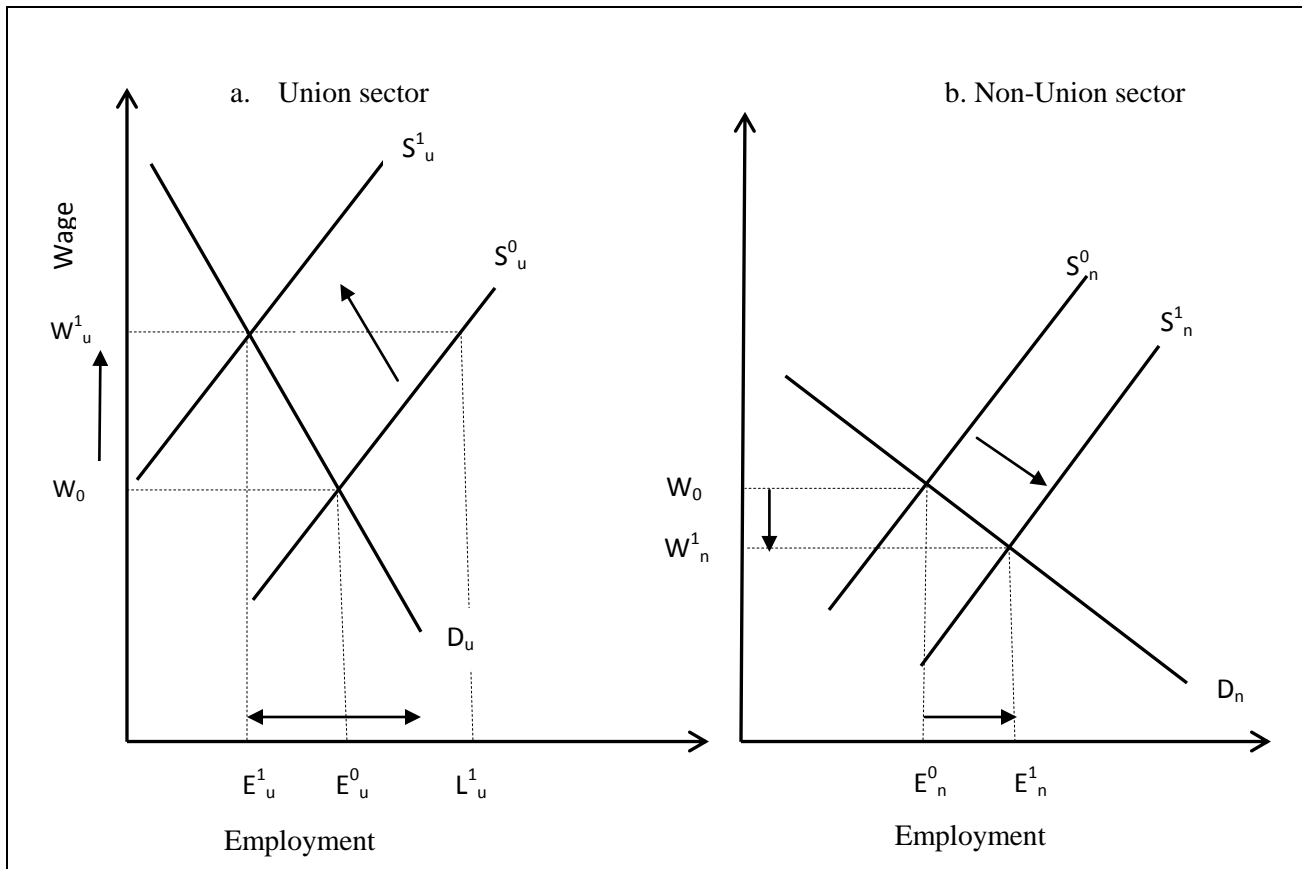
$$R = (W_u - W_n)/W_n$$

This relative advantage does not signify the outright amount, in percentage terms, by which union would have increased the wages of its members, because unions both directly and indirectly impact the non-union wage rates also. Moreover, it cannot be said for sure whether estimates of  $R$  will overstate or understate the absolute effect of unions on their members' real wage levels. To illustrate the complexities in interpreting union/non-union differentials, Figure 3.8 shows a simple model of the labour market.

Figure 3.8 represents two sectors of the labour market, both of which hire similar workers. Panel (a) is the union sector while (b) is the non-union sector. Suppose that initially both sectors are non-union and that mobility between them is costless. Workers will therefore move between the two sectors freely until wages are equal in both. With demand curves  $D_u$  and  $D_n$ , workers will move between the sectors until the supply curves are  $S_u^0$  and  $S_n^0$ , respectively. The common equilibrium wage will be  $W_0$ , and employment will be  $E_u^0$  and  $E_n^0$ , respectively in the two sectors.

Once one sector becomes unionized and its wage rate rises to  $W_u^1$ , the consequential wage in the other sector depends on the reactions of employees who are not employed in the unionized sector. The possible reactions are discussed below.

**Figure 3.8 Spillover effects**

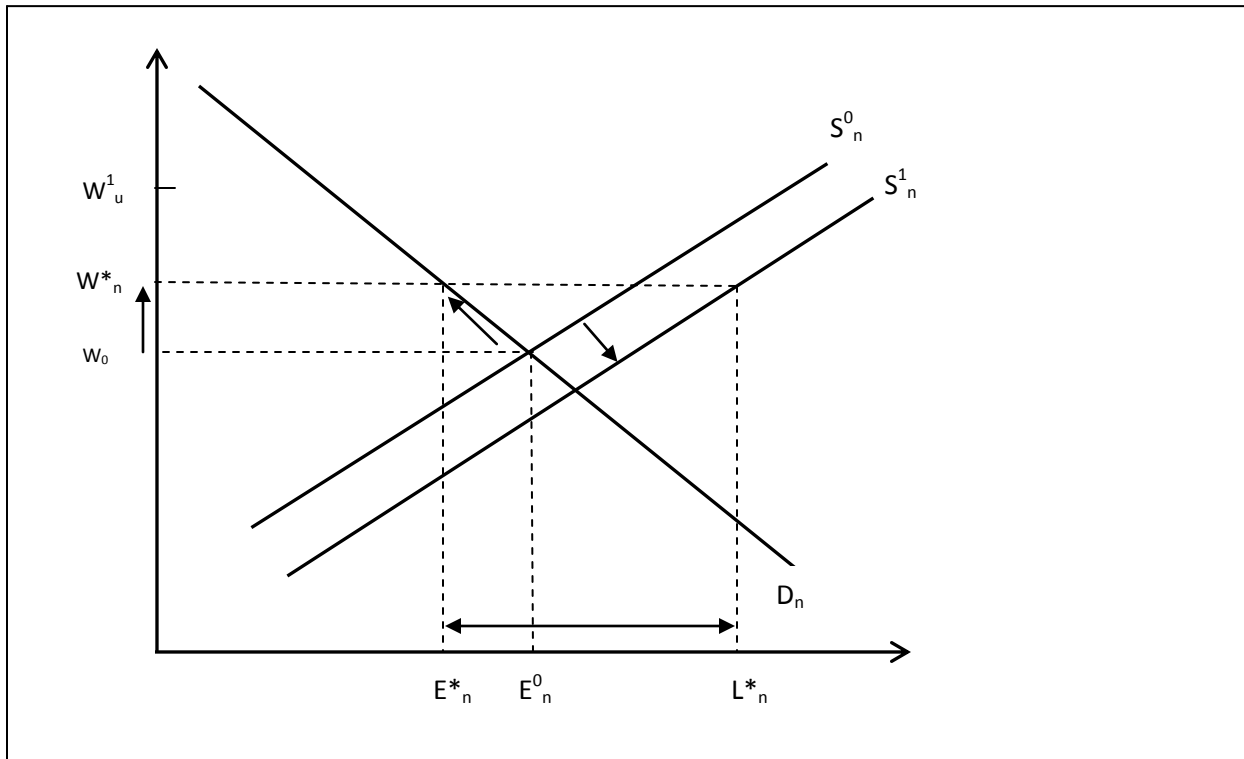


Source: Ehrenberg and Smith (2006)

If the union succeeds in raising wages in the union sector to  $W_u^1$ , this will cause employment to decline to  $E_u^1$  resulting in  $L_u^1 - E_u^1$  unemployment. If all the unemployed spill over into the non-union sector, the supply curves will shift to  $S_u^1$  and  $S_n^1$  respectively. Unemployment is eliminated in the union sector but excess labour supply exists at the old market clearing price  $W_0$  in the non-union sector. Downward pressure on wage rate will be exerted in the non-union sector until the market clears at a lower wage rate  $W_n^1$  and higher employment  $E_n^1$ . In this model context, the union has succeeded in raising the wage rate for its members who kept their jobs. However, it has done so by shifting some members to the non-union sector, and because of these spill-over effects lowering wage rates in the non-union sector (Lewis, 1963).<sup>11</sup>

<sup>11</sup>In figure 3.8 the analysis is a two-sector model with labour supply curves to each sector. Labour supply is derived holding alternative wages constant.

**Figure 3.9 Threat Effects**



Source: Ehrenberg and Smith (2006)

Figure 3.9 shows threat effects on demand for labour that result from the existence of unions in the labour market. Threat effects refer to the increase in non-union wages offered by employers in response to fear of unionism (Barker, 2007). Another probable reaction by non-union employees is to want a union to represent them as well. Non-union employees, fearing that the union would amplify labour costs and limit management prerogatives, might seek to buy off their employees by offering above-market wages (Farber, 2003). Because there are costs associated with union membership, some wage less than  $W_u^1$  but more than  $W_0$  would presumably be ample to assure employers that the majority of employees would vote against unionism (assuming non-wage employment conditions are satisfactory). In response to the threat, non-union employers are assumed to raise wages to  $W_n^*$  (between  $W_u^1$  and  $W_0$ ). This causes non-union employment to decline to  $E_n^*$ ; at the higher wage rate non-union employers demand less workers. Moreover, since the non-union wage is now not free to be bid down, an excess supply of labour  $L_n^* - E_n^*$  exists, resulting in unemployment (Lewis, 1963).

Despite all these possible theoretical outcomes materializing, the question still stands: - do workers who lose their jobs in the union sector necessarily look for jobs in the non-union sector? Even with diminished employment in the union sector, vacancies occur due to retirements, deaths, voluntary turnover. Some find it lucrative to seek employment in the union sector and might opt not to be employed elsewhere at that moment. Workers who shun lower paying non-union jobs, while they search for higher paying union jobs, generate a phenomenon known as Wait Unemployment. The main behaviour behind Wait Unemployment response is that workers will move from one sector to another if the latter offers higher expected wages. Expected wages in a sector are equal to the sector's wage rate multiplied by the probability of finding employment. Thus even if one is guaranteed of employment in the lower paying non-union sector, rejecting it might be beneficial if there is reasonable probability (albeit  $< 1$ ) of attaining higher paying employment. Not everyone who loses their job spills over to the non-union sector; in fact, it is theoretically possible that some workers originally in the non-union sector would quit their jobs to take chance in the union sector. The presence of wait employment in the union sector will reduce the spill-over of workers, thus moderating downward pressure on non-union wages. Moreover, if non-union workers decide to search for union jobs, the labour supply curve in the non-union sector could even shift to the left. In this case, unionization in one sector could cause wages in the non-union sector to rise (Mincer, 1976).

The theory of union wages faces various criticisms. The existence of asymmetric information may render the labour market reactions that occur in reality different to those suggested by the theory, or at least not to identical degrees of changes. Workers may wish to bargain but doubt management's willingness to be completely truthful. In reality, management does know more about the profitability of the firm than the unions such that by withholding this information, unions moderate their wage demands based of information asymmetry. On the other hand, another implication of the asymmetric information model is that greater uncertainty about an employer's willingness and ability to pay for wage increases should raise both the probability and duration of strikes and/or bargaining processes. It would therefore appear that the more variable a firm's profitability is over time, *ceteris paribus*, the greater the uncertainty will be, and the greater will be the incidence and duration of strikes (Kuhn and Gu, 1999).

Another criticism of the theory is the existence of three major parties to bargaining rather than two. On the employee side, there are usually two parties to negotiations: union leaders and the ordinary members. The ordinary members rely completely on their leader for information (Ashenfelter and Johnson, 1969). Hence information asymmetries also exist internally in the union camps. Union leaders have better information about negotiations and proceedings compared to ordinary union members. If offered a smaller than demanded settlement, the union leaders have two options. On one hand, the union leaders based on their perspectives and stance may recommend that the offer be accepted to the employees. Conversely, the union leaders may take the militant stance and provoke strike action regardless of any succeeding outcome. The latter strategy is often assumed since it brings an impression of strength on the part of the leaders. This is so regardless of the interests of the union members.

Threat of arbitration is another phenomenon that disqualifies the operations of the theory of union wages as originally stated. In most cases, legislation provides that neutral third parties enter the dispute-resolving process if bargaining is at impasse. The process involves mediation and if non-coercive methods fail to bring voluntary settlement, arbitration occurs. The arbitration may be heard by one person or by a panel which will bind both parties by law to act in the manner prescribed by the arbitration body. The responses in the labour market depend upon the actions of the arbitration body (Crawford, 1981).

### **3.3 Empirical Literature Review**

This section of the study analyses literature on studies that have been done on the determinants of labour demand and employment in the manufacturing sector. There exists a large body of literature (mainly in developed countries) on the topic with different results. In this study empirical literature is classified according to the country of origin or study area.

#### **3.3.1 Literature from developed countries**

Empirical studies from developed countries have led the debate on labour demand and employment determinants. These studies include, among others, Freeman and Medoff (1982), Hamermesh (1993), Berman, Bound and Griliches (1994), Bruno, Falzoni and Helg (2005) Onaran (2008).

Freeman and Medoff (1982) in a study of the substitution between production labour and other inputs in unionised and non-unionised manufacturing, sought to determine the elasticity of demand for labour in American manufacturing and the economic effects thereof. The study was conducted for the period 1968 to 1975. It sought to test the impact of union-induced wages (union wage effect) on employment. Manufacturing was divided by Standard Industrial Classification (SIC). The study was based on sample data, collected between 1968 and 1972, of manufacturing establishments. It was supplemented by data from the 1972 Census of Manufacturers and 1973-1975 Current Population Surveys (CPS). Furthermore, labour was disaggregated into production and non-production labour. Based on the Hicksian formula, the study estimated labour demand equations using translog cost functions. The results showed that, with unionised production labour, strong substitution existed with capital while that for non-unionised production labour was slightly less. For unionised non-production labour, the substitution for capital was less than that of non-unionised members of the same group. The findings for the primary group were consistent with the Theory of union wage effects while those for the secondary group were inconsistent with the underlying principles of the theory.

