ESTIMATING THE RELATIONSHIP BETWEEN INFORMAL SECTOR EMPLOYMENT AND FORMAL SECTOR EMPLOYMENT IN SELECTED AFRICAN COUNTRIES

Mpho Anna Ntlhola

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School of Economics and Finance
University of KwaZulu-Natal, Pietermaritzburg

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DEDICATION

To my Dad and Mom, Setenane Ntlhola and Mampho Ntlhola,

and my brothers, Tsepiso Ntlhola and Sello Ntlhola.

DECLARATION

I Mpho Anna Ntlhola declare that

(i)   The research reported in this dissertation, except where otherwise indicated, is my original work.

(ii)   This dissertation has not been submitted for any degree or examination at any other university.

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I owe a debt of gratitude to God Almighty for enabling me to complete this dissertation. From the fullness of his grace I have received one blessing after another.

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ABBREVIATIONS

CLRM	Classical Linear Regression Model
DCs	Developed Countries
EX	Exports
FE	Formal Sector Employment
GLS	Generalised Least Squares
GDP	Gross Domestic Product
GNI	Gross National Income
GNP	Gross National Product
HIES	Household Income and Expenditure Survey
HO	Heckscher-Ohlin
IF	Informal Sector Employment
ILO	International Labour Organisation
IMF	International Monetary Fund
LDCs	Lesser-Developed Countries
LSDV	Least Squares Dummy Variable
METR	Marginal Effective Tax Rate
SAPs	Structural Adjustment Programmes
SMMEs	Small, Medium and Micro Enterprises
UNIDO	United Nations Industrial Development Organisation
VAT	Value Added Tax

ABSTRACT

Very little research evidence exists with respect to the informal sector in African countries. Although (mixed) theoretical evidence does exist that postulates a relationship between formal sector employment and informal sector employment, very little is understood about the exact nature of such a relationship. The research problem to be answered by this study thus constitutes two parts: Firstly, to estimate the relationship between informal sector employment and formal sector employment in selected African countries, and, secondly, to compare and contrast the estimated coefficients for the sample of countries with respect to statistical significance, sign and magnitude of such estimated coefficients.

The study makes use of a fixed effects or least squares dummy variable (LSDV) panel data regression model, in double-log form, that comprises observations for informal sector employment, formal sector employment and exports (as a possible proxy for the 'trade cycle' effect on informal sector employment). The sample of countries includes: South Africa; Kenya; Namibia; Zambia; Botswana and Mauritius, for the study period, 1998 – 2008.

Theoretically, the expectation is a negative relationship between informal sector employment and formal sector employment as these are (plausibly) 'substitute' activities in the labour market. However, there is mixed evidence to support/negate this hypothesis. Further, the expectation is a positive relationship between informal sector employment and exports.

Including formal sector employment and exports as explanatory variables in a linear regression framework, poses a possible problem of strong collinearity between the explanatory variables (i.e. multicollinearity) as formal sector employment and exports are,

generally, strong positively correlated. This study uses suitable ratio transformation to remedy this problem.

The general findings of the study are that South Africa, Namibia and Mauritius had statistically significant levels (or average changes therein) of informal employment as a proportion of population not dependent on changes to formal employment as a proportion of population and exports. In Namibia and Zambia, informal employment as a proportion of population was statistically related to formal employment as a proportion of population, with negative sign, and 'elasticity' greater than 1. In Namibia and Mauritius, informal employment as a proportion of population was statistically related to exports. Namibia had a positive sign and 'elasticity' barely in excess of 1. Mauritius, however, had a negative sign and 'elasticity' greater than 1.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Informal sector employment is plausibly a 'substitute' activity for formal sector employment. Informal sector employment has seen remarkable growth in African countries and other developing countries during the past decades (Mulinge and Munyae, 1998). A number of African countries that have embraced economic restructuring that eventually led to decrease formal sector employment and increased informal sector employment (Konayuma, 2006). Although the significance of the informal sector varies across countries over time, society has become more-and-more aware of its importance.

Generally-speaking, one would expect that rising (formal sector) employment leads to falling informal sector employment. Some labour economists hypothesise that wages, unemployment, and informal sector (employment) growth are positively correlated across countries (United Nations, 1995). Hussmanns (2004), on the other hand, stated that the informal economy had a significant contribution to; income generation and poverty reduction in many countries, especially in developing and transition economies.

'Employment in the informal sector' and 'informal employment' are labour market principles, which refer to various parts of the informalisation of employment. According to Hussmanns (2004), the concept of employment in the informal sector is defined in terms of characteristics, while the concept of informal employment is defined in terms of the characteristics of the job. Hussmanns (2001: 8), defines employment in the informal sector as a sum of, "all persons who, during a given reference period, were employed in at least one

informal sector enterprise, irrespective of their status in employment and whether it was their main or a secondary job." Informal employment comprises employment in the informal sector, "plus jobs of contributing family workers and informal jobs of employees in other sectors, plus the activities of persons engaged in the own-account production of goods for own final use by their household." (Hussmanns, 2001: 8)

Mbeki (2003) described the informal sector as the sector that is unable to generate the internal savings that would enable it to achieve the high rate of investment it needs and attain a rate of growth that would ultimately end its state of underdevelopment. The greater part of production units in the informal sector consists of subsistence-level activities and the reason why people join the informal sector is largely survivalist in nature. The informal sector is measured in terms of the production, distribution and consumption of goods and services that have contribution to Growth Domestic Product (GDP). However, these activities are not enshrined in legislation nor reported for use by government-type institutions (Reimer, 2003). According to Millin and Coetzee (2007), the informal sector is largely formed due to the coping behavior of individuals and families in an economic environment where (formal) earning opportunities are relatively scarce.

Figure 1 shows the size of the informal sector as a percentage of Gross National Income (GNI), with South Africa at 28.4 percent, the continent's largest economy, versus 60 percent in Nigeria, Tanzania and Zimbabwe. The average in sub-Saharan Africa is 42 percent (Schneider, 2002).

Figure 1: Size of the Informal Sector in Selected African Countries as Percentage of GNP 1999/2000
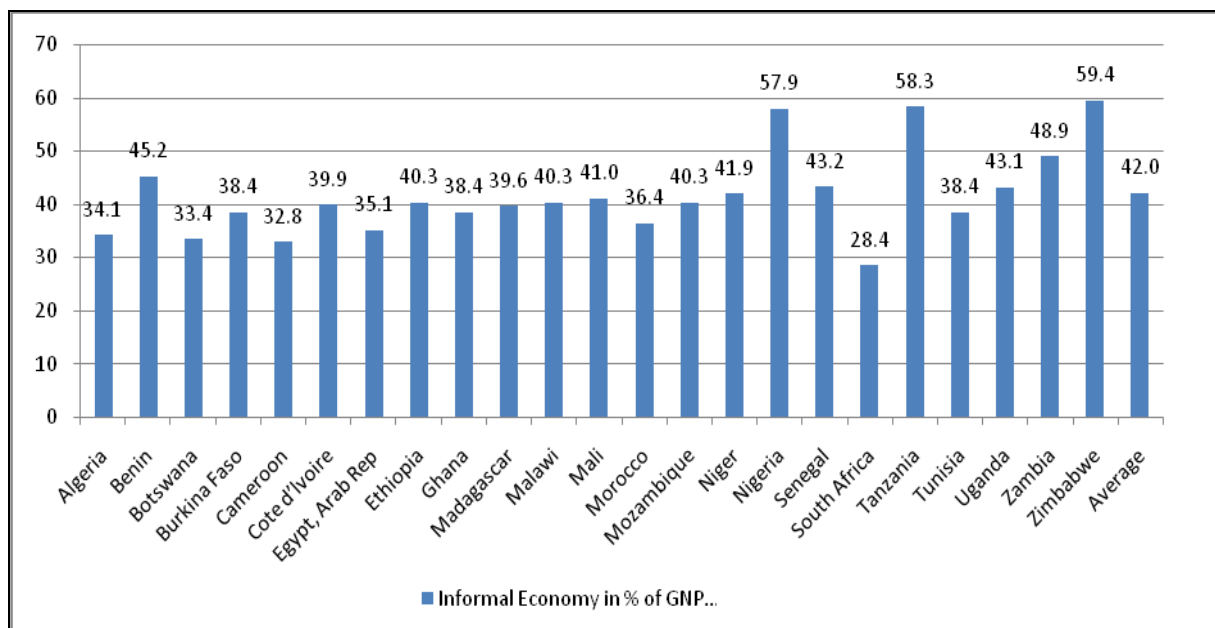
Source: Schneider (2002)

According to Schneider (2002) the informal sector in sub-Saharan Africa was estimated to represent around three-quarters of non-agricultural employment, while the ILO (2002a) stated that the informal sector amounts to 72 percent of employment in sub-Saharan Africa; 78 percent if South Africa is excluded. Chen (2001: 2) further stated that, "93 percent of new jobs created in Africa during the 1990s were in the informal sector, reflecting the impact of globalization, economic reforms and competitive pressures on the labour market in recent years."

Xaba, Horn and Motala (2002) summarised the empirical evidence for various African countries. This study showed that there has been a decline or stagnant employment growth in the formal sector, while the informal sector in Africa has been increasing with respect to both employment and output. For example, informal employment in Kenya is greater than

employment in the formal sector (Schneider, 2002). The United Nations (1995, cited by Schneider, 2002) stated that informal sector employment in Africa is dominated by activities such as by trade-related, with services and manufacturing contributing to a small percentage of the sector.

The informal sector represents a fundamental component of the economic structure of many developing, transition, and even developed countries. Gennari (2005) stated that informal sector activities are a key form of organisation of output and a vital source of employment and income opportunities, not only in rural, but also in urban areas. However, there is general consensus that the informal sector should be reduced in size or formalised in the long-run. Appendix A shows the size of the informal sector in selected African Countries. Growth of the informal sector is a key element of the prospect of all African nations for one reason: their present high unemployment rate will compress both local markets and foreign trade opportunities (Shinder, 1998).