Hamermesh (1993) estimated the own-wage demand elasticities of labour as a generic input (labour undifferentiated by skill level). The studies were undertaken in British manufacturing firms for the period 1974-1982. The estimates discussed were based on studies that used wage, output and employment data from firms. Periodic data was collected from the firms and aggregated to form industry time series trends. The studies intended to determine a typical response, but not one that would occur in all individual firms per se. The study therefore sought out industry rather than firm based reactions in the variables. The research broke down the reactions into scale and substitution effects. The study therefore equated short run estimates of elasticity of labour demand to only the scale effect while substitution effects were regarded analogously as long run elasticity. The study estimated labour demand elasticity using the Vector Autoregressive (VAR) technique. The methodology implemented in the study provided various relevant strengths. The primary advantage is that the VAR solved the possible endogeneity bias that may have occurred. The autoregressive model also reduces the risk of misspecification. Conversely, the large number of equations generated during regression analysis would create, at the least, some form of identification problem. The study estimated short run labour demand elasticity of -0,53 and long run elasticity of -0,45. Thus in the short run, if wages rose by 1%

point, employment declined by 0,53% while in the long run the decline was 0,45%. Conclusively, the wage increases show the scale effect overshadowed the substitution effect, typical of capital growth in developed countries. The study concluded that the short run labour demand curve could be considered inelastic. These findings can be supported by the demand for labour in the Long run approach that weigh the total effect of wages from the balance between the substitution and output effects.

In a study on changes in the demand for skilled labour within U.S manufacturing, Berman, Bound and Griliches (1994) investigated the shift away from unskilled workers in the United States manufacturing industry between 1979 and 1989. The study was primarily concerned with the substitution of productive labour for more advanced production technology. The study sought to explain the introduction of production labour-saving technology as the source skills-based changes in demand for workers. The studies covered 450 intra-industry manufacturing firms and were conducted based on panel data consisting of Current Population Surveys (CPS) data, Employment cost index for 1979-1989, Annual Survey of Manufacturers (ASM) and the Census of Manufacturers. The study used a qualitative approach through graphical and diagrammatic representations of data and trends. The advantage gained was the simplicity in analysis of trends. Although effective, this methodology ignores any tests for causality and directions of relationships among variable. The research showed a drop in employment of unskilled production workers in U.S manufacturing of 15 percent from 14.5 to 12.3 million, while technology based employment rose 3 percent, from 6.5 to 6.7 million. The results of this study were compatible with the theoretical perspective of labour demand in the long run under perfectly competitive markets which suggests a shift or substitution of high cost input for the lower cost input. Theory proposes that increase in capital input would not deplete the entire employment of labour but may trigger further employment to operate the technology.

Bruno, Falzoni and Helg (2005), estimated a dynamic labour demand equation using small, unbalanced panels in Italian manufacturing sectors. The data comprised 31 sectors with an average group size of 24 time observations. The estimator adopted was the Least Squares Dummy Variable Estimator (LSDVE) corrected for the finite-sample bias. The model allowed for the presence of employment adjustments cost and globalization effects. The globalisation variable included two possible effects, that is, a direct effect of on labour productivity and the

role played by international exposure in the labour market as a force of boosting the responsiveness of labour demand to wage changes regardless of economic structures. The study methodology had several disadvantages. Firstly, the LSDV estimator for dynamic panel data models is not consistent. Secondly, the cross-sectional dimension of the data can be considered small for nationwide analysis. Finally, the unbalanced nature of the panel did not permit in-model correction using bias approximation. The estimated coefficients on lagged employment, thus short run and long run labour demand, were significantly negative. This is supported by the underlying theories of labour demand both in the long run and short run. The study though, found no evidence of the impact of globalization in the labour demand equation.

Onaran (2008) studied the effect of import penetration on labour market outcomes in the Austrian manufacturing industry for the period of 1990-2005. The study estimated the effects of imports on employment, wages and the wage share in Austria. The research used panel data of the manufacturing industry. Imports were disaggregated according to their origin. The study also distinguished between final and immediate exports. Imports included those of capital commodities used in manufacturing. Empirical methodology was panel data based on 21 sub-sectors of the manufacturing industry. The study adopted a twin-equation model for labour demand and wage bargaining which was solved simultaneously using the Two Stage Least Squares (2SLS) technique. This approach, opposed to Ordinary Least Squares (OLS), eradicates simultaneity bias generated by regressing endogenously related variables. Although it results in the generation of multiple equations as a disadvantage, it is not too strenuous to interpret. The resultant single equation model was estimated using the OLS approach. The results showed significant negative long run effects of intermediate import penetration on employment in total manufacturing particularly for the high skills sectors. Import penetration rose 4.6% during 1990-2005 and a cumulative 20.9% decline in employment resulted. In the low skills sector, the same variable had positive effects on employment via scope changes. These findings are supported by the theory of labour demand in the long run, where via derived demand substitution of local goods for imported goods would reduce the demand for workers to produce domestically. Alternatively, the positive growth in employment could be supported by the scale effect occurring as a result of growth in capital structures and bases of the local manufacturing industry.

It can be concluded that the empirical studies reviewed from the developed country perspective generally come up with consistent and common findings among them. The majority of the studies such as Freeman and Medoff (1982), Hamermesh (1993) and Bruno, Falzoni and Helg (2005) were consistent in concluding the negative impact of wage increases on the demand for labour. Berman, Bound and Griliches (1994), on the other hand, found no evidence supporting the conclusions of the other researchers. It is prudent, though, to realise that the variations in some of the evidence provided can stem from the fact that developed economies are at different scales. While the bracket term remains, some countries are more developed than others and therefore the relevant economic phenomena react differently.

### **3.3.2 Literature from developing countries**

While studies from developed countries have covered more ground extensively on labour demand issues, relatively fewer studies have been conducted in developing countries. The employment problem is a universal one thus research in less developed economies has also been carried out. Studies such as Teal (1995) Roberts and Skoufias (1997), Heshmati and Ncube (2003) and Alessandrini (2009) have provided some literature on the topic.

Teal (1995), conducted the study on real wages and the demand for labour in Ghana's manufacturing sector. The intention was to find out whether the flexibility in wages, given that Ghanaian real wages had fallen substantially over the preceding 20 years, meant a more competitive market clearing labour market existed. The study was conducted for the period 1969-1994 and utilised wage data collected from employment surveys through the period. The data excluded non-wage benefits as cost of labour. The OLS approach was utilised as the estimation technique. The study yielded estimates results that were both biased and inconsistent by using OLS on a system of equations that were related. The existence of demand, supply and wage variables increased the possibility of endogeneity and identification problems. Labour demand was modelled as a function of factor prices, capital and output. The study revealed results of labour-capital substitution of -0,86 and concluded it not to be significantly far from unit. The study also found evidence that a positive relationship, albeit a weak one, existed between the demand for labour and output generated. The results were in line with the long run demand for labour theory. The study also produced results consistent with those later produced

by Heshmati and Ncube (2003). Roberts and Skoufias (1997) had consistent results despite the relatively different socio-economic phenomenon between Africa and South America.

Roberts and Skoufias (1997) investigated the long run demand for skilled and unskilled labour in Colombian manufacturing plants. Empirical work utilized micro data for a panel of plants that was collected as part of the Colombian Manufacturing Census for the years from 1982 to 1987. The study's primary focus was therefore, plant level demand for labour disaggregated into skilled and unskilled labour and focused on estimation of the own-wage and output elasticities. The methodology also allowed for measurement of the full cost of workers in the plants, including mandated and voluntary fringe benefits and other supplements to wages. The estimation models used were Ordinary Least Squares (OLS) demand equations for both skilled and unskilled workers by plant. For skilled workers, the results showed an own-wage elasticity of -0,279 whereas for unskilled labour it was -0,564. The output elasticities for skilled and unskilled labour groups were 0,733 and 0,661 respectively. The results were consistent with economic theory. The study results were also largely consistent with preceding empirical studies from other developing economies.

In the study on rising wages and declining employment in the Brazilian manufacturing sector in the 1990s, Chamon (1998) aimed at studying employment trends in the country in a decade that comprised recessions, recoveries, hyperinflation, trade liberalisation, failed stabilisation policies and overvalued exchange rates. In the midst of all these, a strong trend of rising wages and employment decline persisted. Rapid growth in productivity in manufacturing was a trend that astonished many economists during the period. The paper sought to explain all these behaviours and also included a test for substitution of labour by capital. The study used a Generalised Leontieff (GL) cost function with constant returns to scale. The Shephard's Lemma was applied to the cost minimising function and subjected to Ordinary Least Squares (OLS) technique. The results showed elasticity of substitution between labour and capital above unit. The results were consistent with trends in newly fast growing economies where capital and technology is being adopted at fast rates as alternative to labour. The results in the study were consistent with Roberts and Skoufias (1997) and only differed on the degree of impacts of variables upon one another.

In a related study on wage elasticity of labour demand in the Uruguayan manufacturing sector, Cassoni (1999) sought to provide new evidence on the magnitude of the elasticity of substitution between labour and capital for the Uruguayan manufacturing sector. The study was applied to the period 1985 to 1997. Data from six different industries were used. Data on output, number of workers and wages were obtained from Quarterly and Annual Industrial Surveys (National Institute of Statistics-INE). In the second model, employment and wage data were collected from household surveys. The Engle-Granger (1987) cointegration test procedure was applied as the estimation technique. The results showed elasticity not statistically different from unit. The results conformed to the Long run demand for labour model where changes in wages would trigger substitution between labour and capital. These results also supported the findings by Chamon (1998). This convergence in the results can be possibly a result of the similarity in the socio-economic demographics of the two economies.

Heshmati and Ncube (2003) conducted studies on the employment in Zimbabwean manufacturing industries for the period from 1970 to 1993. A flexible labour demand function was used consisting of two parts: the traditional labour demand function and a labour demand variance function with labour demand as a function of wages, output, quasi-fixed inputs and other time dependent variables. Data was a balanced panel of 10 manufacturing industries observed during the period 1970-1993 obtained from issues of the Zimbabwean Quarterly Digest and Census of Production publications. A four step generalized Ordinary Least Squares estimation procedure was utilized. The results showed responsiveness to wages in textiles of -0,352. The sample mean in respect to output was 0,089. Counter to research from developed countries, the study found that a 1% increase in capital stock led to a 0,08% increase in labour demand. The wage and capital stock effect on employment/demand for labour are also consistent with economic theory.

In a related study focussing on jobless growth in Indian manufacturing, Alessandrini (2009) analysed the employment problem that persists in India using the Kaldorian approach. Linkages between agriculture and manufacturing were considered to flow into the manufacturing labour demand through changes in terms of trade between the two sectors. The study used dynamic panel data sets on the registered manufacturing firms from 15 major Indian states over the period 1980-2004. A log-linear and differenced labour demand function was used as the analytical tool.

The study discovered evidence that during the relevant period, Net State Domestic Product recorded mean growth of 5 percent. Despite the positive growth performance, the impact on manufacturing employment growth was modest at an average of 0,5 percent across the states. It was concluded that growth in industrial output was in fact sustained by labour productivity growth rather than labour demand growth. These findings refute the derived demand principle and contrast findings by Heshmati and Ncube (2003).

The impact of trade liberalisation on the demand for workers was assessed in Egypt by Nazier (2012). The study focused on the impacts of trade liberalisation policies implemented since 1986 and the Economic reform and Structural adjustment program (ERSAP) of 1991. The study adopted firm-level cost minimisation equations including labour costs, capital costs, production levels and time variables. A General Least Squares estimation model was implemented using data from 18 manufacturing sectors. The results showed that labour demand was insignificantly responsive to trade liberalisation. The conclusion was that the results were caused by the job security measures in the labour market.

Rodriguez (2013) studied the determinants of labour demand in the Colombian manufacturing sector for the 2000 to 2010 period. The demand for workers was disaggregated into professional, administrative and blue-collar. Data from 134 groups of industries collected from the Annual Surveys of Manufactures was utilised and VECM were estimated. The findings showed that demand for blue-collar workers showed the largest adjustment time and was most sensitive to changes in labour costs. Demand for professional and administrative workers was more sensitive to changes in production.

In conclusion, the studies reviewed on developing countries offer more diverse findings on the concept of labour demand and its determinants. A general consensus exists on the adverse impact of wage increases on the demand for workers in developing countries. Findings on the impacts of other variables such as output and capital growth diverge among these similar economies. Similarly, the varying reactions may be centred on the nature of the economies themselves. Developing countries follow and lie along a wider scope in terms of common economic behaviour. These variances in the socio-economic phenomena of the countries may account for the diverging findings.

### **3.3.3 Literature from South Africa**

Limited empirical work has been conducted in South Africa on the determinants of the demand for labour in manufacturing. South Africa has unique socio-economic trends compared to other African countries and other economies of equal scale. The studies conducted in South Africa are Moolman (2003), Borhat (2003), Behar (2004), Edward and Behar (2005) and Dunne and Edward (2006).

In a study on the econometric analysis of labour demand at an industry level in South Africa, Moolman (2003) focused on different Standard Industrial Classification (SIC) groups. The study addressed the period 1970 to 2000 using thirty annual observations. Co-integration econometric techniques were used to determine dependent long run relationships between the variables using time series data from the relevant period. The study divided employment into three categories: Highly skilled, Skilled and semi to unskilled labour. The results showed that a 1 percent increase in output would cause a 0,49 percent increase in total labour demand; a 1,78 percent increase in high skills labour, a 0,58 percent increase in skilled labour and a 0,41 percent increase in semi to unskilled labour. This is in line with the derived demand concept of labour demand which stipulates that an increase in product output will drive an increase in the demand for workers. The results also showed that an increase of 1 percent in the industry's wage rate would cause a decline of 0,94 percent in the industry's highly skilled employment and if union membership increased by 1 percent, total employment would decline by 0.006 percent conforming, albeit marginally, with the Theory of union wages. These results were largely consistent with findings by Hamermesh (1993).