Read and Staines (2004) stated that the informal sector growth reflects no difficulty with which informal businesses can enter and grow within the economy. However, informal business entities will have a greater contribution to the economy if they can operate in the formal sector. Typically, the informal sector largely comprises economic activities not regulated by environmental laws, labour laws or taxation, but is subject to the regulations of the local authorities (i.e. local municipalities) for orderly business operation. Some examples of retail-based activities (which comprise the majority of the informal sector activity in African countries) are: market vendors; road-side stalls; shoe-shining; hawkers; home dress-making; spaza shops; street vendors etc.. Nilima and Shiu (2006) stated that these activities are generally not added to the Gross Domestic Product (GDP) calculation through business

surveys but are usually covered in the Household Income and Expenditure Survey (HIES). The above broad understanding of the informal sector has reference in this study. Further, data acquired via the HIES method will be used in order that a consistent approach to data collection be used in understanding cross-country econometrics analysis.

According to the ILO (2002b), the worldwide informal sector has been growing fast (contrary to previous predictions), and a large number of jobs in recent years, predominantly in less-developed and emerging market economies, has been in the informal sector. Alderson, Talmage and Freeman (2006) indicated that, in the case of Africa, informal employment is as high as 80 percent of the non-agricultural workforce and the informal sector has absorbed almost 90 percent of new jobs over the past two decades. Esim (2001: 3) said:

> "For instance, it accounts for more than half of non-agricultural employment in Latin America and the Caribbean, nearly half in East Asia and as much as 80 percent in other parts of Asia and Africa. It is also responsible for 93 percent of new jobs in Africa and 83 percent in Latin America and the Caribbean."

For those countries where estimates exist, the informal sector accounts for 45 to 60 percent of non-agricultural GDP (Alderson et al., 2006). Gerxhani (2004, cited by Nilima and Shiu, 2006: 5) found that, "the literature on developed countries argues more towards the positive effect, while in less developed countries, a negative relationship appears to be more dominant". According to Pradhan and Van Soest (1995), the positive effect can be seen when informal sector earnings exceed unemployment income. Pradhan and Van Soest (1995) further said that, in equilibrium, a move from being unemployed to the informal sector involves a trade-off between earnings and reduced efficiency of job search. Verick (2001) said the negative effect of informal sector employment is seen by insufficient decent work

opportunities compared to employment in the formal sector of the economy. Verick (2001: 7) further said that, "(informal) workers have lower levels of education and rates of literacy compared with the formal sector, reflecting that poor human capital increases the probability of participation in the informal sector."

The growth of informal sector employment as a result of to trade liberalisation is also possible. Goldberg and Pavcnik (2003) claimed that increased foreign competition in developing countries contributes to mushroom of the informal sector. According to Goldberg and Pavcnik (2003), trade liberalisation represents "a removal of, or reduction in, the trade practices that thwart free flow of goods and services from one nation to another." Integration into the world economy has established a solid means for countries to advance their economic growth, development, and poverty reduction (IMF, 2008).

Similarly, a high (formal sector) unemployment rate has an effect similar to that of an increased labour supply and some empirical results estimated by Walterskirchen (1999: 2) showed that:

> "There is a negative correlation between changes in employment and unemployment, but certainly not 1:1. This relation may be obscured by political and social factors; changes in active labour market policies alter the relationship between unemployment and employment substantially."

Therefore, an increase in formal employment does not imply a reduction in unemployment of the same amount – Walterskirchen (1999: 6) supports this by stating that, "in Australia, out of three additional jobs only one has been occupied by an unemployed person, the remainder by persons from outside the labour market: hidden domestic labour reserves and in particular

additional foreign workers." Alternatively, additional formal sector jobs will be occupied partly by registered unemployed, partly by informally employed or other parts of the labour force (as above).

Okun's law demonstrates that there is a correlation between unemployment rates and deviations between actual and potential GDP (Walterskirchen, 1999). A high unemployment rate has an effect similar to an increase in labour supply; higher unemployment happened to increase the employment intensity growth, as it puts pressure on businesses to raise employment, particularly in low-wage occupations. Walterskirchen (1999) stated that the higher the Okun coefficient, that is, the higher the responsiveness of job loss to GDP growth, the better the chances for reducing unemployment through growth and demand-side policies.

Furthermore, the informal sector's growth (or decline) has essentially been linked to the decline (or growth) of the formal sector economy. According to Becker (2004), inadequate ability of the formal economy to soak up excess labour, together with a growing number of job-seekers, has increased the size of informal sector employment.

Table 1: Contribution of the Informal Economy to Employment

Informal Workforce as Share of:	Africa	Latin America & Caribbean	Asia
Non-Agricultural Employment	78%	57%	45-85%
Urban Employment	61%	40%	40-60%
New Jobs	93%	83%	N/A

Source: Becker (2004)

The informal sector is continuously growing. The estimates show that informal employments' share of new jobs is 93 percent in Africa and 83 percent in Latin America. The informal sector contributes significantly to employment generation and output growth of Africa and Latin America.

1.2   Research Problem

Very little research evidence exists with respect to the informal sector in African countries. Although (mixed) theoretical evidence does exist that postulates a relationship between formal sector employment and informal sector employment, very little is understood about the exact nature of such a relationship. The research problem to be answered by this study thus constitutes two parts: Firstly, to estimate the relationship between formal sector employment and informal sector employment in selected African countries, and, secondly, to compare and contrast the estimated coefficients for the sample of countries with respect to statistical significance, sign and magnitude of such estimated coefficients.

1.3   Research Objectives

1) To discuss various perspectives of informal sector development.

2) To construct a summary framework for the major findings of the various perspectives of informal sector development.

3) To establish the (theoretical) linkages between formal sector employment, informal sector employment and exports (i.e. using exports as a possible proxy for the 'trade cycle' effect on informal sector employment).

4) To estimate the relationship between formal sector employment and informal sector employment in selected African countries using a fixed effects panel data approach.

1.4   Research Methodology

The study makes use of a fixed effects or least-squares dummy variable (LSDV) panel data regression model that comprises observations for informal sector employment, formal sector employment and exports (as a possible proxy for the 'trade cycle' effect on informal sector employment). The panel data approach consists of observations characterised by both cross-sectional (i.e. between various countries) and time series dimensions (i.e. over time). The study will make use of published (secondary) data compiled from a range of statistical sources. Further, data acquired via the household income and expenditure survey (HIES) method will be used in order that a consistent approach to data collection be used in understanding cross-country econometrics analysis.

The samples of African countries selected are: South Africa; Kenya; Zambia; Namibia; Botswana and Mauritius. Data for each country on the preceding three variables is available for the period 1998-2008, making a sample size of 66 observations. The econometric methodology, incorporating the estimation of various panel data regression models, will, ostensibly, use a fixed effects or least-squares dummy variable (LSDV) approach to estimation. A number of possible models will, therefore, be estimated:

1) The intercept and slope coefficient/s are constant over time and across countries.

2) The slope coefficient/s is/are constant; intercept varies across countries.

3) The slope coefficient/s is/are constant; intercept varies across countries and over time.

4) The intercept and slope coefficient/s vary across countries.

1.5   Thesis Organisation

The thesis consists of five chapters. Chapter two focuses on the theoretical approach to informal sector employment growth. Chapter three establishes the (theoretical) link between informal sector employment, formal sector employment and trade liberalisation. Chapter four outlines the theoretical model specification to be used and econometric analysis of the six selected African countries. Chapter five concludes the study by summarising key findings.

1.6   Limitations of the Study

It is acknowledged that there is no established guideline for the compilation and/or collection of statistics on the informal sector economy. A preliminary literature review of the subject reveals that various methods of data collection and definitions of the informal sector economy have been used by different authors which make the comparison of findings difficult. Schneider and Enste (2000), for example, discussed a range of methods: sample survey method; fiscal audit method; national income and expenditure method; official versus actual labour force approach; transactions approach; currency demand approach and the physical input method. However, possible size of the informal sector economy can nonetheless be measured and the information carefully used by policy-makers.

The obtainable data sources do not all the time give the information that the definition asks for. Consequently, available facts about the informal sector trend and composition for the country lack a common meaning and consistency over time. Most countries use labour force surveys to gauge the size of informal sector employment. It is also argued, that when a labour force survey is carry out to calculate approximately the informal sector employment, it tends to miss-out certain categories of single-person/own-account enterprises, because it is not easy

to categorise such workers as enterprises. Further, available data sources sometimes are reduced to different definition and consistency in data collection over time.

The choice of the six African countries is based on availability, consistent time series data for all six countries. These country at some point share same trade union such as COMESA, and they all equally have trade relationship with America on which their exports are measured in US Dollars ($). Therefore, a balanced panel is obtained and all are sub-Saharan African countries (except Mauritius being as Island economy, but part of SADC). According to Gyimah-Brempong (1991: 816), "all sub-Saharan African countries have similar economic structures: low per capita income; largely agrarian economies with very small industrial sectors; relatively low growth rate; and a strictly binding foreign exchange constraint." This makes cross-country comparison much easier.

 Incorporation of exports instead of net exports is due to the fact that there is hardly any country (selected) that has a positive net exports for the period. Gyimah-Brempong (1991: 816) stated that, "because of the relative homogeneity of economic structure, weak economic policy-making apparatus, and a shared legacy of colonial economies, responses to instability in export earnings are likely to be similar among nations of sub-Saharan African countries." These similarities of selected African countries resulted into a negative net export, hence the choice of exports instead of net exports.

CHAPTER TWO

PERSPECTIVES OF INFORMAL SECTOR DEVELOPMENT[1]

2.1   Introduction

Macroeconomics has taken the challenge of explaining informal sector development, as evidenced by the large number of books and articles that have been published on the topic. Chen (2007) has identified informal sector as having the potential to play an important role both in providing employment and in contributing to the reorientation of the economy. Literature on the informal sector uses different approaches to explain informal sector development, ranging from simplistic explanations to more philosophically, complex explanation such as the dualist, structuralist, legalist, continuum (Becker, 2004), micro-business enterprises (Rakowski, 1994), and Todaro-Lewis model (Nolen, 2007) approaches/perspectives. Chapter two attempts to explain the separation between the informal sector and formal sector economies.

2.2   The Dualist Approach

The dualist approach explains the informal sector as a set of subsidiary activities that provide incomes for the deprived; those who are incapable (for various reason) of accessing employment in the formal sector (Reimer, 2003). According to Gorden (1982: 188) informal sector growth, "is due to the fact that not enough modern job opportunities have been created to absorb surplus labour, due to a slow rate of economic growth and/or a faster rate of population growth." The formal sector dominates the key industrial sector, capturing rapidly expanding markets and initiating innovative technological changes. As the economy grows,

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[1] Development in the context of this study largely implies growth in employment and output but also (to some extent) an improvement in the quality of employment conditions, and output over time.

the formal sector economy becomes increasingly differentiated from the informal sector economy that remains on the periphery. African countries are characterised by more than one 'labour market' with huge differences between one market and another (Chen, 2007). The labour market is the market in which people battle for occupations and employers compete for the available workforce. There are various ways of thinking about these two markets: informal-formal markets. The formal sector is deemed superior to the informal sector and these two types of sectors result in economic dualism that comprises informal sector employment and formal sector employment (Gorden, 1982).

2.2.1   The Dual Labour Market

The dual labour market assumes two sectors with two different labour markets: formal and informal. In the formal sector workers enjoy higher earnings, better employment security and often the protection of unions. The informal sector represents a totally opposite situation comprising a large portion of the unemployed; black women being the major participants in the informal sector (Saint-Paul, 1996).

In contrast to the supply-side and individual factors which dominate the neoclassical model of the labour market, segmentation theory emphasises demand-side and organisational features. Segmentation in the employment market arises because of various job attributes rather than differences in worker features, such as education and training (Saracoglu, 2005). Informal employment is largely filled by groups whose attachment to formal employment has been weak. Labour market segmentation differs in quality of jobs, and admission to the sector with good jobs is limited in the sense that not all who want employment in this segment are able to be employed there (Learning Space, 2008). Such job rationing is an essential part of the idea of labour market segmentation.

Until the early 1970s, developing countries were regularly characterised by dual economies, with a traditional agricultural sector and a more modern urban sector (Saracoglu, 2005). The issue of dualism has concentrated on the labour market (e.g. informal sector employment and formal sector employment). There are factors that characterise the informal sector of the less-developed countries, and Schneider and Enste (2000) cite them as:

1) Formal sector unemployment - there is no welfare net to catch the unemployed who thus have to become involuntarily employed and eventually join informal sector employment to survive.

2) Complicated/restrictive rules and regulations - these include labour legislation that may prevent more employment in the formal sector; registration cost of a business that forces it into the informal sector.

3) Decline of 'civic vetoes'- informal sector businesses take care of themselves with no perceived benefit of formalising the business.

4) Rise in taxation in the formal sector - forces those formal sector businesses that are making very small profit into the informal sector as rising costs tip average cost above average revenue.

All these factors can shape the size of the informal sector. Factors two and four above capture the extra cost argument. Employees and employers leave the formal sector to join the informal sector due to reduced work opportunities or profit in the formal sector economy. Further extensions to the dualistic model have evolved, taking into account factors such as job search costs, level of education, discrimination in the hiring process and allowance for an urban informal sector (Schneider and Enste, 2000).

Another characteristic of the dual labour market is the operation of an 'internal' labour market in the formal sector, meaning that many job positions are not filled by posting vacancies in the market but rather by internal promotion, while the 'external/outside' market is the source of recruitment to the informal sector (Saint-Paul, 1996). The informal sector labour market is thought of as providing flexibility to the economy. The workforce in the informal sector is used to adjust to fluctuations in labour demand, including fluctuations induced by regular economic changes (business cycle) as shown in Figure 2. For instance, a firm might use a core formal sector workforce along with informal sector workers who may be fired during times of economic downturn.

Figure 2: Demand for Primary and Secondary Workers Over the Business Cycle
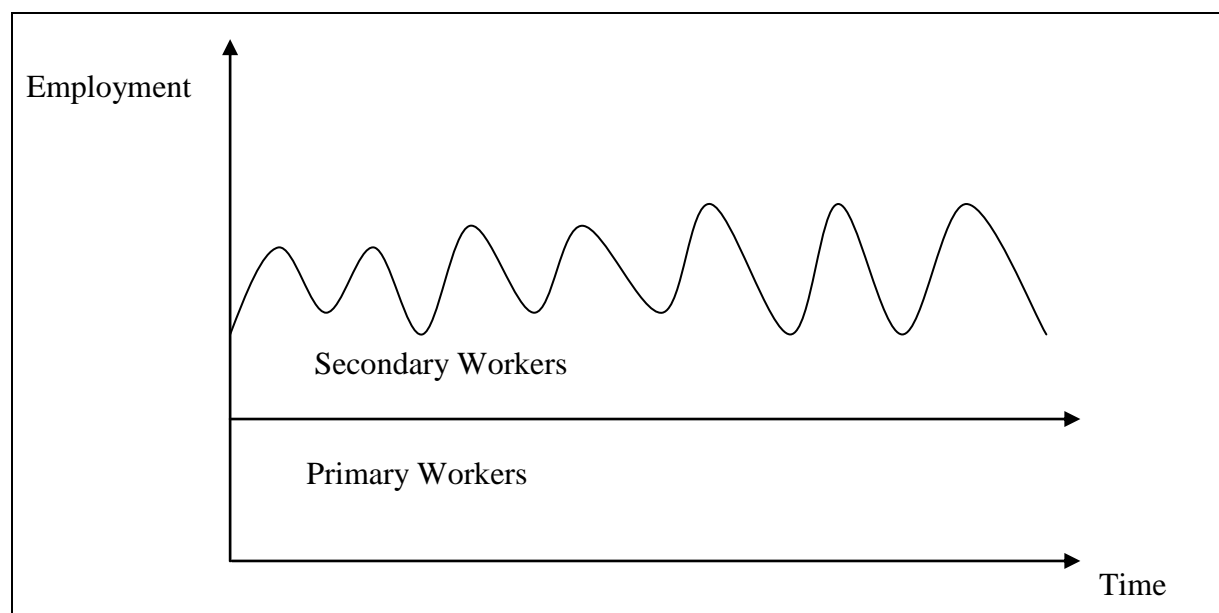
Source: Saint-Paul (1996)

Firms prefer to hire a 'primary' workforce paying efficient wages, provided these firms do not expect to change employment too often. Saint-Paul (1996) explains the primary workforce as that part of the labour market that tends to offer high salaries or wages, better

working conditions, and grater job stability. Firms are more likely to utilise a 'secondary' workforce when greater demand fluctuations are expected. The secondary workforce comprises occupations that tend to pay lower wages, have insecure employment, and provide less opportunity for advancement. The secondary workforce allows firms to employ a 'primary' workforce, but avoid paying the costs associated with efficiency wages. Hence, dualism arises 'endogenously' (i.e. having no clear external cause) within firms as a response to demand fluctuation and, under plausible conditions, reducing these fluctuations, reduces the share of secondary workers (Saint-Paul, 1996).

In most parts of the world, there has been a trend away from core workers towards atypical workers (Freiji, 2002). In South Africa, the move towards temporary or casual labour has been quite widespread and a total of 85.5 percent of enterprises in a recent survey (such as labour force survey 2007) had employed temporary or casual labour (Barker, 2007). Examples of such firms are restaurants and construction organisations. Barker (2007) further explains the informal sector as being separate from the formal sector; the informal sector is distinguished on the basis of various characteristics such as family ownership, skills that are acquired outside the formal school and training system, and a market operation that is unregulated.

2.2.2   Training

The two markets (formal and informal) are not defined according to occupation or industry but rather by a set of general features. As stated in Learning Space (2008), the primary and secondary sectors of the labour market are the result of the interaction between these two main groups. The labour pool to fill jobs in the informal sector is relatively undifferentiated; close to a standardised mass of 'raw' labour power (Learning Space, 2008). This means that there is little or no on-the-job training necessary to perform these jobs and if training is provided, it is general in nature.

The inability of the informal sector to establish markets for their products is due to a lack of business skills (Ormond, 1994). A number of poorly developed skills such as financial record keeping, product quality control and marketing, were identified, all of which could be corrected through training. Informal sector operators often have technological skills, but lack the necessary management skills to successfully operate the business, therefore, failing to meet the formal sector standard of operation. Similarly, informal sector managers seldom plan or train employees, hence business failure is a result of management failure. Gamble (2004, cited by Mlambo-Ngcuka, Wadula, Botha, and Gamble, 2004: 41) said "research that was conducted mostly in African countries shows that the conventional track followed by those who achieve success in sustainable entrepreneurial self-employment is one that starts with completion of general education, followed by further formal or informal vocational or special training." The stark reality for most people in the informal sector all over the world is that entrants frequently have to leave school before the end of the compulsory school period (or no schooling at all) and thus receive limited general education.

The informal sector managers also lack an understanding of the benefit to be had from training and further have very modest expectations of the benefit to be gained from any kind of management development. The management incompetence and lack of experience were the major reasons for informal sector failure (Nattrass and Glass, 1986). The owner/manager of informal enterprises does not identify, or respond quickly enough to, the external environment and ultimately the business fails. Business operations between the formal and informal sectors differ in various activities, and Ormond (1994: 26) cited four major reasons that distinguish business operations in the formal versus informal sectors:

1) Lack of fundamental ability to plan, organise and manage the operation. The failure of informal business starts with lack of planning and follow-through. Failure is still possible if the plans are not revised to take into account contingencies of the operation. Without follow-through, plans are valueless.

2) The lack of balance in business ability (know-how) with either too much or too little formal training relative to experience.

3) Lack of experience in the practices of a particular line of business.

4) The lack of everyday on the job experience in applying management principles. This is called the information gap.

Therefore, what type of workforce is most likely to work in the informal sector? Most studies acknowledge a similar composition of workforce, and Freiji (2002) elaborated by saying individuals with a smaller amount of skills of and education, are more likely to enrol in informal sector employment.

2.3   The Structuralist Approach

The structuralist approach explains the informal sector as a set of subordinated sector units and workers that serve to decrease the input and labour costs for the large formal enterprises, and thereby, increase the competitiveness of formal enterprises. Productivity gains in the formal sector are in part, reliant on an enlargement in the informal enterprises. The nature of formal sector development accounts for the persistent growth of informal production interactions.