Bhorat (2003) conducted a study on labour demand trends in the South African market, 1995-1999. The aim of the study was to provide descriptive overview of absolute and relative shifts in labour demand in South Africa over the period just after apartheid. The research data were drawn from the October Household Surveys (OHS). 1991 and 1996 census data were also used to supplement the household surveys. The methodology decomposed sectoral labour demand shifts using the standard labour force participation formula to test for changes in labour force use from one period to another. The methodology was mainly an analysis of periodic variations in series. The main weakness of this approach was the lack of econometric regressions that could illustrate relationships, causality and estimations. The study concluded initially, that the economy was

generating jobs but at rates far less than the growth in the labour force. The study also discovered that the adoption of new technologies and capital stock was a strong determinant of the demand for labour.

Behar (2004), studied the estimates of labour demand elasticity and elasticity of substitution using firm level data in South Africa. The study utilised national firm level data supplemented with wages from household survey data. The household survey data were used to predict wages for each firm according to the characteristics that are common to both the firm and household surveys, after which the wages were adjusted for firm-size effects. The intention of the research was to estimate the Allen Elasticity of Substitution (AES) between various labour inputs as well as cross and own price elasticity of labour demand using translog cost functions. The study measured elasticity between capital and labour inputs disaggregated according to skill. Skill was disaggregated into four categories: professional/managerial, skilled/artisan, semi-skilled and unskilled. The data were collected for 300 firms with the appropriate variables. The results showed own-price elasticities of -0,56 for managerial/professional and skilled/artisans occupations, -0,65 for unskilled workers and -0,8 for semi-skilled workers. The results conform to labour demand theory which states that an increase in the cost of labour will trigger a decline in the demand for labour. The results showed elasticity of substitution for capital of 1,74 showing that if wages rose by 1 percent the demand for capital would rise by 1,74 percent. These conformed to the theory of demand for labour in the long run period were an increase in the cost of labour (wage rate) was met with an increase in the demand for capital which would have become relatively cheaper *ceteris paribus*.

In a joint study on trade liberalisation and labour demand within South African manufacturing firms, Edward and Behar (2005) sought to test the impact of the government's commitment to the GATT/WTO Uruguay negotiations on employment in manufacturing from 1998 to 2004. Preceding literature had produced largely inconsistent results on the impact of trade on labour demand. The study disaggregated labour into skilled and unskilled and adopted two methodologies. The survey method was used jointly with a General Equilibrium approach. Cross sectional data was obtained from the National Enterprise Manufacturing Survey (NE survey) for 941 firms. The results found relationships between trade, technology and factor demand that were consistent with theoretical expectations. Firms that import large amounts of raw materials

were found to be more skills oriented and therefore demanded less workers who were unskilled. The study also discovered that higher tariffs were consistent with demand for less skilled employees as firms sought to minimise costs of labour.

Dunne and Edwards (2006), in the study on trade, technology and employment in South Africa, analysed the impact of trade on employment. The study focused on the relationship between demand for factors and trade liberalisation particularly in the manufacturing sector. The intention was to determine the both the direct and indirect effects of trade on demand for workers in the 1990s. Initially, the study employed the decomposition technique (Chenery, 1979) then applied econometric analysis of time series data. A Cobb-Douglas function was employed and developed into a linear model including variables to test the impact of trade-induced technological growth on demand for labour. The Vector error correction model was applied to a VAR model. The results showed statistically significant negative relationships between labour demand and its lagged value, relative wage, import penetration and technological growth. Conversely significantly positive relationships existed between labour demand and output and export orientation.

Despite the largely limited number of studies conducted in South Africa, it is common knowledge that unemployment remains a problem in the country. The studies conducted for the manufacturing sector have resulted in closely aligned conclusions. Common variables such as wages, output, interest rates and trade liberalisation have produced commonly aligned effects on employment in the sector.

### **3.4 General Assessment of literature**

The theoretical literature reviewed in this chapter provided a basis upon which the study lies. It is assumed that it is the underlying facets of these theories that govern the operations of the labour market in reality. Contrary to this view, the analysis of the theoretical literature suggested that theory has significantly less influence on the realistic operations of the South African labour market. The empirical literature from developed and developing economies and South Africa was generally consistent as to the inverse impact of wage increases on labour demand. The degree of impact of the variables upon one another is what varied spatially. The empirical methodologies utilised mostly were the Least Squares and the VAR technique. The least squares

approach to modern research can be considered to be inappropriate. It has been proven that it may result in biased and inconsistent parameter estimates. On the other hand, the VAR is more suitable as it seeks to solve the problems associated with least squares.

The underlying theories were the classical model, labour demand (short run and long run) and the union wage approach. The empirical studies generally were consistent with economic theory. The findings largely suggested negative relationship between labour demand and wages and positive relationships between labour demand and output. These suggestions support the underlying theories.

**Table 3.1 Summary of selected empirical literature on the demand for labour**

<b>Study</b>	<b>Country(s)</b>	<b>Methodology</b>	<b>Findings</b>
Freeman and Medoff (1982)	United States of America	Census of Manufacturers and Population surveys	Increases in cost of unionised labour resulted in substitution with capital while non-unionised labour, substitution was less.
Hamermesh (1993)	Britain	Vector Auto Regression	Wages have an impact on the demand for labour. If wages rose by a percentage point, employment would decline by between 0,45 percent and 0,53 percent.
Roberts and Skoufias (1997)	Colombia	Ordinary Least Squares (OLS)	Increases in wages of skilled workers had less impact on the demand for their services compared to unskilled workers. As output increases, more skilled workers are demanded compared to less skilled workers.
Behar (2004)	South Africa	Firm Level Surveys and Household Surveys	Strong negative relationship between labour demand and wages exists. It is relatively less for skilled and unskilled workers compared to semi-skilled labour. Substitution for capital was high with wage increases.
Moolman (2003)	South Africa	Cointegration	Very strong negative relationship exists between wages and the demand for highly skilled workers. Unionism has little impact on the demand for workers.

### **3.5 Conclusion**

Various theories have been reviewed in this chapter. These are: The Theory of a perfectly competitive labour market (The Classical Approach), Labour demand theories, which are the Marginal revenue productivity theory of labour demand (Neoclassical short run demand for labour theory) and the Demand for labour in the Long run approach and The Union wages theory. The Classical model and the Union wages model are similar in pointing out wages as a strong determinant of the demand for workers. The Short run demand model emphasises the derived demand concept and implies output as the strong determinant of labour demand while the Long run demand model emphasises the concept of relativity in costs of inputs as a determinant of the amount of workers demanded. In the chapter empirical literature on labour demand in manufacturing was also reviewed. The studies employed qualitative and quantitative methodologies. Most of the studies had consensus on the determinants of labour demand and the direction of impact of these variables.

## CHAPTER FOUR

### METHODOLOGY

#### 4.1 Introduction

This chapter provides the analytical context of the study. The methodology is derived from and guided by literature reviewed in the preceding chapters. The primary section develops an analytical model and the following section defines and explains the variables used thereof. The sources of data for the study are given in the succeeding section. The fourth section reviews the estimation techniques that are used in the study and the conclusions are provided for in the last section.

#### 4.2 Theoretical framework

The theoretical frame work is developed from the theory of labour demand in the long run. The theory suggests a relationship between output, cost of labour (wages) and cost of capital (interest rates). The theory states that demand for labour is derived demand and therefore, workers will only be employed if there is demand for the firms' final product. According to the theoretical approach, the demand for workers/employment level is therefore a function of output, wages and interest rates. This is mathematically illustrated in equation 4.1.

$$Y = f(o, w, r) \dots\dots\dots(4.1)$$

Where:

*Y* = level of employment/labour demand,

*o* = real value of output

*w* = real wages

*r* = prime lending rate/interest rate.

According to the theory, any of the above independent variables has got a level of influence on the hiring decisions made by employers. The explanatory variables *w* and *r* are closely related and their behaviours invoke substitution between capital and labour. This is such that a change in

the cost of labour ( $\Delta w$ ) with cost of capital ( $r$ ) unchanged would trigger either a decrease or increase in the demand for workers.

### 4.3 Empirical Model Specification and Definition of Variables

To estimate the impact of different variables on labour demand in the TCF manufacturing sector, the study takes into account the postulations of the theoretical framework. After taking into perspective the underlying theory, the study utilises a related empirical approach and modifies the econometric model by Heshmati and Ncube (2003), in their study: An Econometric analysis of employment in Zimbabwe manufacturing industry empirical model:

$$L = f(y, w, k, t, \alpha) \dots \dots \dots (4.2)$$

Where  $L$  is the level of employment (measured as number of persons) used in production of a certain level of output  $y$ ,  $k$  is cost of capital,  $t$  are time varying trends and  $\alpha$  is a vector of unknown parameters to be estimated

From the above equation, the following equation was modelled with variables adjusted to suit the TCF sector in South Africa.

$$L_t = \beta_0 + \beta_1 OUT + \beta_2 RW + \beta_3 IR + \beta_4 MPEN + \beta_5 SINV + \mu \dots \dots \dots (4.3)$$

The variables are converted into their logarithmic form to capture the changes in the data and coefficients of elasticity rather than the absolute trends. The model assumes the structure below:

$$\ln L_t = \beta_0 + \beta_1 \ln OUT_t + \beta_2 \ln RW_t + \beta_3 \ln IR_t + \beta_4 \ln MPEN_t + \beta_5 \ln SINV_t + \mu_t \dots \dots \dots (4.4)$$

Where  $\ln L_t$  = log quantity of workers demanded,  $\ln OUT_t$  = log real value of TCF manufacturing output (gross income),  $\ln RW_t$  = log of the relative wage /average real wage to interest rate ratio,  $\ln IR_t$  = log of real prime rate (interest rate),  $\ln MPEN_t$  = log value of import penetration index of TCF commodities,  $\ln SINV_t$  = log of sector based investment in TCF,  $\beta_0$  = intercept term and  $\beta_1 \dots \beta_5$  = slope parameters and  $\mu$  = error term.

**LnL<sub>t</sub>** is the logarithm of labour demand derived from the existing generic employment (that is disregarding any distinctions in skills levels) in the sector. This data also do not differentiate sexes. The numbers of employees in the sector for the relevant period was taken because it can be studied analogously as demand for labour in an economy in which labour supply outstrips labour demand.

**LnOUT<sub>t</sub>** is the logarithm of real value of output produced from the TCF manufacturing sector in South Africa per the relevant period. The nominal quarterly values are converted to real values using 2000 as the base year CPIX = 100. The variable is a proxy for earnings and product price, implying via derived demand, that an increase in output should increase the demand for labour, *ceteris paribus* (Sparrow *et al*, 2008).

**LnIR<sub>t</sub>** is the logarithm of the real prime overdraft lending rate. This variable was used as the proxy for cost of capital. The data are converted from nominal to real values with 2000 as base year (CPIX=100) using formula adopted from (Watts and Helmers, 1979):

$$r' = \left( \frac{1+r}{1+f} \right) - 1$$

Where:  $r'$  = real interest rate,  $r$  = nominal interest rate, and  $f$  = inflation rate.

**LnRW<sub>t</sub>** is the logarithmic relative wage/ratio of average wages to the interest rate. The mean real wage received by workers in the sector during the relevant period is non-specific and is derived as a quotient of data on total wages received by workers and the total employment in the sector. The mean quarterly wages were expressed in real terms with 2000 as base year (CPIX=100). The mean wages are expressed as a ratio with real prime overdraft lending rate.

**LnMPEN<sub>t</sub>** is the log of import penetration rate of TCF goods. Imports act as substitutes to more costly, but locally produced commodities which ultimately reduces the demand for local TCF goods. The effect of imports on labour demand is not a direct one but emanates from that demand for labour is derived demand. By substituting demand for local goods, imports induce a reduced demand for labour as well.

$\text{LnSINV}_t$  is the logarithm of aggregate investment into the TCF sector. The data includes both private sector and government investment. It is the percentage of manufacturing sector investment linked with SIC 311-317.

#### 4.4 Expected priori

$\beta_1$  the coefficient of (OUT) variable for output is expected to be greater than zero which is consistent with the derived demand concept. According to conventional economic theory, an increase in the demand for a firm's output would trigger the demand for more workers in the labour market to meet demand in the product market.

$\beta_2$  the coefficient of the relative wage variable (RW) is expected to be negative consistent with the law of negatively sloped demand curve. Supposing substitution is possible between labour and capital it implies that an increase in wages would render labour the more expensive of factor resources. The resulting effect is a reduction in employment *ceteris paribus*.

$\beta_3$  the coefficient of (IR), the proxy for cost of capital is expected to be positive consistent with the long run substitution between capital and labour should cost of labour rise relative to cost of capital.

$\beta_4$  the coefficient of (MPEN) which act a substitutes to locally produced goods is expected to be negative. The increase in the number of TCF goods demanded locally is expected to escalate the level of employment in the country's TCF manufacturing sector. The existence of cheaper substitutes for locally produced goods, via derived demand, is expected to diminish demand for workers because of decline in domestic production.

$\beta_5$  the coefficient of SINV is expected to be positive. A growth in investment outlay for the sector would likely boost its growth in both output and employment levels.

#### 4.5 Data sources

The study will employ South African semi-annual data for the period 1990 – 2012. The data is obtained from the Department of Trade and Industry website, Statistics South Africa (StatsSA), the Central Intelligence Agency (CIA) countries database, the SARB online database and World Bank online statistics.

## 4.6 Research Techniques

The study will use the Phillips-Perron and Augmented Dickey-Fuller tests for stationarity and unit roots in the data. The Johansen (1991) technique is then employed in the study for the cointegration.

### 4.6.1 Unit root and Stationarity tests

Auto regressive unit root checks are founded on testing the null hypothesis  $\phi = 1$  (difference stationary) against the alternative that  $\phi < 1$  (trend stationary). They are termed unit roots because under the null hypothesis, the auto regressive (AR) polynomial has a unit root. Stationary time series is explained as that with constant mean, variance and auto-covariance for each given lag (Brooks, 2008). A solitary stationary time series (no deterministic trends) comprises an infinite moving average (MA) representation which is generally approximated by a finite ARMA process. Non stationary time series can be considered as prospectively a major difficulty in acquisition of results from empirical econometrics. Most time series data are subject to trends. Successive differencing of the time series until stationarity is attained has been suggested as a possible solution. Nonetheless, differencing has been evidenced to result in forfeiture of valuable long run information in the data (Utkulu, 1994). Thus the definition that a series with no deterministic component which has a stationary, invertible ARMA representation after differencing  $d$  times is said to be integrated of order  $d$ , denoted  $x_t \sim I(d)$  (Engle and Granger, 1987).

Several reasons exist for the importance of the concept of stationarity and why it is important that variables that are non stationary be treated differently from stationary ones. Since the whole value in the AR from the prior period is transferred to the present period, values of random walk never decline. The incessant accumulation of errors generates a problem that non stationary time series will incline toward an infinite variance (Salvatore and Reagle, 2002). Brooks (2008) put it as; stationarity strongly impacts the conduct and properties of a series. For stationary series, shocks to the system steadily expire away. A shock during time  $t$  will have smaller effect in time  $t+1$ , and even smaller in  $t+2$  and so on. With non-stationary data, however, the persistence of shocks is infinite such that for a non-stationary series the effect of a shock during time  $t$  will not have smaller effects in  $t+1$  and  $t+ 2$ .

Use of non-stationary data may lead to spurious regressions. If two stationary variables are generated as independent random series, when one of those is regressed against the other, the t-statistic on the slope coefficient would be expected not to be significantly different from zero and the  $R^2$  value would be expected to be very low. This would be obvious if the variables are unrelated. Supposing variables are trending over time, a regression of one on the other would have a high  $R^2$  even if the variables are completely unrelated. The results of a regression applied to non-stationary data are attractive when realistically they are valueless (Brooks, 2008). According to Utkulu (1994), trends, either stochastic or deterministic, are the root for occurrence of spurious regressions, un-interpretable t-values, goodness of fit measures which are too high and generally make regression results strenuous to appraise

#### 4.6.2 Phillips-Peron and Augmented Dickey-Fuller Tests

To illustrate the important statistical issues associated with auto regressive unit root tests, the simple (AR)1 model is considered.

$$y_t = \phi y_{t-1} + \varepsilon_t \dots \dots \dots (4.5)$$

Where:  $\varepsilon_t \approx WN(O\sigma^2)$

The hypotheses are:

$$H_0 : \phi = 1 \text{ (unit root in } \phi(z) = 0) \Rightarrow y_t \sim I(1)$$

$$H_1 : |\phi| < 1 \Rightarrow y_t \sim I(0)$$

The test statistic is:

$$t_{\phi-1} = \frac{\hat{\phi} - 1}{SE(\hat{\phi})}$$

Where  $\hat{\phi}$  is the least squares estimate and  $SE(\hat{\phi})$  is the usual standard error estimate. The test is a one-sided left tail test.

When checking for the presence of unit roots, it is fundamental to identify the null and alternative hypotheses fittingly to depict the trend properties of the data. Supposing the observed

data do not demonstrate a rising or decreasing trend, the appropriate null and alternative hypotheses ought to illustrate this. The trend characteristics of the data under the alternative hypothesis will establish the composition of the test regression employed. Additionally, the nature of the deterministic terms in the test regression will influence the asymptotic distributions of the unit root t-statistics.

Standard Dickey Fuller stationarity checks are only applicable for time series that is characterized by an AR(1) with white noise errors. Nevertheless, countless series have more intricate dynamic structures than is captured in a straightforward AR(1) model. Dickey and Said (1984) augmented the central AR unit root test to cater for general ARMA models with unknown orders and thus the augmented Dickey-Fuller (ADF) test. The ADF tests the null hypothesis that a time series  $y_t$  is  $I(1)$  against the alternative that is  $I(0)$ . The ADF test is based on the estimating the test regression:

$$y_t = \beta'D_t + \phi y_{t-1} + \sum_{j=1}^v \varphi_j \Delta y_{t-j} + \varepsilon_t \dots \dots \dots (4.7)$$

Where  $D_t$  is a vector of deterministic terms. The  $v$  lagged difference terms,  $\Delta y_{t-j}$ , are used to approximate the ARMA structure of the errors and the value of  $v$  is set so that the error  $\varepsilon_t$  is serially uncorrelated. Heteroskedasticity is also assumed to be non-existent in the error term. Alternatively,

$$\Delta y_t = \beta'D_t + \pi y_{t-1} + \sum_{j=1}^v \varphi_j \Delta y_{t-j} + \varepsilon_t \dots \dots \dots (4.8)$$

Where  $\pi = \phi - 1$ . Under the null hypothesis,  $\Delta y_t$  is  $I(0)$  which implies that  $\pi = 0$ . The test regression in 4.8 is often employed because the ADF t-statistic is the usual t-statistic reported for testing the significance of the coefficient  $y_{t-1}$ .

A crucial issue for the execution of the ADF test is the specification of the lag length  $v$ . if  $v$  is too small then the remaining serial correlation in the errors will bias the test. If  $v$  is too large, then the power of the test is compromised.

### **4.6.3 Lag length selection**

The study uses suggestions by Ng and Perron (1996) for lag length selection that results in stable size of the test and minimal loss of power. The number and of augmented lags is determined by minimizing the Schwartz Bayesian information criterion minimizing the Akaike information criterion or lags are dropped until the last lag is statistically significant.

### **4.6.4 Co-integration**

The cointegration technique is applied to the labour demand model. The appeal of cointegration analysis is that it simply provides an effective formal framework for estimating (also testing and modeling) long run economic relationships in time series data. Gujarati and Porter (2010) state that two or more time series which are co-integrated suggest the existence of a long term relationship or equilibrium relationship between them. The concept is the brainchild of Granger (1981). Engle and Granger (1987) provided a firm theoretical base for representation, testing, estimating and modeling of cointegrated non stationary time series variables. The existence of cointegration between variables implies that long run relationships exist which prevent residuals becoming larger.

Methods of testing and modeling cointegration relationships include the error-correction models (ECM), Engle and Granger method (1987), Charemza and Deadman (1992) which made the attempt to estimate alternative cointegration regressions by including dynamic components and Engle and Yoo (1991) who concentrated more on corrections and modifications to static parameter estimates. These different approaches yield different outcomes and comprise varying advantages and disadvantages.

The study uses an error correction model in the form of the Johansen and Juselius (1991, 1995) method. The model is a likelihood-based inference in co-integrated vector autoregressive (VAR) models. The full notion of cointegration in this system is more intricate computationally because of the (VAR) model within it. The method also creates the crisis of numerous long run relationships which can at best be viewed as identification problems (Granger, 1986). The Johansen method, though, has benefits that warrant its selection. According to Kitamura (1998), the Johansen way is attractive in that it presents an integrated set of tools for estimation, co-integration testing and hypothesis testing based on the Gaussian likelihood for a (VAR). Utkulu (1994) stated that the Johansen (1991) procedure is also acknowledged to have statistical

properties that are generally better and the test is of high power relative to the Engle and Granger model.

#### 4.6.5 Johansen Maximum likelihood VAR

The Johansen model employed in the study is a sequence based model. Various steps are undertaken to effectively apply the technique.

Initially, the order of integration between the variables involved must be determined. The second step is to determine and set the proper lag length in the model, thus estimate the model and determine the rank of  $\Pi$ . The succeeding step involves selecting the model appropriate in reference to the deterministic trends in the system then finally determining the number of cointegrating vectors and applying causality tests.

Assuming that the variables are co-integrated a VAR with lags  $n$  is set as:

$$Z_t = \alpha_t + \sum z_{t-1} + \sum z_{t-2} + \dots \sum z_{t-n} + \mu_t \dots \dots \dots (4.9)$$

Where  $Z_t$  is a vector of all the variables in the model,  $L_t, OUT_t, RW_t, IR_t, MPEN_t, SINV_t$

The Johansen (1991) model introduces an error correction term (VECM) of the form

$$\Delta z_t = \Pi z_{t-k} + \Gamma_1 \Delta z_{t-1} + \Gamma_2 \Delta z_{t-2} + \dots \Gamma_{k-1} \Delta z_{t-(k-1)} + \mu_t \dots \dots \dots (4.10)$$

Where  $\Pi = \left( \sum_{i=1}^k \beta_i \right) - I_g$  and  $\Gamma_i = \left( \sum_{j=1}^i \beta_j \right) - I_g$

In 4.10,  $z_t$  is an  $n \times 1$  vector of variables that are  $I(1)$  and  $u_t$  is an  $n \times 1$  vector of constants. If the coefficient/short run response matrix  $\Pi$  has reduced rank  $r < n$  then there exists  $n \times r$  matrices  $\alpha$  and  $\beta$  each with  $r$  such that  $\Pi = \alpha\beta'$  and  $\beta'y_t$  is stationary.  $r$  is the number of cointegrating relationships, the elements of  $\alpha$  are the adjustment parameters in the VECM and each column of  $\beta$  is a cointegrating vector (Hjalmarsson and Osterholm, 2007). Johansen proposed two different likelihood ratio tests of the significance of correlations and thereby reduced rank of the  $\Pi$  matrix. The Trace test and Maximum Eigenvalue test are shown in equations 4.11 and 4.12

$$J_{trace} = -T \sum_{i=r+1}^n \ln(1 - \hat{\lambda}_i) \dots\dots\dots(4.11)$$

$$J_{max} = -T \ln(1 - \hat{\lambda}_{r+1}) \dots\dots\dots(4.12)$$

Where  $T$  is the sample size and  $\hat{\lambda}_i$  is the  $i^{th}$  largest canonical correlation. The trace test tests the null hypothesis of  $r$  cointegrating vectors versus the alternative of  $n$  cointegrating vectors. The Maximum eigenvalue tests the null hypothesis against the alternative hypothesis of  $r$  cointegrating vectors and  $r+1$  cointegrating vectors. None of the above tests follow a chi-square distribution and the asymptotic critical values can be found in the Johansen methodology. In both cases, the null hypothesis is rejected if the tests statistic is greater than the critical value.

#### 4.6.6 Vector Error Correction Model (VECM)

If two variables are cointegrated, the long run relationship between them should be accounted for. Deviations from the long run relationship stipulated should be included as explanatory variables in an ECM. Using combinations of first differenced and lagged levels of the cointegrated variables:

$$\Delta z_t = \alpha_1 \Delta x_t + \alpha_2 (z_{t-1} - \rho x_{t-1}) + \mu_t \dots\dots\dots(4.13)$$

In 4.13, the equilibrium correction term is  $z_{t-1} - \rho x_{t-1}$ . Supposing  $z_t$  and  $x_t$  are cointegrated with coefficient  $\rho$ , then  $(z_{t-1} - \rho x_{t-1})$  will be  $I(0)$  even though the constituents are  $I(1)$ . Coefficient  $\rho$  exposes the long run relationship between the variables  $z$  and  $x$  while  $\alpha_1$  shows the short run relationship.  $\alpha_2$  shows the rate of adjustment back to equilibrium. It measures the proportion of the preceding period's equilibrium error when corrected.

The VECM was selected as the appropriate methodology because it has various advantages. Primarily, the ECM has greater power compared to the EG method, albeit, they are based in different econometric methodologies that cannot be directly compared. The ECM, because it evolves from a VAR model were variables in the vector regress each other and their lagged

values, solves the endogeneity problem. In a study theoretically based on equilibrium between supply and demand, endogeneity in some variables may be problematic. Finally, the adjustment in the long run relationship allows errors to be managed from becoming perpetually larger.

#### **4.6.7 Diagnostic Tests**

Diagnostic tests will be conducted to check and validate the stochastic properties of the model. White's test will be used to test for heteroskedasticity in the residuals. To test for normality in the distribution of residuals, the Jarque-Bera test will be used. The Lagrange Multiplier (LM) test will be employed as the test for autocorrelation.

##### **4.6.7.1 Autocorrelation**

When the error term in one period is positively correlated with the error term from the previous period, the problem of serial correlation (positive first-order) exists. It leads to downward-biased errors and thus incorrect statistical tests and confidence intervals. To test for autocorrelation the Lagrange Multiplier test is used. The LM test permits testing of relationships between the error term and its lagged values simultaneously (Brooks, 2008). In this test  $T-r$  is multiplied with the  $R^2$  rather than  $T$ . This is so because the first order  $r$  values would have been sacrificed to acquire lags used in the test leaving  $T-r$ . If the test statistic  $(T-r)R^2 \sim \chi^2$ , is larger than the critical value, then the null hypothesis is rejected.

##### **4.6.7.2 Normality**

Gujarati (2004) states the normality assumption for the error terms  $\mu_i$  with  $\mu_i \sim N(0, \sigma^2)$ , where  $N$  means normal distribution representing the parameters of normal distribution; the mean and the variance. If normal distribution is followed, the coefficients of the estimates are unbiased and efficient and have minimum variance. The Jarque-Bera test is used in the study. The *t-statistic* in the Jarque-Bera test follows under the null hypothesis that the series is distributed normally. It is rejected if the residuals are significantly skewed.

##### **4.6.7.3 Heteroskedasticity**

When the assumption that the variance of the error term is constant for all observations does not hold, the heteroskedasticity exists (Salvatore and Reagle, 2002). This leads to variance larger than the minimum (inefficiency) in the coefficients of the estimates, but no bias. It also leads to biased estimates of the *SE* and therefore incorrect confidence intervals and statistical tests. To

test for heteroskedasticity in the error terms, the study will utilise White’s test. Contrary to the Goldfeld and Quandt (GQ) and the Breusch-Pagan-Godfrey (BPG) tests, White’s test is independent of the assumption of normality and is comparatively easier to implement (Gujarati, 2004). The squares of the residuals from the primary regression are run against the primary explanatory variables, their squared values and the relevant cross products. The null hypothesis suggests no presence of heteroskedasticity.

$$n \times R^2_{asy} \rightarrow \chi^2_{df} \dots\dots\dots(4.14)$$

The sample  $n$  multiplied by the secondary equation  $R^2$  follows the Chi-square distribution asymptotically with the degrees of freedom equal number of explanatory variables minus the constant (Gujarati, 2004). Therefore, if the  $\chi^2_{calc} > \chi^2_{crit}$  at the chosen level of significance, then the null hypothesis is rejected.

**4.6.8 Impulse response and Variance decomposition analyses**

Estimation by VAR will illustrate variables that have statistically significant effects upon other variables in a system. Tracking the reactions of the system to shocks in the variables and decomposing forecast error variances in VAR are standard means for economic analysis (Lutkepohl, 1990). In this study, they show the extent to which labour demand reacts to disturbances in itself and the other variables. Proportions of the forecast error variances of the variables accounted for by innovations in other variables will be shown. The tests however, ignore the impact of variations in values of the variables in the system on other variables and the durations of the effect (Brooks, 2008). To an extent, variance decompositions and impulse responses offer the same information (Brooks, 2002).