According to this school of thought, the nature of industrial progress (rather than a lack of formal sector growth) accounts for the persistence and development of informal production interaction. Castells and Portes (1989) subscribe to the idea that the informal sector ought to be viewed as subordinate economic units and employees that provide to shrink input and labour costs, increase the competitiveness of large capitalist firms. According to Chen (2007), retrenched workers often move into informal sector employment when formal businesses are closed or the public sector is rationalised. Jose (2008: 4) defines the informal sector as broadly characterised of "units engaged in the production of goods or services with primary objective of generating employment and income to the persons concerned." It is important not to pronounce any judgement on whether such informal sector activities are good or bad for the economy. Gli (2004: 1) stated that:

> "The debt crisis of the underdeveloped countries, the dismantling of the public sector,
>
> the deregulation of the labour market under the structural adjustment programs of the
>
> IMF and the World Bank, and the succession of economic and financial crises in
>
> 1997, has pushed millions of people in Africa, Asia and Latin America out of formal
>
> employment and into the informal economy."

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People are generally not in informal sector employment by choice, but as a means to survive. Currently, development of informal employment is related to several structural changes in the dominant economy such as new immigrant labour - market entrants to a pool of workers already swollen by technological changes (Davies, 2002).

2.3.1   Trade Liberalisation

According to Maiti and Marjit (2007), globalisation through trade, foreign direct investment (FDI), capital, technological know-how and resettlement can fuel demand and output, give rise to privileged income and job formation (in both formal and informal sectors), thereby decreasing poverty. From the Stolper-Samuelson theorem, the main outcome of the Heckscher-Ohlin (HO) model of trade, has presented a hypothetical (economic) structure to clarify how trade impacts employment and earnings. The essential hypothesis is that trade openness stimulates an enlargement in demand for labour-intensive exportable goods produced in less-developed countries. In most developing countries unskilled labour is in abundance, and trade openness is likely to contribute positively to informal sector employment creation (Maiti and Marjit, 2007).

Employment growth in export-oriented firms relies on the flexibility of demand for labour in the informal sector, which, in turn, is provisional on the labour supply elasticity (Verick, 2006). The effect of trade and other forms of globalisation on employment depends on how the labour market operates. A hypothetical model of small open-market economies with two factors: labour and capital, and three types of goods: exportable, importable and non-tradable, gives a different prediction for the impact of trade on employment and wage (Hasan, 2001). A more relevant prediction for the impact of trade on informal employment can be proposed, and Verick (2006: 11) explains by saying:

"Prior to liberalisation, import-competing capital-intensive industries in developing countries typically operated in the formal (private and public) sector. After reducing barriers to trade, we would expect, therefore, that there is a fall in demand for goods produced in the formal sector, resulting in a drop in employment in this sector in the short and long-run. Employment in the exportable sector is predicted to increase in any case, while the effect on wages in this sector depends on the assumption regarding wage rigidities."

The development of the informal sector pivots on whether this sector specialises in the manufacturing of tradeable or non-tradeable goods. The presumption is that informal businesses produce exportable goods; then the demand for these goods would also hike after trade openness, leading to development of informal sector employment (Verick, 2006). However, Maiti and Marjit (2007) argue that the informal sector has in fact two roles in a globalised economy: firstly, as a provider of intermediate goods to the formal sector; and secondly, as manufacturer of final goods. Increased production in the informal sector permits the firms to take advantage of a growing export market. As a result of an expansion in the export market, segmentation of labour emerges and specialisation takes place during the expansion of the informal sector.

2.3.2   Unemployment

Not all labour units are employed all the time. All global economies experience some kind of unemployment whether structural, cyclical or frictional. Laws mandating a high minimum wage in the formal sector, contribute to increased unemployment amongst the unskilled and less-experienced members of the labour force. One of the reasons for unemployment is wage rigidity - the failure of wage to adjust until the quantity of labour supplied equals' quantity of labour demanded (Mankiw, 2003). When the real wage is more than the level that equilibrates supply and demand, the quantity of labour supplied is greater than the quantity of labour demanded. Real wage rigidity decreases the level of job acquisition in the formal sector. The rate of unemployment rises and unemployed workers now search for informal sector employment as a matter of survival. People are jobless not because they are aggressively looking for employment that best matches their individual skills, but because, at the going wage, the quantity of labour supplied exceeds the quantity of labour demanded (Mankiw, 2003).

Figure 3: Real Wage Rigidity Leads to Job Rationing
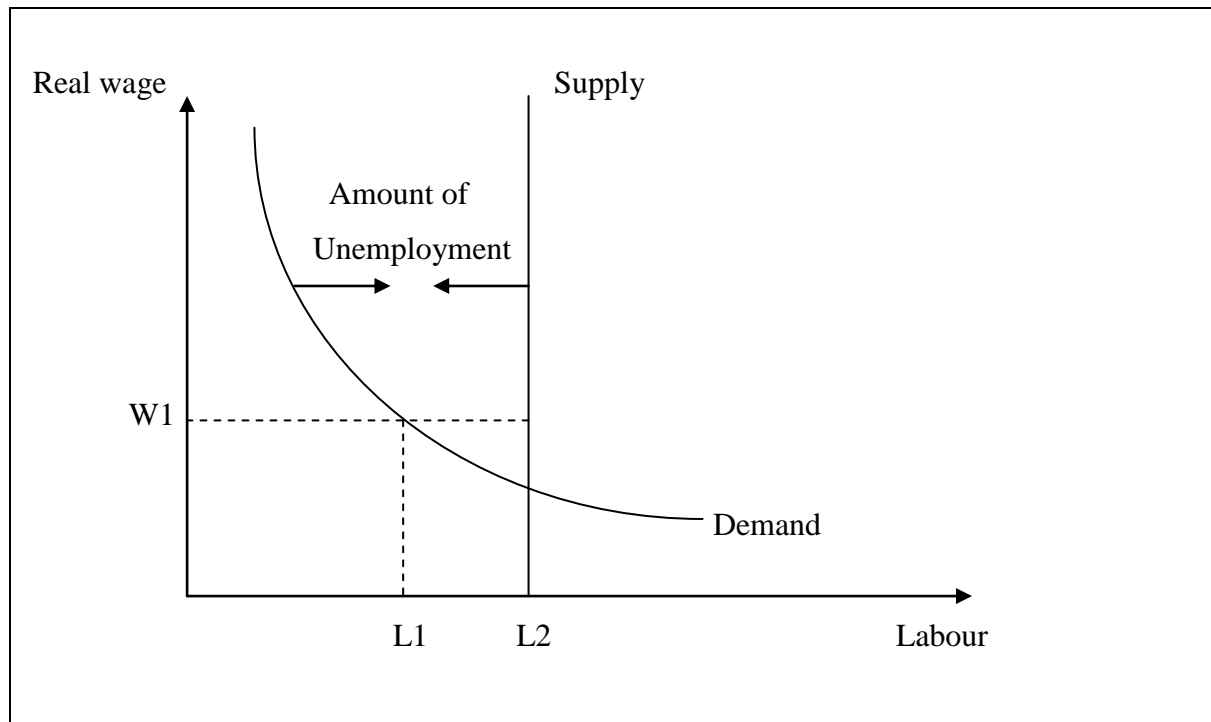
Source: Mankiw (2003)

Note: W1 = Rigid real wage; L1 = Amount of labour hired; L2 = Amount of labour willing to work

Labour economists have used the notion of compensating differential (additional income given to an employee who is working undesirable job, relative to other jobs) to hypothesise that (higher) wages and unemployment, and unemployment and informal sector growth are positively correlated across space (United Nations, 1995). Furthermore, the privatisation of state-owned businesses have consequently lead to job losses, while trade liberalisation has the resulted in reduction and shutting-down of some formal businesses which were not able to compete given the accessibility of relatively cheaper imports (Barker, 2007). The growth in the unemployment rate is indicative of rising job losses. Unemployment occurs as a result of skills or regional mismatches arising from workers whose skills have become technologically redundant and/or lower demand for specific labour skills in a region. As a result, many

skilled workers are pushed into taking relatively inferior jobs in the informal sector. Unemployment is further attributed to various causes such as frictional effects, seasonal changes, technology, business cycle fluctuations and structural barriers.

The unemployment rate is the most broadly used gauge of the state of an economy. Changes in unemployment and proportion of employment in formal and informal sectors explain most of the changes in inequality, whereas changes in wage dispersion in formal and informal sectors, explain less of the changes in inequality (Kingdon and Knight, 2000).

2.3.3   Skill-Biased Technological Progress

In African countries, increased capital intensity as a structural change in big firms has contributed to an increase in unemployment and underemployment (Pianta and Vivarelli, 2000). A popular explanation for the unemployment problem is that the opportunities for less-skilled workers have been declining relative to those for more highly-skilled workers. The inability to compete with low-wage labour in developed countries (DCs) and technical progress that is biased against unskilled workers, have both been identified as reasons for a shift in demand away from less-skilled workers (Shi, 1999).

The significant sectoral increase in unemployment, nonparticipation and non-employment are heavily concentrated amongst less-skilled individuals. These increases are the result of reduced demand for unskilled workers. According to Juhn (1991, cited by Archibald, 2002: 40), "the evidence suggests that non-neutral changes in the long-run demand for labour, coupled with wages that are flexible in the long-run may be the major factors explaining changing jobless rates." Labour market regulation is not the fundamental cause of labour market problems, but does determine the form these problems take (Gindling and Terrell,

2002). Countries like South Africa, which have institutions or measures in place (i.e. such as a welfare grant, minimum wages and trade unions), aim to prevent increased inequality in income distribution, but will hinder adjustment in relative wages and exacerbate high unemployment, particularly amongst unskilled individuals.

Archibald (2002: 42) stated that, "new technology could only lead to permanently high unemployment in the improbable and more likely impossible event that all consumer desires have been fully satisfied and demand could not increase to match an increase in productive capacity." New technology may cause unemployment to rise in certain occupations or regions. Technology does tend to destroy lower wage, lower productivity jobs and create more productive, high-skilled and better-paid jobs. The transition to new technology can lead to a disparity between the skills people possess and those that are required.