**4.6.8.1 Impulse Response Analysis**

Impulse responses outline the reactivity of the exogenous variables in the VAR to impulses to the other variables. This is such that each variable from each equation (separately), a shock is effected upon the random error and the impacts upon the VAR are recorded over time. Thus if there exists a certain number of variables in a system, the number of impulse responses generated

are a total of the square of the variables (Brooks, 2008). This is achieved by expressing the VAR model as a vector moving average (VMA)<sup>12</sup>.

#### **4.6.8.2 Variance Decomposition Analysis**

Variance decomposition analyses provide a minutely varied means of testing the VAR system processes. They offer the fraction of the dynamics in the dependent variables instigated by internal shocks, against innovations to other variables. A shock to a variable will have a direct effect on the variable itself. This shock is also conveyed to the other variables through the VAR system dynamics (Brooks 2002). Variance decompositions determine how much of the error variance of a specific variable is accounted for by innovations to each of the independent variables. In reality, it is observed that own-series innovations account for the majority of the error variance of the series in the autoregressive process.

#### **4.7 Conclusion**

The chapter provided a specification of the empirical model applied in the study including the variables to be regressed and tested. The application of the Unit root and stationarity test which are the Phillips-Perron and augmented Dickey-Fuller tests are also explained. The empirical research technique in the form of the Johansen (1991, 1995) model was selected to be employed in the study. The diagnostics tests to be conducted to test for stochastic characteristics in the model are also elaborated. Finally, the procedures to undertake impulse response and variance decomposition analyses are explained.

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<sup>12</sup> Provided that the system is stable, the system will eventually die away (Brooks, 2008).

## CHAPTER FIVE

### PRESENTATION AND ANALYSIS OF EMPIRICAL FINDINGS

#### 5.1 Introduction

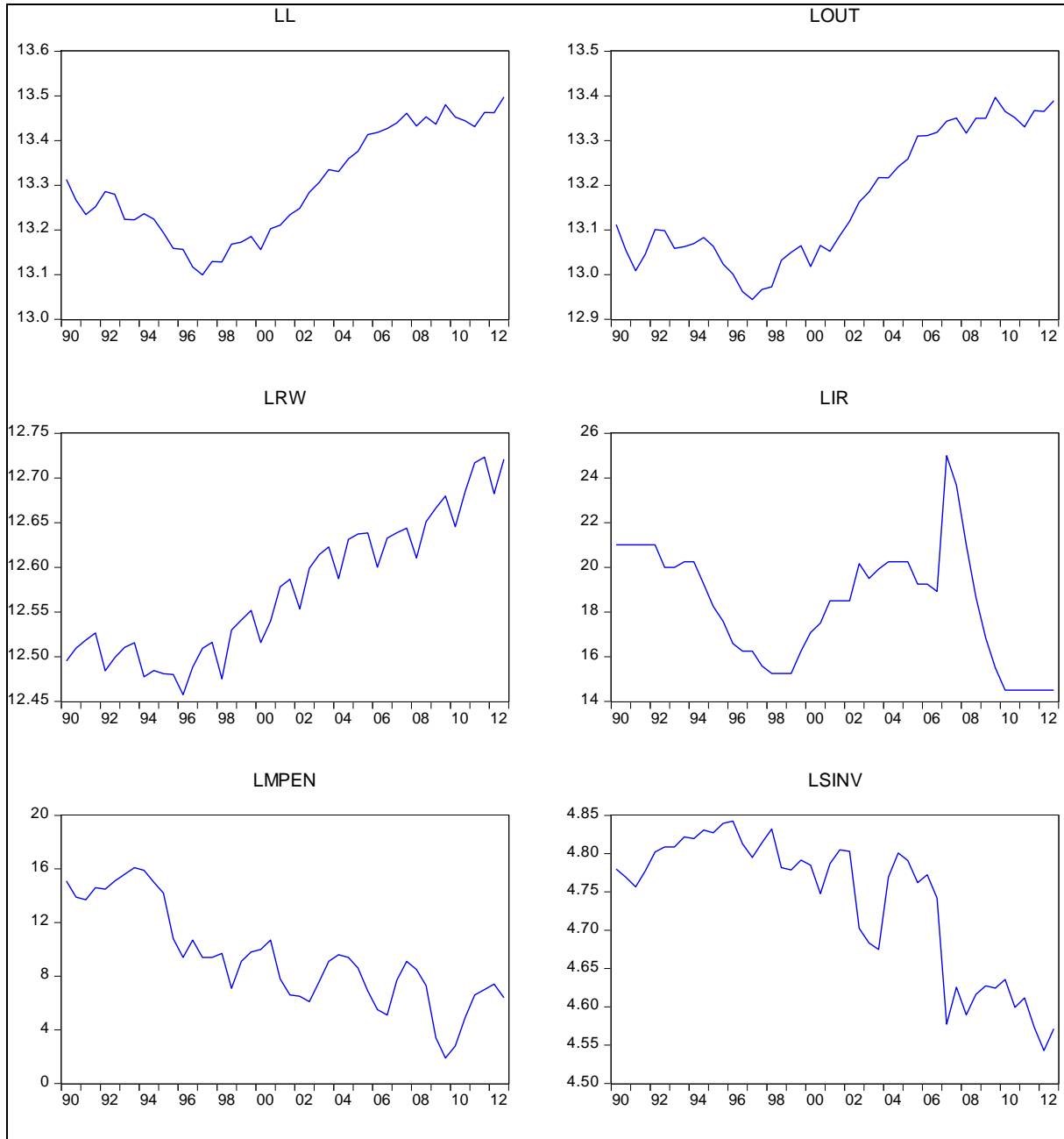
The primary purpose of this chapter is to provide solutions and responses to the research questions imposed at the beginning of the study. The determinants of labour demand and their quantitative impact on labour demand in the South African clothing and textile manufacturing sector are presented. In Section 5.2 the tests for unit roots and stationarity are presented followed by Section 5.3 where cointegration tests are conducted and presented. Sections 5.4 and 5.5 show the error correction model findings and the diagnostic tests for the model respectively. Impulse responses and variance decompositions are then presented in Section 5.6. Section 5.7 presents the conclusions of the chapter.

#### 5.2 Stationarity/Unit root tests

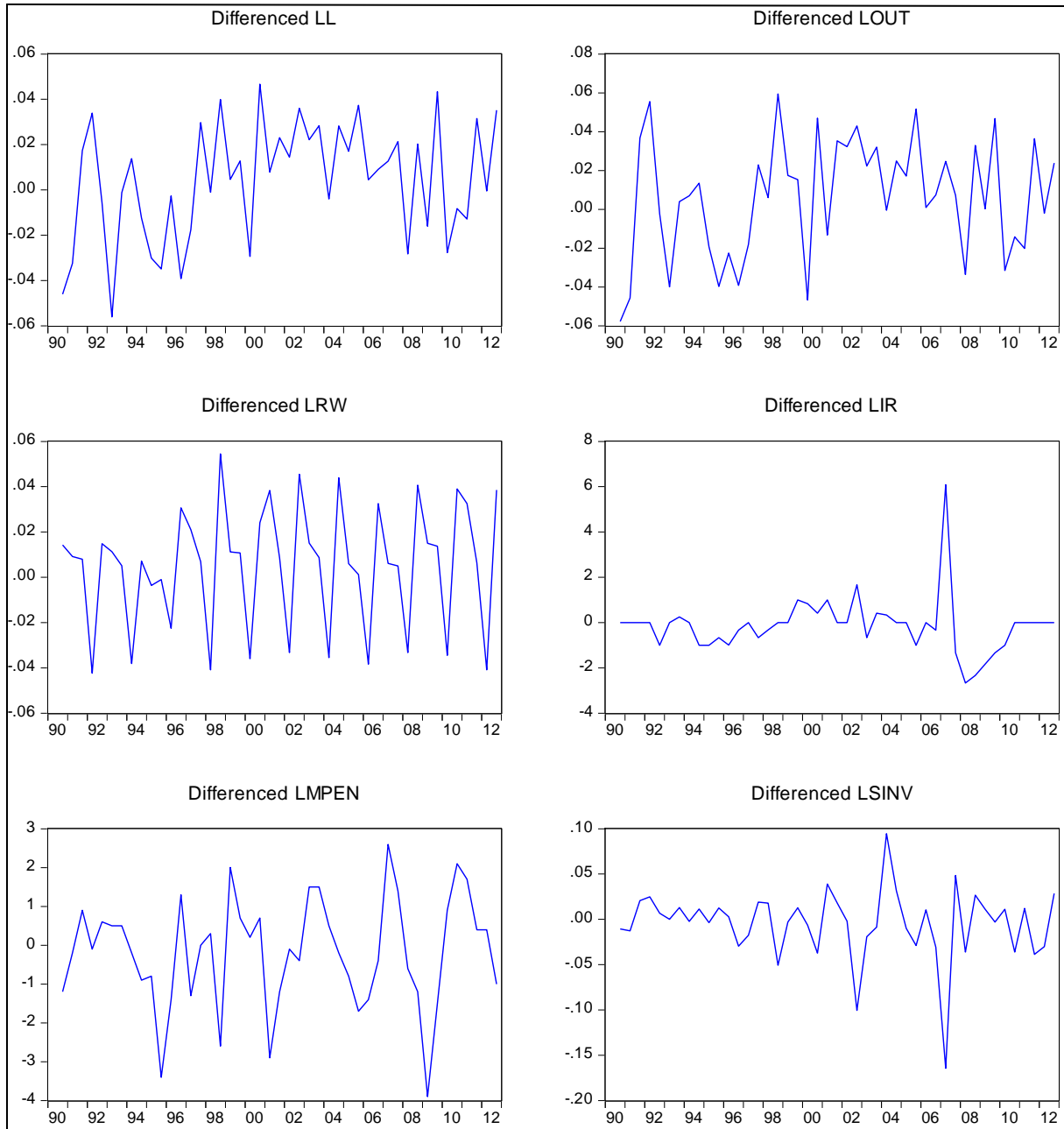
Tests for stationarity and unit roots are conducted first before cointegration tests in the Johansen methodology. The recognised tests for unit roots implemented in this study are the Phillips-Peron (PP) and Augmented Dickey-Fuller (ADF). Before the formal tests, graphical presentations of the data can be used to assess for structural breaks, trends and stationarity in the data. The graphical results are presented first then the PP and ADF are presented in tabular form thereafter.

Figure 5.1 (a) illustrates the existence of trends in the logarithms of labour demand (L), output (OUT), relative wage (RW), interest rate (IR), import penetration rate (MPEN) and investment (SINV). Imports, output and wages/interest ratio are exhibiting upward or growth trends while labour demand is displaying negative growth trend. Such series of data are non-stationary. Figure 5.1 (b) on the other hand, shows the graphs for the differenced variables. The differencing was done to attain stationarity from the level series and thus avoid spurious regressions. It can be concluded that differenced series are all fluctuation around a zero mean. The graphical means of testing for stationarity though is not entirely accurate. It merely provides a pictorial view of the behaviour of the series.

**Figure 5.1 (a) Plots of level variables (1990-2012)**



**Figure 5.1 (b) Plots of first-differenced variables**



**Table 5.1: Phillips-Peron test**

UNIT ROOT TEST		PHILLIPS-PERRON	
ORDER OF INTEGRATION	VARIABLE	INTERCEPT	TREND AND INTERCEPT
Level	LL	0.228	-2.373
1 <sup>st</sup> Diff	DLL	-6.271***	-6.638***
Level	LOUT	0.030	-2.400
1 <sup>st</sup> Diff	DLOUT	-6.122***	-6.149***
Level	LRW	-0.038	-3.397*
1 <sup>st</sup> Diff	DLRW	-11.139***	-12.106***
Level	LIR	-1.466	-1.760
1 <sup>st</sup> Diff	DLIR	-5.580***	-5.515***
Level	LMPEN	-1.654	-2.850
1 <sup>st</sup> Diff	DLMPEN	-4.619***	-4.527***
Level	LSINV	-0.627	-2.528
1 <sup>st</sup> Diff	DLSINV	-7.644***	-9.477***
<b>CRITICAL VALUES</b>	1%***	-3.585	-4.176
	5%**	-2.928	-3.513
	10%*	-2.602	-3.187

\*\*\* Stationary at 1% significance level  
 \*\* Stationary at 5% significance level  
 \* Stationary at 10% significance level

Initially, the PP test was conducted instead of the conventional DF test. It tests with the assumption of a trend (no intercept) and trend with intercept. Critics of the DF test have levelled certain reservations against its robustness in testing for stationarity. Leybourne, Mills and Newbold (1998) argued that if a series is created by a procedure that is stationary around a broken trend then DF tests can be questionable. The PP test had the null hypothesis of non-stationarity or unit root. The null hypothesis would be rejected if the absolute value of the t-statistic is larger than that of the critical values at different significance levels. Table 5.1 shows that all level variables were non-stationary except LRW which was stationary at 10 percent significance level. The stationarity suggested by the PP test, though, was questioned because the p-value was high and greater than 5 per cent, thus it was differenced and became level at 1 per cent significance level. After first differencing, all the variables became stationary at 1 per cent significance level.

To complement and verify the results of the PP test, the ADF test was conducted. The ADF test is argued to be a fitter test for unit roots in series than its predecessor. Likewise, the null hypothesis was existence of unit root or non-stationarity. Similarly, the null hypothesis was rejected if the absolute t-value was greater than the critical values at all levels of significance. Table 5.2 shows the ADF test results revealed that at level values, all the variables contained unit roots. When put to first differences, all the variables became stationary at 1 per cent significance level except LRW. When second differenced, the series became stationary at 1 per cent significance level.

Combining both tests it was concluded that the series contained unit roots at level but became stationary after first differencing at 1 per cent significance level.