Lags between the redundancy of old jobs and the creation of new ones may also exist, when the economic growth rate of a region or countries slow down. Firms in the formal sector tend to shrink by laying-off employees in order to cut down their operating cost (Kingdon and Knight, 2005). Retrenched workers then seek alternative sources of income, which mostly turn out to be informal employment. The faster productivity grows, the lesser formal sector jobs created by a given rate of economic growth. Ishengoma and Kappel (2006: 10) explain that, "an increase in the economic growth rate of a country does not automatically result in the movement of workers from the IS to the formal sector." The demand for labour relies upon the connection between output and earnings.

2.4   The Legalist Approach

The most common technique of distinguishing between the informal sector and the formal sector considers the nature of technology used and whether business activity escape regulation. de Soto (2000) subscribes to the belief that the informal sector consists of 'plucky' small business innovator who decide to labour informally with an intention to evade the expenses, time and process of formal registration. According to de Soto (2000), micro-entrepreneurs will carry on to operate informally so long as administration regulations are weighty and costly. Pratap and Quintin (2006) find that the levy burden, weak rule-of-law, government corruption, significant bureaucracy related to registration, poorly protected property rights and the inefficiency of the legal system are important factors explaining disparity in the size of the informal economy in countries with comparable levels of economic development.

Economists have established a relationship between tax rates, tax evasion and the size of the informal economy. A striking feature of the informal sector in developing countries is that production of goods and services is legal, but is largely unregulated (Becker, 2004). As opposed to regulating the informal sector, authorities tend to adopt a non-interventionist attitude as they are aware that the informal sector provides a means of survival for poor people. In addition, informal economic activities are not fundamentally carried out by way of calculated objective to escaping expenses of taxes, social security contributions, or infringing labour legislation or other regulation.

2.4.1   Tax Evasion

Tax avoidance is the characteristic of the informal sector that has encouraged the most debate. Andreoni, Brain and Feinstein (1989) see significant links between the economics of tax conformity and public finance; regulation enforcement; organisational design; labour supply. Gerxhani (1999) stated that there are two clusters reasons that contributed to the informal sector activities, thus; the 'structural' and 'opportunity' factors. The structural factor consists of fiscal pressure, socio-psychological pressure and institutional limitations. The opportunity factor consists of individual surroundings such as skills, schooling, contacts and living situation, ethics and principles, and environmental factors.

Gerxhani (1999: 10) said, "the individual free choice affects the decision on tax payments based on a combination of inadequate information and a lack of any trust in the way taxes are spent." The evasion of tax is mainly caused by high tax especially on small business. The Marginal Effective Tax Rate (METR) analysis in Table 2 shows that small businesses face a higher METR than large firms. The fact is that many small businesses do not register for VAT and hence cannot claim input tax credits. The small business thus, in all sectors, may face high METR (Small Business Tax regime) compared to large firms, in any sector, with or without investment allowance (See Standard Tax Regime).

Table 2: Summary of Marginal Effective Tax Rate (METR) for the Standard and Small Business Tax Regimes by Country, 2005

Country/Sector	Standard Tax Regime					Small Business Tax Regime
	Manufacturing	Tourism	Agriculture	Financial	Mining	Not Vat Registered
Zambia	0%-10%	0%-10%	10%	25%-25%	0%	20%-25%
South Africa	27%	28%	23%	31%	10%	22%-32%
Rwanda	29%	14%	7%	38%	15%	34%-51%

Source: Stern and Barbour (2005)

The objective for taxation of small business is to raise revenue for the government budget. The tax burden is another factor that deters informal sector firms from joining the formal sector mostly due to the compliance costs of monitoring rather than the financial obligation, thus some firms choose to operate informally primarily to avoid tax. Visser (2004, cited by Mlambo-Ngcuka et al., 2004) realised the need to review the administrative tax burden faced by SMMEs.

The informal sector operates in, and mediates between, state and private spheres, system of government and marketplace, lawful and unlawful, and essential and marginal levels. Wedel (2003:29) said, "the informal entrepreneurs take advantage of economic opportunities by enabling themselves to survive and even thrive in an environment of uncertainty." The state bureaucrats make it possible for private organisations to appropriate public property for

themselves through political bribery (Heintz and Pollin, 2008). The decision to evade taxes can also affect occupational choices, investment in human capital, and labour supply.

Figure 4 shows that most operators in the informal sector would not be willing to accept formal employment if given a choice because they perceive their business endeavor to be a permanent career path.

Figure 4: Percentage of Owners Who Would Not Accept Jobs in the Formal Sector
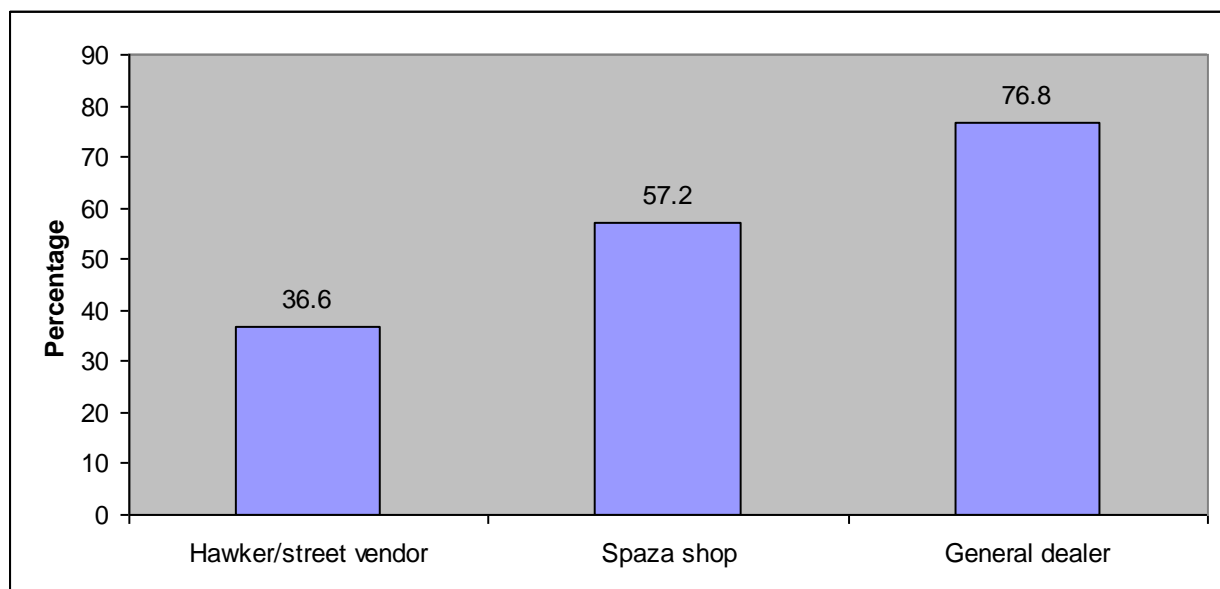
Source: Ligthelm and Lamb (2004)

Wedel (2003: 35) explains, "even when members appear to work primarily in business or private organisations, the group's economic strength and influence may derive significantly from its ability to participate in the state sector and simultaneously access its advantages for the survival of their business." The informal sector will continue to operate informally as long as government rules and regulations are stifling private enterprise. Wedel (2003: 34) said, "the state officials have used their positions to further private interest in the informal sector economy by creating nongovernmental bodies that involve the resources of the state

and that rely on the coercive power of the state administration." Hence, the legislative approach postulates that certain rules and regulations hamper private enterprise in the formal sector economy, and possibly make it more profitable for private enterprise to operate in the informal sector economy, thereby providing an incentive for the informal sector to thrive and grow.

2.5   The Continuum Approach

According to Barker (2003: 97), "this approach refers to the economy as a whole seen as a continuum of activities from stable, full-time wages employment on one hand to informal self-employed persons on the other hand, and with a number of variants in between." At the formal end of the continuum, there is a relatively complete range of social protection against a wide range of contingencies, while towards the informal end of the continuum, the likelihood is that the bulk of economically active women in less-developed countries are engaged in informal sector employment (Lund and Srinivas, 2000). Chen (2007: 2) found that, "economic relations – of production, distribution and employment – tend to fall at some point on a continuum between pure 'formal' relations (i.e. regulated and protected) at one pole and pure 'informal' relations (i.e. unregulated and unprotected) at the other, with many categories in between."

The formal and the informal ends of the economic continuum are often dynamically linked (Lund and Srinivas, 2000). For instance, numerous informal businesses conduct production or distribution relationships with formal sector businesses, providing input, finished goods or services either through direct transaction or subcontract arrangement. Cabagarajah, Niels-Hugo and Raju (2001) said that the relationship between the formal and informal sectors can

often be relatively 'solid and wide' (i.e. movement of workers between formal and informal work), predominantly in urban areas, across countries.

The term 'informal sector' simply refers to economic activities at the base end of a continuum of business activities. According to Hussmanns (2004), the informal sector is used as a convenience, since the 'informal' conjures up an image of less-stable, more oppressed and fragile, and sometimes impermanent economic activities and these represent the focus of the activities which are central to this work.

2.5.1 Linkage Between Informal and Formal Sector Economies

The continuum approach is characterised by the acknowledgment of the dependence of informal sector employment on formal sector employment. This dependency could be either harmonising (e.g. via sub-contracting activities) or unviable (e.g. unregistered business activities because labour is cheaper and operational costs are lower). The dependency is shown in Table 3 where the informal sector in South Africa is gradually more recognised by manufacturers and wholesalers as a key distribution channel of goods to consumers (Ligthelm and Lamb, 2004).

Table 3: Type of Support Received From Formal Sector Suppliers

Type of Support	Spaza/tuck-shop (%)	Hawkers/Street Vendors (%)	General Dealers in Township (%)
Deliveries	87.9	86.7	89.6
Promotion materials	60.8	21.1	53.7
Name on signboard	48.6	4.4	62.7
Shop equipment	32.1	16.7	43.3
Discount price	19.0	17.8	34.3
Credit	8.6	0.0	13.4

Source: Ligthelm and Lamb (2004)

The type of support received by informal township retailers from formal sector suppliers is that approximately ninety percent of informal retailers received deliveries of merchandise from suppliers. Township general dealers seem to be more established than spaza shops or hawkers. Although manufacturers and wholesalers support the informal sector, the level of credit offered is still low and this makes it harder for the informal sector to grow. Therefore, access to credit is a major factor that needs to be remedied if the informal sector is to become a sustainable entity.