**Table 5.2: Augmented Dickey-Fuller test**

UNIT ROOT TEST		AUGMENTED DICKEY-FULLER	
ORDER OF INTEGRATION	VARIABLE	INTERCEPT	TREND AND INTERCEPT
Level	LL	-0.029	-1.598
1 <sup>st</sup> Diff	DLL	-4.079***	-4.234***
Level	LOUT	-0.117	-1.540
1 <sup>st</sup> Diff	DLOUT	-4.620***	-4.545***
Level	LRW	-0.107	-3.135
1 <sup>st</sup> Diff	DLRW	-1.916	-2.128
2 <sup>nd</sup> Diff	DLRW	-26.332***	-26.000***
Level	LIR	-1.466	-1.598
1 <sup>st</sup> Diff	DLIR	-5.605***	-5.542***
Level	LMPEN	-1.254	-1.392
1 <sup>st</sup> Diff	DLMPEN	-7.509***	-7.524***
Level	LSINV	-0.899	-2.737
1 <sup>st</sup> Diff	DLSINV	-6.848***	-6.906***
<b>CRITICAL VALUES</b>	1% ***	-3.592	-4.186
	5% **	-2.931	-3.518
	10% *	2.604	-3.190

\*\*\* Stationary at 1% significance level  
 \*\* Stationary at 5% significance level  
 \* Stationary at 10% significance level

### **5.3 Cointegration Tests**

The Johansen and Juselius (1991, 1995) model employed in the study is a co-integrated vector autoregressive (VAR) model. The Johansen methodology is most appropriate because it comprises a combined set of methods for estimation, co-integration and hypothesis testing (Kitamura, 1998). The model starts as a VAR with a number of lags chosen by a unified combination of various lag selection criteria. An error correction model (VECM) is then imposed on the VAR.

If the endogenous and exogenous variables display long run association, then it is inadequate to simply difference the series to run a regression. Gujarati (2010) states that with series which are co-integrated, the long run relationship amongst the variables must be accounted for. Therefore the divergence from the long run equilibrium will be included in an error correction model.

The whole notion of cointegration testing in this model is more complex computationally because of the underlying VAR included. The Johansen methodology may also display multiple cointegration relationships which present identification problems (Granger, 1986). Johansen and Juselius (1991, 1995) method nevertheless, has its advantages that merit its use in the study. Utkulu (1994) stated that the procedure is understood to hold preferred statistical properties and that the model, generally, is of higher power relative to the Engle and Granger (EG) model.

**Table 5.3 Pair-wise correlation**

	LL	LOUT	LRW	LSINV	LIR	LMPEN
LL	1.000000	0.982021	0.872745	-0.822913	0.071324	-0.530928
LOUT	0.982021	1.000000	0.909715	-0.834811	-0.023059	-0.632337
LRW	0.872745	0.909715	1.000000	-0.852731	-0.202078	-0.740302
LSINV	-0.822913	-0.834811	-0.852731	1.000000	0.153288	0.582322
LIR	0.071324	-0.023059	-0.202078	0.153288	1.000000	0.448165
LMPEN	-0.530928	-0.632337	-0.740302	0.582322	0.448165	1.000000

Table 5.3 shows the correlations among the variable utilised in the study. It is seen that the variables are correlated in different ways. LL is relatively more correlated to LOUT, and positively. This is consistent with the basic underlying economic concept which states that increase in output will lead to increase the employment of labour. The correlation between LL and LMPEN is as expectedly, negative. Imports are expected to act as substitutes for the demand for locally produced commodity, thus a weakness in the demand for workers is created as imports rise. The positive correlation between LRW and LL is inconsistent with economic theory since we assume a rise in wages would trigger reduced demand for workers and vice versa. LSINV is negatively correlated with both LOUT and LL contradicting the notion that increase in investment is expected to increase both sector output and employment.

The second step of the Johansen model is to identify the most appropriate lag length to utilise in the model.

**Table 5.4 Lag order selection criteria**

<b>Lag</b>	<b>LogL</b>	<b>LR</b>	<b>FPE</b>	<b>AIC</b>	<b>SC</b>	<b>HQ</b>
0	116.4243	NA	2.37e-10	-5.136015	-4.890266	-5.045390
1	312.9597	329.0824	1.38e-13*	-12.60277	-10.88253*	-11.96840*
2	350.6854	52.64053*	1.41e-13	-12.68304	-9.488305	-11.50492
3	391.3988	45.44757	1.49e-13	-12.90227*	-8.233042	-11.18040

\*Indicates the lag order selected by the criterion

LR- sequential modified LR test statistic at 5% significance level each

FPE- Final prediction error

AIC- Akaike information criterion

SC- Schwarz information criterion

HQ- Hannan-Quinn information criterion

The selection of the appropriate lag length to use is shown in Table 5.4. Different lag order selection criteria are displayed and observed. The usual selection criteria balance off the inefficiency caused by over-parameterisation and the bias linked to parsimonious parameterisation. The differing criteria provide a range of the bias/efficiency balance, thus reveal differing results on lag order (Thorntorn and Batten, 1985). In Table 5.4, the FPE, SC and HQ select 1 lag length. The lag selection is in this model based on majority. All the selection criteria used have their strengths and weaknesses based on their prejudice in the bias/efficiency trade-off.

After concluding the lag order test, the Johansen procedure introduces tests for the existence of long run association among the variables in question. Two tests are available for this procedure; the unrestricted cointegration rank test (Trace test) and the unrestricted cointegration test (Maximum Eigenvalue test). The relative strength and reliability of these two tests is subject of debate.

**Table 5.5 (i) Trace tests**

<b>Hypothesised N<sup>o</sup> of CE(s)</b>	<b>Eigenvalue</b>	<b>Trace Statistic</b>	<b>0.05 Critical Value</b>	<b>Prob.**</b>
None *	0.690227	114.2713	95.75366	0.0015
At most 1	0.446036	62.70698	69.81889	0.1618
At most 2	0.362460	36.71811	47.85613	0.3610
At most 3	0.237095	16.91205	29.79707	0.6465
At most 4	0.094676	5.004718	15.49471	0.8083
At most 5	0.014180	0.628384	3.841466	0.4279

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

The cointegration tests are run with the 1 lag selected by the criteria assuming the existence of an intercept and no trend in the cointegration equation(s) and VAR, thus a linear deterministic trend. The null hypothesis suggests the existence of no cointegration equation(s) among the variables. The null hypothesis will be rejected if the p-value is more than 0.05. It is also rejected when the Trace and the Max-Eigen statistics are larger than the 0.05 critical value. For the Trace test the null hypothesis of no cointegration is rejected since the 0.0015 probability value is less than 5 per cent. The 114.2713 trace statistic is also larger than the 0.05 critical value of 95.75366. The trace test therefore suggests that one cointegration equation exists among the variables.

**Table 5.5 (ii) Maximum Eigenvalue tests**

<b>Hypothesised N<sup>o</sup> of CE(s)</b>	<b>Eigenvalue</b>	<b>Max-Eigen Statistic</b>	<b>0.05 Critical Value</b>	<b>Prob.**</b>
None *	0.690227	51.56432	40.07757	0.0017
At most 1	0.446036	25.98887	33.87687	0.3214
At most 2	0.362460	19.80606	27.58434	0.3547
At most 3	0.237095	11.90734	21.13162	0.5568
At most 4	0.094676	4.376333	14.26460	0.8176
At most 5	0.014180	0.628384	3.841466	0.4279

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level

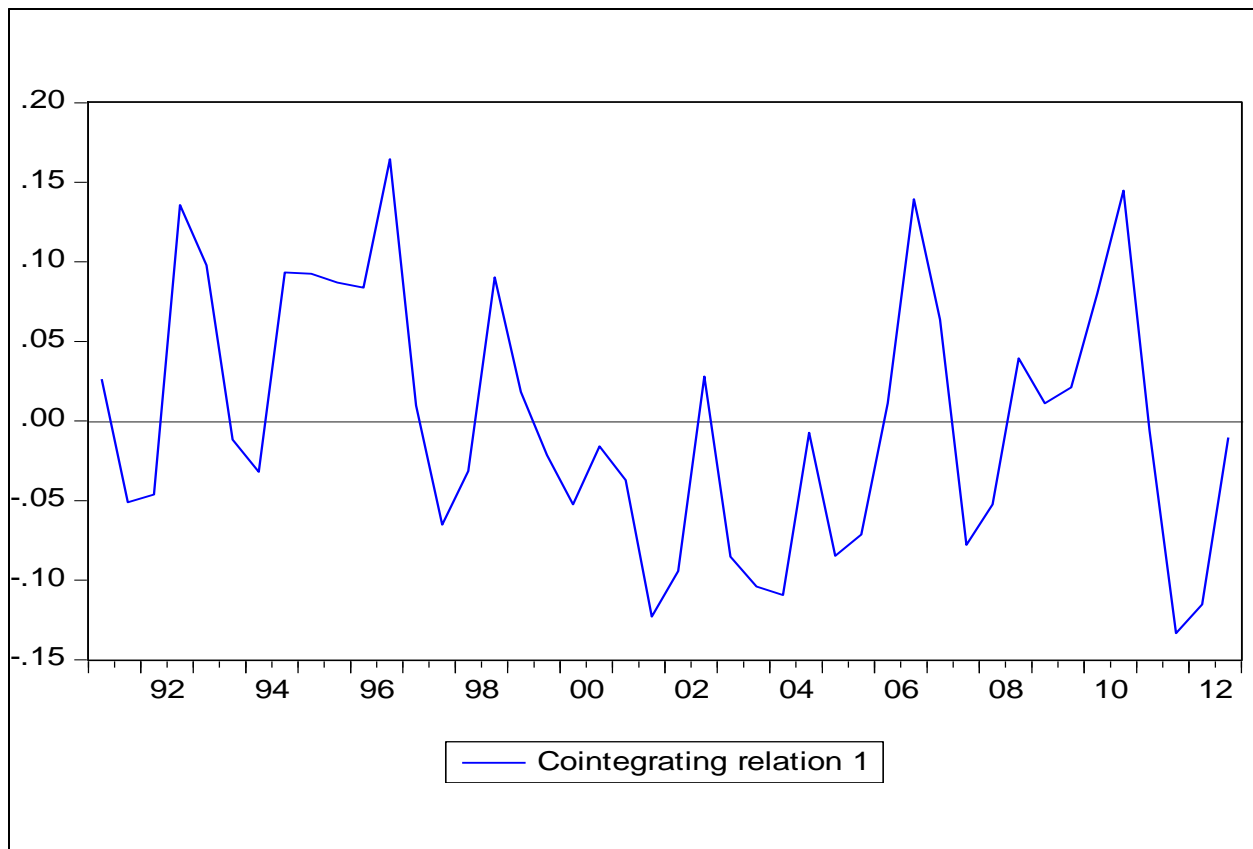
\* denotes rejection of the hypothesis at the 0.05 level

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

Likewise, the Maximum Eigenvalue test has a null hypothesis of no cointegration equation(s). The null hypothesis of at most one cointegration equation is rejected because the Maximum-Eigen statistic (51.56432) in Table 5.5 (ii) is greater than the critical value (40.07757) at 5% significance level. This decision is supported by the p-value (0.0017) which is less than 0.05. It is concluded therefore that there are long run associations among the variables. The test indicates that two cointegration equations exist.

It can be concluded from the concurrence between the above tests that there does exist cointegration among the variables. With this understanding, it becomes clear that the relationships among the variables in question differ between the short run and long run periods. These variations in impulse can be accounted for using the vector error correction model.

**Figure 5.2 Cointegration Vector**



For the VECM to function, the variations from equilibrium for the series are required to be stationary. The cointegration vector in Figure 5.2 shows that the deviations in the series between 1990 and 2012 are stationary since they hover around the zero mean.

#### **5.4 Vector Error Correction Model**

The error correction model makes it possible to differentiate the impacts of the variables on the demand for labour into the short run and long run impacts. The results for the two periods are presented in the tables below.

**Table 5.6 Long run cointegration results**

Variable	Coefficient	Standard error	t-statistic
Constant	16.13912		
LL	1.000000		
LOUT	0.419261	0.15774	2.65793
LRW	-2.81563	0.35984	-7.82469
LIR	-0.015356	0.00360	-4.26959
LMPEN	-0.009765	0.00346	-2.82267
LSINV	0.173552	0.17356	0.99995

The results obtained as shown in Table 5.6 make it possible to estimate the long run impacts of the variables on the demand for labour by substituting into the model as;

$$LL = 16.1 + 0.42LOUT - 2.82LRW - 0.02LIR - 0.01LMPEN + 0.17LSINV \dots\dots\dots(5.1)$$

(2.65793)      (2.65793)      (-7.82769)      (-4.26959)      (-2.82267)      (0.99995)

( ) *t-statistics*

The results obtained show the elasticity of labour demand to the relevant variables. From the results obtained, it is clear that all the variables except LSINV are statistically significant. The statistical significance of the variables is displayed by their absolute *t-statistic* values which are greater than 2. The results obtained confirm the long run relations between the variables. The equation above can be interpreted as portraying the inverse long run association of LRW, LIR, LMPEN and the dependent variable LL. It also shows that a positive long run relationship exist of LOUT and LSINV and the dependent LL. The relationship between LL and LOUT can be interpreted as a 1 percent change in output causes a 0.45 percent change in labour demand. LSINV can be inferred that a 1 percent increase in sector investment causes 0.17 percent increase in the demand for labour. These results obtained are consistent with the theoretical concept. The underlying principle is that the increase in investment would increase the number of firms available thereby instigating a need for workers. These findings were consistent with Heshmati and Ncube (2003) who concluded that there was a positive relationship between capital

investment growth, output and employment growth. Conversely, they were inconsistent with those by Bound and Griliches (1994). Their study showed that investment increased levels of technical growth and grossly diminished the net skills-based employment by 12%. The results also show that 1 percent increases in relative wages, interest rates and import penetration rate would trigger 2.82, 0.02 and 0.01 percentage declines in labour demand. These findings are consistent with those of Moolman (2003), Behar (2004) and Onaran (2008). Onaran (2008) found significant negative long run effects of immediate import penetration on employment of high skilled workers. Although the relationship displayed between LL and LIR contravenes the assumption of the long run demand for labour, it could be a result of the increase in cost of capital causing stunted growth in the sector. LRW and LMPEN results are consistent with underlying theory. The theoretical assumptions are that if relative wage rises, the cost of labour increases therefore the demand for workers declines and that growth in imports likely leads to decline in demand for locally produced commodities and in turn the demand for workers.

**Table 5.7 Error correction results**

<b>Variable</b>	<b>Coeffient</b>	<b>Standard Error</b>	<b>t-statistic</b>
D(LL)	-0.265141	0.05385	-4.92339
D(LOUT)	-0.281508	0.06836	-4.11815
D(LRW)	0.107348	0.06937	1.54750
D(LSINV)	-0.159079	0.11016	-1.44405
D(LIR)	3.918031	3.53384	1.10872
D(LMPEN)	5.164163	3.69447	1.39781

Table 5.7 displays the error correction results obtained from the estimation procedure. The error correction results in the VECM approach show the rate at which the departures from equilibrium of the variables are eliminated. The variations from the equilibrium condition may be caused by a large number of variables (some included and other omitted in the VAR). From the results

obtained the coefficients of the error correction terms indicate the rates of long run equilibrium convergence. The results show negative results for D(LL), D(LOUT) and D(LSINV) showing pressure towards long run equilibrium restoration. The rest of the error correction terms have positive coefficients indicating long run divergence from equilibrium. This could have been a result of endogeneity between the explanatory variable and the regressand. Only the LL and LOUT error correction terms are statistically significant.