The linkage which exists between the informal and formal sectors, hinges on two questions: Firstly, are the linkages of a benign or exploitative nature, and secondly, is the lower end of the economic continuum capable of responding to promotions policies or is it not – is it evolutionary or not (Dewar and Watson, 1989)? The debate has revolved around the question of how capital accumulation takes place in the informal sector. Dewar and Watson (1989:4) said:

"It is argued that these activities do generate surplus unless unduly suppressed by law, in this case it is assumed that the linkages are benign. On the other hand, it has been argued that the informal sector is incapable of accumulation because its level of surplus is dictated by the accumulation process in the formal sector, thus linkages are exploitative".

The informal sector plays a role in the flow of goods and services by being situated near consumers, by providing credit to consumers, by selling in units as requested, and by targeting products specifically to the needs of the low-income market. The informal sector, therefore, generally serves a specifically poor market, and in this sense remains complementary to the formal sector.

The relationship between the formal and the informal sectors generally has, as a point of departure, the theory of unequal exchange as being a fundamental explanation of regional inequality (Dewar and Watson, 1989). Chen (2007: 9) said, "also, many formal firms in developed countries have decided to sub-contract production to workers in developing countries: some of whom are relatively protected (e.g. those who work in call centres) while others are not protected (e.g. many of those who work in assembly factories)." The relationship between the formal and the informal sector is largely explained by an economic surplus which is generated in the informal sector and is then transferred to the formal sector.

There are two major mechanisms through which a surplus may be transferred from the informal sector to the formal sector, and, hence, inhibits informal sector growth: Firstly, the informal sector lacks access to the basic resources of production because these resources are monopolised by the formal sector. Dewar and Watson (1989: 6) said:

"The oligopolistic organisation of the product markets leaves for informal activities those segments of the economy where minimum size or stability conditions are not attractive for oligopolistic forms to ensure the realisation of economies of scale and to guarantee an adequate utilisation".

Secondly, the informal sector is forced into a position whereby it must pay higher prices for its purchases, whether for production or resale, and have smaller margins on its output; any surplus being harvested by the formal sector. Prices are usually high because small operators can only purchase small quantity, and do not have access to credit services, while prices for their goods are lower because of the consumer markets they depend upon (Dewar and Watson, 1989). The ability of the informal sector to grow or respond to 'promotional policies' (i.e. formalisation of the informal sector) is limited and the sector as a whole is said to be 'involuting'. Involuting in this context means that when the formal sector thrives, the informal sector remains on the periphery and does not develop.

However, the distinction between informal and formal businesses arises because of higher relative operating costs in the formal business structure, such as wages, administrative and transaction costs (Gray, Cooley and Lutabingwa, 1997). As demand grows, specialisation in the manufacture method becomes more deepened to match dynamic consumer demand. Micro-businesses in rural or secluded areas encounter information gaps regarding markets and technology (Ishengoma and Kappel, 2008). Thus, to close these gaps, formal businesses have to develop a strategy to gather information in exchange for a part of the profits. As the size of the market increases, the degree of operation has to increase, necessitating investment in capacity building. Small local entrepreneurs are however far more capital constrained than larger businesses and traders.

2.6   The Micro-Business Enterprises Approach

The theoretical link between business constraints and the growth potential or performance of Small Medium and Micro Enterprises (SMMEs) can be viewed from different points-of-view. According to Ishengoma and Kappel (2008), business constraints (limited access to finance, high taxes, and lack of market access) may, on one hand, limit physical capital accumulation, while on the other hand, constrain a firm's ability to undertake its daily operations by reducing the capacity to make business decisions. Bigsten and Soderbon (2005) further said that the modern African manufacturing sector is small and stagnant; there is little investment; and does not compete in the export market.

Many economists attribute comparatively small size of many businesses in developing countries to the insufficiency of capital and administrative experience (Gray et al., 1997). However, through the informal sector, the less-skilled rural labour force obtains skills essential for survival in the more challenging urban environment (UNIDO, 2008). The informal sector also 'sponges' skilled persons retrenched from formal sector jobs, but the informal sector is viewed as a second-best option for those incapable of finding and keeping jobs in the formal sector (Kimuyu, 1999).

Micro enterprises can successfully create employment, innovation, returns and growth. However, small businesses generally do not achieve their full potential because they are hampered by restricted market access, finances, technology and various operational skills (Ishengoma and Kappel, 2008). The formalisation of businesses in many less-developed countries is impeded by bureaucratic policies, which usually bring longer delays, higher costs of public services, greater corruption and less investment (Becker, 2004).

2.6.1   Limited Labour Absorption

A low rate of labour absorption in the formal sector is a more complex problem than merely the adoption of a relatively capital-intensive structure of production induced by underpricing capital and overpricing labour. Geithman and Landers (1973) stated that among today's less-developed countries (LDCs) even high growth rates can, and frequently do, fail to generate an associated rapid rate of employment expansion. The dualism concept holds that the formal sector, consisting of large-scale and capital-intensive economic units, is characterised by a limited range of technical substitutability of factors of production, while the informal sector, consisting of smaller-scale economic units employing much smaller quantities of capital, enjoys a much wider range of factor substitutability (Ishengoma and Kappel, 2006).

In the informal sector, capital is, by definition, the relatively scarce factor. Thus, the amount of labour absorption in the formal sector is determined not by labour's own availability but by the availability of capital to this sector. Geithman and Landers (1973) further stated that the remaining supply of labour, which fails to find employment in the formal sector due to the occurrence of capital scarcity, is compelled to seek work in the labour-intensive informal sector. Labour forced to search for work in the informal sector can be absorbed there in two primary ways: either as "wage labour" or as "disguisedly unemployed" (Santana, 2002). In the first case, labour can find employment as wage-earning agricultural labour; labour in construction, trade, handicraft manufacturing and personal services, so long as the value of its marginal product exceeds its money wage. In the second case, labour is absorbed into informal sector employment as disguisedly unemployed primarily in connection with family-operated peasant farms and family-operated trade, services and small craft firms, and the like.

The establishment and growth of the informal sector is related to a number of factors. With prevailing business/economic and rigid atmosphere in less-developed countries, the benefits of operating informally seem to be much higher than the cost of operating formally (Ishengoma and Kappel, 2006). This is based on the premise that even the SMMEs with a higher degree of formality still face the similar obstacles as those with a higher-level of informality. Therefore, SMMEs are discouraged from growing and increasing their degree of formality. According to Geithman and Landers (1973), survival informal sector businesses control employment in the informal sector and a larger number of employees rapidly growing informal sector are poor. Informal enterprises build excessive competition for formal businesses besides not paying taxes or social security contributions for workers or avoid other industry expenses acquired during business operation (ILO, 2002b).

2.7 Todaro-Lewis Model Approach

According to this school of thought, more formal sector employment and urbanisation results in more informal sector employment (Kucera, 2008b). "For every one person who got hired in the urban sector, more than one person migrated from the rural sector." (Nolen, 2007) Lack of work in the rural areas and the perception of better opportunities in towns (urban areas) were major causes of migration. However, employment in the formal sector failed to keep pace with urban labour force growth; the process of urbanisation has elevated the concern over urban employment, underemployment and unemployment. Galli and Kucera (2004) further said that, "though a large number of industrial jobs were created in cities; these were insufficient to provide formal employment for all migrants." Many who comprise additions to the urban labour force seek refuge in the informal sector in which they create their own employment to the extent that the capital and skills at their disposal would permit (Sethuraman, 1981). It is this labour surplus that contributes to the rise of informal sector

employment; that is, immigrants enter the labour market and suddenly increase the number of workers available.

2.7.1 Rural-Urban Migration

The rural-urban migration is chiefly driven by the decrease in production of the agricultural sector and increasing demand for labour required by an expanding industrial sector (Srinivas, 2009). The Todaro model throws some light on this: the rural population migrate to the cities on the expectation of a job, and because the formal sector is not big enough to absorb all labourers – the urban informal sector has helped to 'absorb' these excess labourers (Basu, 2000). Nolen (2007) further said that creation of one job in the formal sector has been able to generate employment for excess labour supply by using labour-intensive technologies. People move into urban areas to look for economic opportunities. In remote areas, often on small family farms, it is not easy to improve an individual's standard of living beyond basic subsistence. People are absorbed into urban areas because they suppose that they will have better prospects. For several, life is improved, but a number of them end up in poverty.

Rural migrants who have a high-level of productivity and who can adapt rapidly to conditions in the urban labour market can make a significant contribution to economic growth (Bromley, 1979). However, rural migrants generally lack the skills that employers demand and find it difficult to adapt. As a result an increase in the size of the urban population requires public assistance and exacerbates inequality. There will be an excess supply of unskilled labour force at the going rate. According to Borjas (2006), incorporation of the 'new' labour force into the economy will consequently almost surely engage short-run variations in wages and employment levels for various types of skilled labour. Informal sector employment in this

regard has played a significant role in absorbing this excess labour force (Sethuraman, 1981). According to Bromley (1979), informal sector expansion is dependent on the growth of the formal sector and labour supply. This basically means that the size of informal sector employment will expand with the growth of formal sector employment because a complementary relationship prevails.

Rural migrants differ in their skills endowment from those of formal sector workers, thus inducing a change in the overall (labour) composition of the urban economy. For instance, most rural migrants are less-skilled which creates imbalance between the supply of and demand for dissimilar labour skills at a prevailing wages and output levels (Dustmann, Frattini and Glitz, 2008). The empirical evidence shows that the migrants who moved to a city to look for work were generally successful in finding one. However, most jobs found were not in the formal sector employment and Andersen (2002) stated that, even though most jobs were in informal sector employment, they were reasonably well-paid relative to rural workers. It is a presumption that the process of development in a dual economy begins with the mobilisation of labour resources from the main remote (rural) areas to growing urban areas. However, Basu (2005) stated that this mobilisation seems inconsistent with the existence of unemployment in the urban sector. According to Nwaka (2005), the growth of informal sector employment follows closely the general pattern of urban development in most African countries.

2.8   Conclusion

Table 4: Summary Findings of Each Theoretical Perspective

Model	Findings
Dualist Approach	i. The formal sector is dominated by the key industrial sector while the informal sector is largely a subsistence economy. ii. The dual labour market: formal and informal or primary and secondary. iii. Primary labour market offers high salaries and wages and better working conditions while the secondary labour market offers lower wages and insecure employment.
Structuralist Approach	i. Unemployment is mostly amongst the least skilled. ii. Unemployment and informal sector growth are positively correlated. iii. High wages in the formal sector and unemployment are positively correlated particularly amongst unskilled individuals.
Legalist Approach	i. Tax evasion is the main cause of informal enterprise operation. ii. Informal enterprises operate informally because the process of formalising is time-consuming and costly iii. Certain rules and regulations (e.g. labour laws) hamper the formal economy, and, therefore, private enterprises shift to the informal sector economy.
Continuum Approach	i. Characterised by 'first' economy and 'second' economy. ii. The linkage that exists between the formal and informal sector is through the support informal sector receives from the formal sector (i.e. deliveries, promotion materials, name on signboard, discount price and credit). iii. The existence of the informal sector enhances the profitability of the formal sector. For instance, if formal sector markets are potentially highly scattered, the informal sector acts as an intermediary, through which the formal sector can access such markets.
Micro-Business Enterprises Approach	i. The growth of SMMEs is slowed due to limited access to finance and lack of market access. ii. The (opportunity) cost of informality seems to be much lower than the cost of operating formally. iii. The informal sector, where capital is a scarce factor, is largely labour-intensive.
Todaro-Lewis Model Approach	i. There is a positive relationship between formal sector growth and rural-urban migration. ii. Migration causing labour surplus in the urban areas contributes to the growth of informal sector employment. iii. Informal sector expansion is dependent on the growth of the formal sector and labour supply.

Source: Author's Compilation from Various Sources

The response of the informal sector hinges on workers who often move into informal sector employment when employment in the formal sector failed to keep pace with the urban labour force growth; that is, labour surplus contributes to the rise of informal sector employment. However, the formal and the informal are often dynamically-linked: more formal sector employment and urbanisation results in more informal sector employment.

Dual labour markets: informal and formal is explained by the the dualist, structuralist, legalist, continuum, Todaro-Lewis Model, and micro-business enterprises approaches as summarised in table 4. The dualist approach explicitly explains the informal sector as a set of subsidiary activities that provide incomes for the deprived; those who are incapable (for various reason) of accessing employment in the formal sector (Reimer, 2003). The formal sector is deemed superior to the informal sector, and these two types of sectors result in economic dualism that comprises informal sector employment and formal sector employment. Segmentation in the employment market arises because of various job characteristics rather than differences in worker attributes, such as education and training (Saracoglu, 2005).

The literature also showed that informal sector employment is related to several structural changes in the dominant economy such as new immigrant labour-market entrants to a pool of workers already swollen by technological changes. Although the formal economy may be more capital-intensive, the labour-intensive sector (informal sector) cannot cease to exist because labour is too flexible to adjust to new innovation that will cater for the growth in the formal sector. The following chapter attempts to survey the contemporary literature to establish the validity of the hypothesis that reduced formal sector employment and increased trade liberalisation lead to increased informal sector employment.

CHAPTER THREE

ESTABLISHING A THEORETICAL LINK BETWEEN INFORMAL SECTOR EMPLOYMENT, FORMAL SECTOR EMPLOYMENT AND TRADE LIBERALISATION[2]

3.1   Introduction

Unemployment is one of the developmental problems that less-developed countries are faced with in the 21st century. The workforce that is unable to source employment in the formal sector economy is likely to source an income from occupations in the informal sector. Goldberg and Pavcnik (2003) assert that increased foreign competition in less-developed countries also contributes to growth of informal sector employment. However, not all unemployed workers are absorbed into informal sector employment. Large formal firms' decentralised production, through subcontracting to smaller firms, also results in a steep rise in open unemployment (Galli and Kucera, 2004).

The theory of dualism postulates the existence of two separate labour markets (i.e. primary and secondary) with mobility within each market but no, or limited, mobility between the two. The structuralist and Todaro-Lewis theories explain the growth and development of informal sector employment as being related to several structural changes (such as liberalisation of the economy, privatisation etc.). This chapter attempts to survey the contemporary literature to establish the validity of the hypothesis that reduced formal sector employment and increased trade liberalisation lead to increased informal sector employment.

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[2] The rationale for including "trade liberalisation" (in the form of a proxy variable such as exports) is that, according to the literature (see Goldberg and Pavcnik, 2003), it affects both formal and informal sector employment. Consequently, trade liberalisation is likely to impact the relationship between formal and informal sector employment.

3.2   A Review of Selected Contemporary Literature

3.2.1   Formal Sector (Un)employment

Loss of employment in the formal sector (and resultant increase in formal sector unemployment), were considered to be the most important causes of informal sector employment growth (Pradhan and Van Soest, 1995). As the number of more skilled workers in the formal sector increase, some firms switch to 'skill-biased' technology, and employ only skilled workers, increasing the skill premium. This skill biased technology has left much unskilled labour force with no job as a result of retrenchment from the formal sector. Unlike formal sector employment, the growth of informal sector employment is largely due to productivity not being dependent on a match between jobs and skills available.

The analysis by education status advocates that people with no basic education are the ones affected by unemployment (Chandra and Nganou, 2001). However, many skilled workers were pushed into taking relatively inferior jobs in the informal sector. Pradhan and Van Soest (1995) further stated that the informal sector is viewed as an intermediary sector between not working (being unemployed) and the formal sector. Informal sector employment acts as an economic shield while a person is unemployed or such person may earn supplementary wages in the informal sector.

From the traditional performance hypothesis stated by Field (1975, cited by, Pradhan and Van Soest, 1995), formal sector employment is rational, and all informal sector workers would be better-off in formal sector jobs. However, recent empirical evidence showed that many informal sector workers favoured their current status versus formal sector employment (see Saibal and Marjit, 2008). Kucera and Roncolato (2008a: 2) also supported this statement

by saying "it is unremarkable that some workers would prefer informal work, and that is, what is meant by voluntary informal employment." Participation in the informal sector comes from a variety of reasons. People may counter a lack of economic prospects in the formal sector by finding or securing informal sector employment or by joining subsistence-type informal employment (Saibal and Marjit, 2008).

Informal sector employment in many developing countries, notably in Africa, is performing an important role in the formation of human capital, by providing access to training, and at a cost substantially lower than that provided by the formal training institutions. Although informal sector employment seems to have emerged as a major source of employment for those unemployed in the formal sector, Jha (2009) argues that it is not clear under what conditions labour is being absorbed into the informal sector.

Antoine (2004) established two important points regarding the relationship between formal sector employment and informal sector employment. Firstly, the wage differential between the (rural) agricultural and (urban) industrial or (urban) government sector, causes workers to move to the city, in the hope of finding formal sector employment, however, inevitably have no option but to undertake jobs in the informal sector. Secondly, the vast majority of the informal sector is located within urban centres or major cities, and the migration to the cities generates excess labour supply in a given economy, which leaves the majority of people with no jobs. The reason being the labour market is unable to absorb all the available labourers into employment. The labour market is frictional in the sense that not every unemployed person is guaranteed a job in the formal sector, hence, they alternatively enter informal sector employment.

In Kenya, Antoine (2004) found that government planned to deal with unemployment within the country by enhancing competence of the informal sector to absorb workers. Importantly, Duncan (1992) stated that formal and informal employment are gross substitutes for one another, that is, when people lose jobs in the formal sector economy, they turn to informal jobs to make ends meet. Antoine (2004: 23) thus said:

> "As far as the impact on the informal sector of these processes is concerned, it seems clear there are very important positive relationships between segments of the modern industrial sector and micro-enterprises. This is particularly evident in the metal-working sector. And it is likely, therefore, that any major closure or reduction in the capacity of the modern sector would have direct knock-on effects on the informal sector, such is the latter's dependence on both new and scrap materials from the former."

A number of African countries have shown that there has been a downturn or stagnation in formal sector employment, while the informal sector has been increasing in terms of both its share of output and employment (Xaba et al., 2002). However, an increase in formal sector employment does not necessarily lead to a decrease in unemployment of the same magnitude – Walterskirchen (1999: 6) supports this by stating that in Australia, "out of three additional jobs only one has been occupied by an unemployed person, the remainder by persons from outside the labour market: hidden domestic labour reserves and in particular additional foreign workers." Additional formal sector jobs will be taken in part by registered unemployed, and in part by the informally employed labour force (Walterskirchen, 1999).

Shi (1999: 1) stated that "matching rates and wages are different between skills in the same industry, implying skill premium, and different between industries for the same skill, implying a within-skill wage differential." A skilled labour force is preferred by high-technology firms for their higher efficiency. According to Antoine (2004), informal sector employment grows faster than formal sector employment, because low-technology industries (informal sector) expand faster than the high-technology industries (formal sector) as a result of a lower fixed (capital) cost.

Partridge and Rickman (1997) stated that the Harris and Todaro model give an explanation of why the rural-urban migration could create a shortage of available urban jobs, resulting in open urban unemployment. Antoine (2004: 15) found that, "as a result of the higher wages in the industrial and government sectors, workers migrate from the rural areas to the urban areas. The incentive for these workers to move to urban areas is still there even in the absence of the jobs within the cities." From the Harris-Todaro model of rural-urban migration, it is evident that with the (urban) formal sector wage set significantly above the rural agricultural wage, and with the decision to migrate based largely on perceived (higher) earnings in the urban sector, migration to the urban areas is a rational decision although this might mean the likelihood of being unemployed, hence an increase in informal sector employment (Shi, 1999).

The Harris-Todaro model implies that as migrants go into the cities searching for formal sector employment, the bulk of people find themselves in a state of joblessness. In order to survive within these cities, some will endeavour to take on business-related activities becoming workers in the informal sector (Antoine, 2004). According to Srinivas (2008), the

urban informal sector has soaked-up migrants with modest or no expertise, educating them in diverse informal skill that can be utilised in their own development.