**Figure 5.3: Actual versus Fitted Residuals**



The actual versus fitted residuals plot in Figure 5.3 above shows the fitness of the model. Some prediction errors have occurred but it is clear the model was considerably appropriate.

### 5.5 Diagnostic Checks

Diagnostic checks make it possible to examine the econometric validity of a model (Brooks, 2008). The diagnostic tests include the Lagrange Multiplier (LM), White's test and the Jarque-

Bera (JB) test. They test for serial correlation, heteroskedasticity and normality in the residuals respectively.

**Table 5.8 Diagnostic Checks Outcomes**

<b>Test</b>	<b>Null Hypothesis</b>	<b>t-statistic</b>	<b>p-value</b>
Lagrange Multiplier(LM)	No serial correlation	29.957	0.892
White's Test	No conditional heteroscedasticity	290.097	0.553
Jarque-Bera (JB)	Normal distribution	2.509	0.285

The underlying concept in autocorrelation is that the error term in one period is positively correlated with the error term from the previous period. The LM test null hypothesis of no serial correlation is not rejected because the p-value of 0.892 is greater than 0.05. The White test for heteroskedasticity has the null hypothesis of no heteroskedasticity or that the residuals are homoskedastic. The null hypothesis is not rejected since the p-value of 0.553 is considerably higher than 0.05. The null hypothesis would have been rejected had the p-value been less than the 5 per cent significance level in the test. This indicates that the model has largely been well specified and the residual relatively behaved. To show whether there is normal distribution in the error terms, the JB test is used. The null hypothesis is the existence of normal distribution. The null hypothesis would be rejected if the p-value in the test is less than the 0.05 significance level. The results show that normal distribution in the residuals exists. The null hypothesis is not rejected because of the 0.285 p-value which is greater than 0.05. The findings of the diagnostic tests can jointly be concluded to ascertain that the Johansen model is a stable one whose results can at least be relied upon.

### **5.6 Impulse Response and Variance Decomposition Analyses**

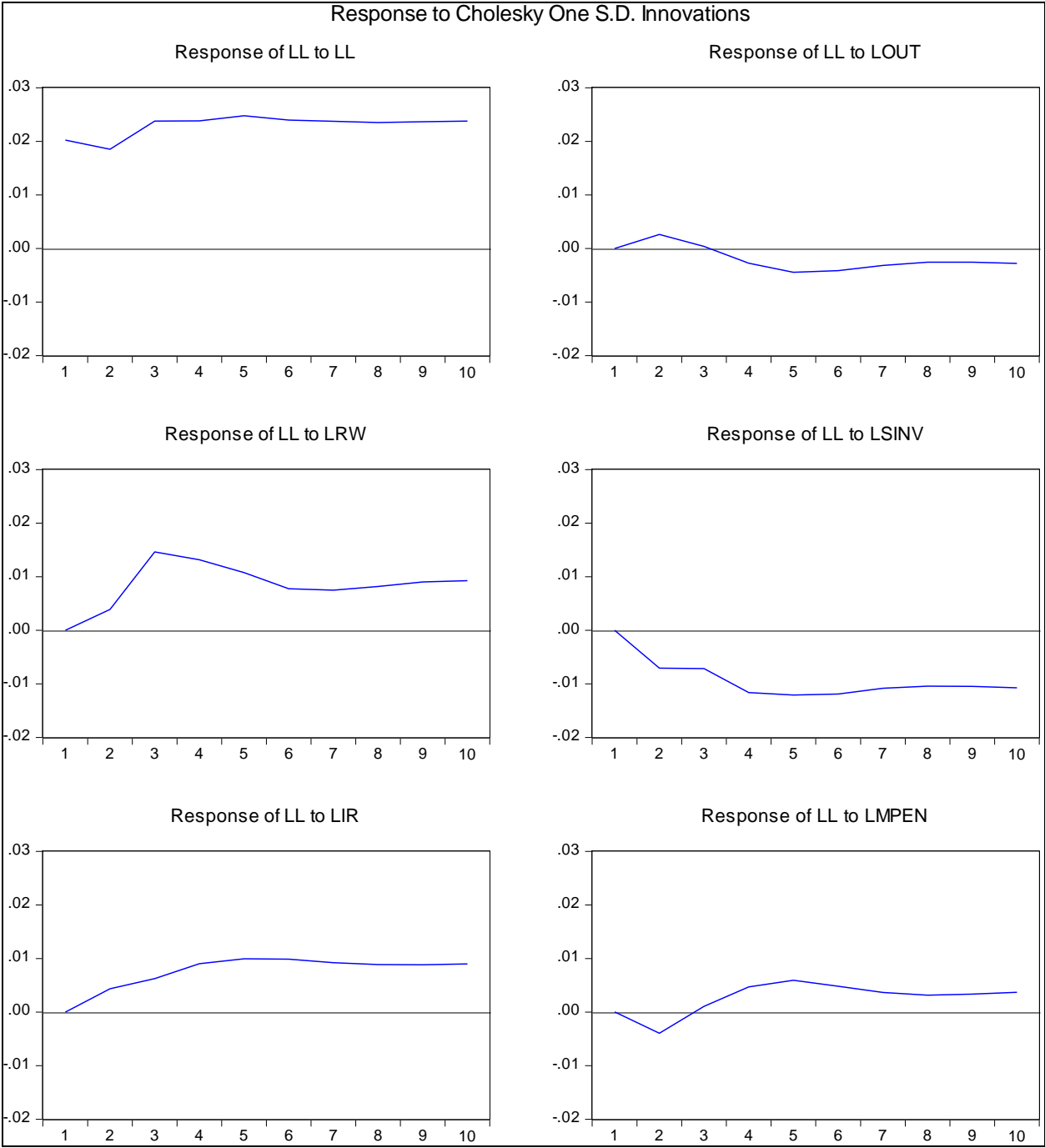
Analysis of the findings of the VAR will suggest which variables in the models are significantly related. The results will not however, by design, be capable of explaining the relationships or the duration required for the effects in the relationships to occur. The findings of the VAR alone are incapable of showing whether changes in variables will have inverse or positive impacts on the other variables or how long these effects will take in the process.

### 5.6.1 Impulse Response Analysis

Impulse responses illustrate the degree of responsiveness of the LL in the VAR to impulses to the explanatory variables (LOUT, LRW, LIR, LMPEN and LSINV). This is such that each of LL, LOUT, LRW, LIR, LMPEN and LSINV from each equation, has a shock effected upon the random error. The effects of these shocks on the VAR are recorded periodically. Ultimately, because there are six variables in the systems, the number of impulse responses generated will be thirty six. The study, though, will select a proportion of the impulse responses to analyse.

The impulse response analysis provides a picture on the reaction of the dependent variable to shocks in the explanatory variables and itself. In this case the analysis focuses on the LL variable. The innovations in the variables in the system and their impulses are indicated in Figure 5.3 over 10 periods. Jointly, the durations and direction of the shocks can also be studied. The shocks are existent in all the variables. Although for the larger part they are consistent with the results of the analysis, small deviations occur in persistency. A single period shock to LIR affects LL negatively but not significantly from zero. The effects level out in the second period and reverse from then onwards. A periodic shock in LOUT impacts LL slightly and less than a percentage. The impact is level over two periods and increases from the third period onwards. LMPEN affects LL negatively and less than one percent. The single period shock levels slightly until the third period, but continues to persist over the relevant period. The shock imposed by LSINV is initially negative and not significant from zero in the first period but reverses and rises persistently from the second period onwards. The single period shock to LL of LRW is also consistent with the error correction results. It is positive and persistent over the entire period.

**Figure 5.4: Graphical Impulse Response Analyses**



### 5.6.2 Variance Decomposition Analysis

Variance decomposition analysis is a slightly different approach to the impulse response analysis in testing the effects of shocks in variables in the autoregressive system. The variance decomposition analysis will illustrate the fraction of changes in the labour demand caused by internal shocks in it, versus shocks to the other explanatory variables (LOUT, LRW, LIR, LMPEN and LSINV). The shock to in LL is expected to have a direct effect on the variable itself. This shock is also transferred to the other variables through the dynamics of VAR system (Brooks 2002). It is anticipated that LL innovations will account for the majority of the error variance of the series.

**Table 5.9 Variance Decompositions**

Period	S.E.	LL	LOUT	LRW	LIR	LMPEN	LSINV
1	0.020195	100.0000	0.000000	0.000000	0.000000	0.000000	0.000000
2	0.029265	87.58090	0.786023	1.750644	6.366335	1.612698	1.903396
3	0.041553	76.19609	0.397110	13.20694	7.893366	0.886624	1.419869
4	0.052079	69.38099	0.530581	14.79570	11.97106	1.487561	1.834102
5	0.061165	66.69770	0.914026	13.81047	14.50018	2.111199	1.966429
6	0.068230	65.93232	1.101152	12.39166	16.23778	2.255747	2.081344
7	0.074160	66.04163	1.117625	11.50874	17.04927	2.185446	2.097282
8	0.079515	66.17948	1.077462	11.06402	17.49368	2.083367	2.101990
9	0.084666	66.17122	1.041552	10.89489	17.77252	2.018598	2.101214
10	0.089643	66.04630	1.026882	10.78575	18.03619	1.995857	2.109020
Cholesky Ordering: LL LOUT LRW LIR LMPEN LSINV							

Table 5.9 shows the variance decompositions for 10 periods, thus the extent to which the variances in the dependent variable are explained by shocks in the independent variables over time. The variance in labour demand in the first period is explained entirely by shocks in labour demand itself. In the second period, variances in LL are still largely explained by shocks in the variable. Midway through the periods, variances in labour demand are explained about 66.7 per cent by itself while the remaining 33.3 percent are explained by the independent variables with LIR contributing the comparatively biggest portion of 14.5 percent. After the 10<sup>th</sup> period, labour demand explains about 66 percent of its own variations. The impact caused by shocks in LOUT, LRW, LIR, LMPEN and LSINV account for the remaining 34 percent in the ratio 1.0; 10.8;

18.0; 2.0 and 2.1 respectively. By this period, it is clear that the shocks in the explanatory variables account for slowly increasing variations in labour demand.

## **5.7 Conclusion**

This chapter analysed findings of the empirical procedures and presented results. Initially, tests for unit roots in the series were conducted. Cointegration tests were then carried out and succeeded by the error correction model. Diagnostic tests, impulse response and variance decomposition analyses were also conducted. The unit root tests showed that the series were stationary at the first differenced terms and integrated of order one. The lag order selection chose 1 lag and the cointegration tests concurred on the existence of at least one cointegration equation at 5 percent significance level. The long run results showed that some variables were statistically significant in explaining labour demand. The results showed that increases in wage and import variables were significant in reducing the demand for workers. The results also showed the strong positive impact of sector-based investment in increasing the demand for workers.

## CHAPTER SIX

### CONCLUSIONS AND POLICY RECOMMENDATIONS

#### 6.1 Summary of the study

Chapter one of the study combined the introduction and the background of the study question. It provided a base picture on labour demand, employment and the determinants thereof in the South African TCF manufacturing sector. The second chapter provided overview of the trends in labour demand and the relevant determinants over time periods. The relevant underlying theories on the demand for labour were analysed in chapter three along with empirical literature. Chapter four illustrated the methodology implemented in the study and the results obtained were analysed and interpreted in the succeeding chapter. The conclusions to the entire study and the policy recommendations thereafter will be covered in chapter six.

Observation of the time based trends on employment and labour demand in the South African TCF manufacturing sector shows a general declining trend albeit periods of weak employment growth in the sector. The decline in employment has been caused by the massive decline in the sector, with many firms closing shop. Declining trends were also observed in interest rates. The overview, on the other hand, showed rising trends in the levels of real wages received by employees in the sector, output and imports of textile commodities from other nations.

In the third chapter various theories were analysed and reviewed. These included labour demand theories in the short run and in the long run, the perfectly competitive labour market and the Union wages theory. The theoretical literature suggested, in some instances, common determinants of labour demand such as absolute wages and output. Some on the other hand suggested the existences of relative wages, relative costs of factor inputs and productivity as possible determinants of employment. The empirical literature reviewed generated varying conclusions. It was common in most studies that inverse relationships existed between labour demand and the costs associated with hiring the labour. In some cases though, the relationships between labour demand and the determinants was grossly inconsistent spatially. Some of the disparities in the conclusions available in the different studies can be attributed to inconsistencies

in the type of data used, the period of study in question and the econometric methodology applied.

Chapter four of the study illustrated the empirical methodology used. The theoretical framework on which the empirical model is based is shown and explained. The empirical model adopted in the study and used as the guideline to the research methodology is illustrated and modified to suit the study. Chapter four also shows, explains and justifies the variables included in the model. The expected signs of coefficients (expected priori) are explained based on the relevant economic theory. The Johansen and Juselius (1991) model was used. It is a maximum likelihood vector autoregressive model fitted with vector error correction model.

The methodology implied that tests for unit roots should be carried out. The Phillips-Peron and Augmented Dickey-Fuller tests were therefore utilized. Succeeding these tests, long run relationships in the variables were tested using the cointegration technique and an error correction model was imposed. To test for the suitability of the model, diagnostic tests in the form of the Lagrange Multiplier, Jarque-Bera and White tests were conducted. Following the latter, impulse response and variance decompositions were undertaken.

## **6.2 Policy Recommendations**

The following section consists of policies recommended for government and responsible authorities. The policies suggested and explained in this section have been derived from the observations and results of the study. These policies are meant as possible remedies to the existing problems in the South African TCF manufacturing sector. These policies include various labour market policies, trade policies and tax policies.

### **6.2.1 Labour Market Policy**

Policies to increase employment growth may be implemented within the labour market to achieve the desired impact more directly. These policies are meant at generating conducive environments within which employers may operate thus providing incentive for them to hire more workers.

### **6.2.1.1 Wage Subsidy**

A targeted or specific wage subsidy is an agreeably unpredictable and potentially dangerous policy tool. It can be argued though, that if meticulously managed, a wage subsidy may produce the required labour market results, in the short term at least. Wage subsidies are compensations paid to employers as a proportion of their wage costs or wage rates to stimulate or incentivise higher quantities of employment in a selected sector or group (Rutherford, 2002). The purpose of typical wage subsidies, directly, is to selectively increase employment in the short term with the hope of harvesting rewards associated with lower unemployment rates. Wage subsidies, though, cannot be relied upon as long term solutions to employment problems and must be implemented in conjunction with alternative policies or possible replacement policies.

The underlying economic concept behind wage subsidies is a rather simple one. The primary objective of the wage subsidy is to increase the demand for a particular type of worker or in a particular industry. Wage subsidies given out by the Government to firms have the impacts of reducing employers cost of labour. The reduction in the firms' employment costs can have both direct and indirect impacts on the hiring decisions undertaken by employers. The direct way is that the firm will simply intensify its usage of labour because it would have become the relatively cheaper factor of production. More indirectly, it is possible that the decline in labour costs stimulates profitability growth which in turn results in mechanisation, output growth and via the derived demand concept, increase in employment. Practically, the application of the wage subsidy may not be as glamorous as it is theoretically. Various advantages can be attributed to the use of wage subsidies, but conversely, there is an abundance of demerits in association.

The possible major advantage of a wage subsidy system if applied to South Africa's TCF manufacturing sector is the decline in unemployment. The decline in unemployment though is largely reliant on the employment multiplier or the elasticity of demand for workers that would exist in reality. The employment multiplier is a measure of the change in employment that would occur as a result of changes in cost of labour (Rutherford, 2002).

Little empirical publications have occurred on the employment multiplier in the case of a wage subsidy as it is a policy tool still being debated. Supposing the multiplier is significantly high, the wage subsidy would have significant short term benefits in terms of employment and output growth in the clothing and textiles sector. These short term benefits would have strong "Domino

effect” such that poverty and the welfare burden on government are also reduced. The tax revenue may also increase.

Besides the employment multiplier in the particular industry, various other characteristics have to be considered before implementing the wage subsidy. Factors such as the Value-added structure; the industry’s (potential) contribution towards national income, the employment structure as a measure of relative employment levels, the factor inputs ratio, labour-output coefficient and the wage elasticity of demand (Pauw, 2002). Wage subsidies have been applied in Europe to create and maintain jobs and promote mobility. It has also been used to smooth adjustments of employment to changes in output and address social equity (European Commission, 2010).

#### **6.2.1.2 Arbitration**

Since employment creation is one of the Government’s more pressing and demanding of macroeconomic objectives, any measures that increase output by substituting labour would be less favourable in the short term. Perpetually and consistently increasing wage rates are major drivers of decline in labour demand. The workings of labour unions can therefore be analogously concluded to have compounding negative impacts on the demand for workers. Government should therefore instill measures that limit the operational muscle of labour unions in the South African labour market. On many occasions, the standoff between employee representatives and employers has stretched to levels that have resulted in neither party being better off and as a consequence, significantly adverse welfare implications.

The South African labour market is an extremely volatile one, and its workings can be argued to have significant influences on the perceptions of employers towards labour. Regardless of this instability and unpredictability, it is still possible that the Government can still act as a regulatory authority in cases where agreement has failed to be reached. Extended leave off work hinders production and the consequential real losses and opportunity costs incurred are noteworthy. To limit such possible damage, the Government may act as an arbitrator of last resort. Interest arbitration<sup>13</sup> undertaken by government may take two forms; conventional and final offer

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<sup>13</sup> Interest arbitration is arbitration focused with bargaining distinguishable from the grievance-arbitration process widely used in resolving contract based disputes (Ehrenberg et al, 2006).

arbitration. With the conventional form of arbitration, the Government will retain the prerogative of selecting a resolving-wage. They take into contemplation the cases presented by both parties and independently settle on a wage. Final-offer arbitration involves a radical approach towards problem resolution in the wage determination process. The Government arbitrator must select between the pre-arbitration wage offers presented by the disputing parties. It is theorized that the impact on disputing parties is that they cease to offer grossly prejudiced demands.

Such arbitration policies have been previously implemented and function relatively well in Norway. The European Federation of Public Service Unions acknowledges (2013) that the Norwegian government imposed compulsory arbitration and successfully halted damaging public sector strikes in vital sectors.

### **6.2.2 Trade Policy**

South Africa has to a certain extent made attempts at reaping the benefits of free trade, but has also taken measures to ascertain that the economy is not prejudiced through it. Free trade has the major advantage of allowing low-cost products to be produced and imported from low-cost countries. Countries such as China have got absolute advantage in labour intensive manufacturing industries because of the factor abundance (labour). South Africa attains benefits from trading with such low-cost countries, but conversely, certain disadvantages are associated with such trade. A typical example is replacement of the domestic industry.

One of the paramount observations about the 2012 South African trade policy is its relegation from being a vital stimulant of economic growth to a sheer instrument of industrial policy (Dube and Mandigora, 2012). This is hardly surprising considering the inherent impact of the global financial crisis, the Eurozone crisis, the American fiscal crisis and China's subsequent creeping takeover of local industry. The view is now a more cynical one towards total liberalization. Nonetheless, to attain the bold objectives of the New Growth Path and the National Development Plan there is still an argument for a proactive trade policy. It would be more prudent on the part of South Africa to employ the proposals within the Trade Policy Strategic Framework (TPSF) that suggested firmer integration within the developing country framework<sup>14</sup>. Despite the

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<sup>14</sup> The so called South-South cooperation instruments are not contextually defined within the (TPSF) but advocate for preferential trade with the South countries (Dube and Mandigora, 2012).

cynicism directed towards the efficacy of preferential trade agreements, it is potentially beneficial in this instance to participate with countries with similar economic demography and limit the inclination towards more advanced economies.

#### **6.2.2.1 Restrictions on TCF imports**

Subsequent import quotas on the importation of mainly Chinese textiles and clothing were imposed in 2007 (SEDA, 2008). The importation of various TCF commodities was largely governed by the ITAC. The consequences of these restrictions have been inconsistent and subject to debate. The inconsistencies have been caused by selective application of the restrictions among the different commodities in SIC 311-317. Further inconsistencies have been a result of the quota application according to ITAC HS 2 to 8 digit codes applicable to imports. Only TCF commodities in HS 4 digit codes are subject to the import quotas. Edwards and Morris (2006) suggested a strong misrepresentation of the influence of quotas on the TCF sector. Only clothing and textile fabrics are affected by the HS 5208 to HS 5210 and HS 5514 digit codes. The subsequent influence on footwear and other textile materials is at best sketchy.

To eradicate these phenomena, inconsistencies and unpredictability, universal application of import restrictions is recommended for all TCF commodities being imported. Anything less than this measure will likely lead to continuous interpretation problems in the sector and therefore makes it difficult to formulate any consistent and sustainable policy towards imports.

#### **6.2.3 Investment Promotion Policy**

The policies on investment if or when implemented are meant to attract/provide incentive for potential investors to invest in the sector. Various policy measures can be used to directly draw investment and in turn growth into the TCF manufacturing sector in South Africa. Such measures can include various tax and operational policies. Streak (1998) analysis of FDI showed that inbound FDI was mainly market and resource-seeking based. The study suggested that Efficiency-seeking FDI was very little because of less attention towards institutional, infrastructural and factor related determinants of FDI. The study concluded that the current policies would not attract as much FDI as needed.

### **6.2.3.1 Tax Policy**

As a result of high labour costs prevalent within the country, alternative methods of attracting investors must be contemplated. The government has to decide on methods that reduce the set-up and operational costs currently faced by potential investors in the TCF manufacturing sector. The tax regime prevalent in an economy has the capability to deter or attract investment. Economic theory states that lower and fewer taxes are associated with increased FDI inflows. This is so because investors are assumed to be profit maximisers and the lower tax rates are favourable. Taxes on the other hand, comprise a large part of revenues generated by Government. A dilemma exists where authorities are torn between compromising revenues with the hope of attracting investment. In the short term, the major repercussion associated with lower taxes is an increase in government deficit. As a result, lower to middle income economies are averse to lowering taxes as a policy tool. The logic behind lowering taxes is that it would stimulate inflows of FDI which in turn increase employment. The reduction in unemployment rates would at least disqualify the newly employed citizens from the state's welfare system. Furthermore, the increase in employment would introduce a group of newly employed persons that are eligible to pay taxes such that the phenomenon may offset itself.

It is advisable though, that if tax reductions are implemented as policy tools to attract investment, it should be prudently and carefully done. According to Treasury (2011), corporate tax rates in South Africa averaged 29%, and they have been so since reduction from the 2004-2005 30% rate. This rate is comparatively higher than those implemented in other countries such as Hong Kong, Egypt and Botswana. Their tax rates are 15%, 20% and 25% respectively. Tax holidays, in reality, if implemented for long periods of time provide incentives for firms to operate at capacity and maximize profits then shut down operations as soon as the tax holidays are revoked. When implementing tax cuts/holidays, it is wise that they are set up and revoked within periods that are not conducive for the investor to close shop.

The United Nations Conference on Trade and Development (2000) assessed and concluded that tax incentives were a common trade and investment promotion tool in over 85 countries. Over 12 different types of tax incentives have been used to differing levels of success. They have been particularly vital in China, Singapore and Brazil.

### **6.3 Limitations of the study**

The value of labour market data has severe inconsistencies, leaving analysis of key market tendencies problematic<sup>15</sup>. The data is furthermore subject to end-point selection sensitivity, with statistics for differing phases offering significantly diverging results (Bhorat and McCord, 2003). Despite significant drive towards attaining the best results in the study, some of the data may have been compromised where data was only available in annual form while the study employed quarterly data. The data used in the study was secondary data whose data generation process (DGP) was not clear and thus cannot be concluded to be fully efficient and reliable<sup>16</sup>. More reliable and appropriate data would have been applied in the study if primary data had been collected at firm level. Some proxy variables were utilized in place of unavailable true variables. The study assumed directly related impact between the proxy and the true variable which might not materialize in reality. In the study, no variation was accounted for among different employee aggregates based on gender, production or skills level. This could be a possible source of bias in the results obtained.

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<sup>15</sup> Particular emphasis on the data problems and the inherent implications are associated more with the informal sector.

<sup>16</sup> Employment data in the textile manufacturing sector is largely inconsistent and difficult to utilize in time series as it comprises varying sampling and collection techniques. Such data may have prejudiced the estimates and resulted in strenuous interpretation (Edwards and Morris, 2006).

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**APPENDIX**  
**Regression Data (Natural Logarithms)**

	<b>LL</b>	<b>LRW</b>	<b>LMPEN</b>	<b>LSINV</b>	<b>LIR</b>	<b>LOUT</b>
1990S1	13.3127	12.4952	15.1	4.77994	21	13.1121
1990S2	13.2667	12.5095	13.9	4.76924	21	13.0543
1991S1	13.2343	12.5186	13.7	4.75663	21	13.0087
1991S2	13.2516	12.5266	14.6	4.7773	21	13.0454
1992S1	13.2855	12.4842	14.5	4.80203	21	13.1008
1992S2	13.2797	12.499	15.1	4.80876	20	13.0985
1993S1	13.2237	12.5103	15.6	4.80876	20	13.0585
1993S2	13.2225	12.5154	16.1	4.82181	20.25	13.0624
1994S1	13.2363	12.4774	15.9	4.8195	20.25	13.0694
1994S2	13.2239	12.4846	15	4.83079	19.25	13.0828
1995S1	13.1938	12.481	14.2	4.82711	18.25	13.0635
1995S2	13.1588	12.4799	10.8	4.83964	17.58	13.0238
1996S1	13.1561	12.4574	9.4	4.84253	16.5833	13.0012
1996S2	13.1169	12.4882	10.7	4.81281	16.25	12.9621
1997S1	13.0993	12.5092	9.4	4.79518	16.25	12.9439
1997S2	13.1291	12.516	9.4	4.81427	15.58	12.9668
1998S1	13.1281	12.4752	9.7	4.8322	15.25	12.9728
1998S2	13.168	12.5297	7.1	4.78161	15.25	13.0322
1999S1	13.1726	12.5409	9.1	4.77873	15.25	13.0496
1999S2	13.1854	12.5517	9.8	4.79151	16.25	13.0649
2000S1	13.1561	12.5157	10	4.78502	17.0833	13.0182
2000S2	13.2028	12.5398	10.7	4.74777	17.5	13.0652
2001S1	13.2107	12.5781	7.8	4.78683	18.5	13.052
2001S2	13.2337	12.5867	6.6	4.8049	18.5	13.0873
2002S1	13.2481	12.5534	6.5	4.80296	18.5	13.1196
2002S2	13.2842	12.5989	6.1	4.70245	20.1667	13.1625
2003S1	13.3064	12.6141	7.6	4.68337	19.5	13.1848
2003S2	13.3347	12.6228	9.1	4.67482	19.9167	13.2169
2004S1	13.3307	12.5873	9.6	4.76941	20.25	13.2165
2004S2	13.359	12.6312	9.4	4.80085	20.25	13.2413
2005S1	13.376	12.6372	8.6	4.79096	20.25	13.2585
2005S2	13.4134	12.6384	6.9	4.76206	19.25	13.3101
2006S1	13.4178	12.6001	5.5	4.77258	19.25	13.311
2006S2	13.4269	12.6326	5.1	4.74183	18.9167	13.3184

2007S1	13.4396	12.6387	7.7	4.57729	25	13.343
2007S2	13.4609	12.6437	9.1	4.62563	23.6667	13.3503
2008S1	13.4326	12.6105	8.5	4.58952	21	13.3167
2008S2	13.4528	12.6511	7.3	4.61621	18.6667	13.3496
2009S1	13.4368	12.6662	3.4	4.62739	16.8333	13.3499
2009S2	13.4802	12.6798	1.9	4.62435	15.5	13.3967
2010S1	13.4524	12.6454	2.8	4.6356	14.5	13.3652
2010S2	13.4442	12.6844	4.9	4.59942	14.5	13.351
2011S1	13.4313	12.7169	6.6	4.61152	14.5	13.3308
2011S2	13.4628	12.7233	7	4.57292	14.5	13.3672
2012S1	13.4624	12.6824	7.4	4.54287	14.5	13.3652
2012S2	13.4976	12.7209	6.4	4.57137	14.5	13.3891