Due to population growth and rural migration to the cities, the economically active population grow at a much faster rate than the accessibility of jobs in the formal sector. Hence, there is a negative correlation between formal sector employment and informal sector employment (Walterskirchen, 1999). But formal sector employment, of course, will increase simply if economic growth rate exceed productivity gain (Walterskirchen, 1999). It is noted that the formal sector, recognising the constraints within which the informal sector operates, often tends to exploit the latter by imposing a dominant – subordinate relationship. According to Jha (2009), the formal sector is hypothesised to appropriate a part of the surplus generated in the informal sector. In other words, a significant part of the vitality of the informal sector, and its ability to generate surplus growth, is attributed to the presence of the formal sector.

The matter of formal sector employment is an important aspect in the developed world, and it must be considered as being of crucial significance in developing economies. Structural unemployment arises when the economy fails to create employment for the total labour force even at times of robust growth during the business cycle. According to Mafiri (2002), the major proportion of unemployment in African countries is structural[3]. This is caused by change in the composition of labour supply and demand. As people struggle to get employment in the formal sector of the economy, they are eventually pushed into informal sector employment.

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[3] A key component of 'structural' unemployment is a lack of relevant skills or a mismatch between the skills supplied versus skilled demanded.

Although there is evidence of significant wage dispersion, there appears to be a significant overall surplus of labour, particularly at the lower end of the wage spectrum. According to Mafiri (2002), the labour surplus has had a substantial effect on the nature of labour force in African countries. Informal sector employment was originally treated as a residual emanating from the inadequate absorptive power of the formal economy. It has been emphasised in the literature that productivity growth in formal sector employment acts as a "pull" factor for drawing informal sector workers and enterprises towards it (CUTS CITEE, 2009).

3.3.2   Slower Economic Growth

Some theorists believe that the informal sector can be better understood by considering activities outside the mainstream economy. Given that the informal economy consists of both self-employment and wage employment, Pianta and Vivarelli (2000) found that, more often than not, the informal sector self-employment provides a supplementary income to people's primary employment income. This often involves switching between the formal and informal sectors during the same workday. Participation in the informal economy arguably results from people who lack opportunities in the formal sector, thereby creating new activities in the informal sector, or by joining existing informal businesses (Pradhan and Van Soest, 1995).

Growth of informal sector employment is attributed to economic restructuring and economic crises. One possible reason for slow economic growth in Africa over the last couple of decades is as result of structural changes. For example, the structural adjustment programmes (SAPs) of the 1980s and 1990s are said to have amplified informal sector employment owing to cutbacks of formal sector workers and allied liberalisation strategies (Ulyssea, 2006). Informal work arrangements may also be a strategy imposed by the process of economic restructuring brought about by the advent of sub-contracting. Workers are 'pushed' out of the

formal sector likely due to more favourable sub-contracting terms-of-trade or potential cost-saving advantages afforded to firms by the sub-contracting relationship, thus leading to a rise in informal employment (Pradhan and Van Soest, 1995).

Several research studies demonstrate that South Africa's economic performance was motivated by a strong and convincing dedication to a macroeconomic policy supported by tight monetary and fiscal policies accepted by worldwide markets. Yet in spite of the common approval from international markets preserving fiscal and financial solidity, an important, and subsequent surge in private investment, did not occur. Chandra and Nganou (2001: 4) said:

> "GDP growth rates peaked only once at 4 percent and averaged less than 2 percent for the decade. The weak performance of the real sectors surfaced in high unemployment rates reaching 37 percent in the 1990s and persistent job losses in non-agriculture employment measuring 14 percent between 1990 and 1998."

One of the most significant reasons for the slow economic growth of the last decade can be seen in the structural change with regard to the interest-growth-differential. According to Pianta and Vivarelli (2000), a key condition to stabilise formal sector employment in African countries is high sustained GDP growth followed by correct industrialisation tactics. A shift from formal to informal employment is generally as a result of decreasing GDP growth rates, and is accompanied by lower income per capita; an enormous increase in the size of the services sector, and a very modest increase in industrial sector employment (Pianta and Vivarelli, 2000). Melvyn and Syrett (2006) found that elastic labour markets in many of the affected countries permitted the affected workforce to be reallocated from the formal sector to the informal sector, thus alleviate the blow of the economic downturn.

Sustained economic growth is expected to expand formal sector employment, but shrink informal sector employment. According to CUTS CITEE (2009), developing countries, Africa in particular, could experience a growth in their respective informal sectors under the following circumstances: low or slow economic growth which is capital-intensive in nature (i.e. jobless growth); or capital-intensive growth which brings about a rise in the demand for skilled labour in the services and manufacturing sectors.

Pianta and Vivarelli (2000) stated that the economies are unable to soak-up all existing workers or addition to the labour force. Hence, it was found that informal sector employment exists to attract some of the labour force due to slow economic growth. Mafiri (2002) found that rather than the South Africa economy experiencing formal sector employment growth, not only did the unemployment rate was increasing, on one hand, while on the other hand, number of new jobs created in the economy actually went down extensively.

Walterskirchen (1999: 2) explained that "the simple-minded argument that there cannot be a negative relation between economic growth and unemployment, because both are rising in the long run, is of course completely wrong," the rationale being, there is a strong negative relationship connecting real output growth and the change in the unemployment rate in time-series and in cross-country analysis (Pianta and Vivarelli, 2000). In his empirical study, Walterskirchen (1999) found that an increase in productivity of one percent leads to an increase in employment of half a percentage point. This means that the higher the positive (labour) productivity effects of growth, the easier it will be to keep unemployment from rising. Calmfors and Holmlund (2000) found that more often than not, it is taken for granted that a rapid rate of economic growth also implies lower unemployment.

Ranis and Stewart (1999, cited by Ishengoma and Kappel, 2006) explained that when economic growth of a country slow down, formal sector firms are likely to lay-off employees in order to reduce their operating costs. Tokman (2001) further stated that retrenched workers then look for alternative sources of income, which predominantly turn out to be informal employment. Ishengoma and Kappel (2006: 10) said, "the expansion of the IS and the deteriorating employment situation in many developing countries in SSA, Latin America and Caribbean are associated with low GDP growth rate." However, economic development of a country does not automatically lead to the movement of workers from informal sector employment to formal sector employment (Ishengoma and Kappel, 2006). According to Becker (2004), economic growth may negatively shape the extent of informal sector employment only if growth is "pro-poor", meaning if growth comes with increased formal sector employment and income distribution.

The literature generally advocates that a negative economic growth rate may raise unemployment, hence increase informal sector employment. People who are laid-off during economic downturn, fit into place in the informal sector employment (Fox, Betchrman, Chandra, Eifert and Adams, 2009). Sluggish economic growth and low investment has resulted in a slow rate of new formal sector job creation. As a result unemployed labour force enters informal sector employment for survival (Becker, 2004). The need for suitable structures that would aid the absorption of workers into formal sector is important; new jobs in recent years in many of the developing countries have emerged in the informal sector.

Becker (2004) explained the growth or decline of informal sector employment as being fundamentally correlated with the growth or decline of the formal sector employment. Some studies (see ILO, 2002a; Weeks, Tully, and Kimerling, 1975; Pratap and Quintin, 2006)

showed that informal sector employment has in effect declined during point of economic growth and increased during point of economic recession (Misati, 2007). Among less-developed countries (LDCs) rapid economic growth can, and frequently does, fail to create a commensurate rapid rate of formal employment expansion (Calmfors and Holmlund, 2000). It appears as if economic growth is not followed by growth in formal sector employment levels and income distribution, the informal sector employment does not reduce in size (Fox et al., 2009). The situation is, therefore, that informal sector employment is continuously increasing in most developing countries, and African countries, in particular, have exhibited this growth of informal sector employment (Becker, 2004).

Actual development in the high-productivity, capital-intensive modern sector, that is formal sector, has not induced sizeable increases in employment. Calmfors and Holmlund (2000) reasoned that productivity growth has led to real wage increases, but there will be no long-run effect on the unemployment rate. Osmani (2006) stated that the reaction of employment growth to GDP has not declined in developed countries as a whole. However, in African faster economic growth has not for all time been converted into better employment prospects.

The large majority of Africans are not self-sufficient, and rely solely on being employed for their key source of income. Therefore, failure to creating employment in the formal sector can lead to marginalised workers joining the informal sector for survival. Osmani (2006) found that economic growth is not the sole source of employment prospects. According to Macias and Massa (2009), the labour force participation rate is generally high in sub-Saharan Africa, and yet large numbers of employed people cannot lift their families out of poverty. Heintz and Pollin (2008) justified the extent of informal sector employment in Africa by saying in Kenya, Ghana, and Mali, informal employment is the dominant form of

employment, except in South Africa where formal employment is a dominant form of employment.

3.3.3   Globalisation

Increased globalisation throughout the 1990s – and the emergence of growing competition in global markets – has led many developing countries to move towards increasingly capital-intensive production and to reduce labour costs, which resulted in reduced employment in the formal sector (Verick, 2001). According to Goldberg and Pavcnik (2003: 3) trade reforms, "reduce labor costs by cutting worker benefits, replacing permanent workers with part-time labor, or subcontracting with establishments in the informal sector, including home-based and self-employed microentrepreneurs."

A clear paradox exists in that increased pressure to move towards economic liberalisation and globalised markets, instead of expanding formal sector employment opportunities, has in fact generated a massive flow of workers into informal sector employment (Pianta and Vivarelli, 2000). Goldberg and Pavcnik (2003) said that increased foreign competition in developing countries has lead to an expansion of the informal sector. For this reason, since the 1970s, labour markets in African countries have been characterised by historically high unemployment rates (Ostry, 2005). A decline in tariffs reduces open unemployment through expansion of employment in the informal sector and an increase in informal sector wages.

The informal sector in African countries largely comprises trade-related activities, with other services and light manufacturing contributing only a small percentage of the informal sector. Norman, Oviedo, and Serven (2005) stated that the lack of a suitable mechanism that would contribute to the incorporation of the labour force into the national economy has meant that a large number of new jobs in recent years in many of the developing countries have taken

place in the informal sector. Slow economic growth and increased trade liberalisation have perpetuated the flow of unemployed labour from formal sector to the informal sector (Fox et al., 2009).

Trade liberalisation has led to a rise in informality through trade reform, which exposed formal 'establishments' to increased foreign competition. According to Stalling and Peres (2000, cited by Goldberg and Pavcnik, 2003), trade reforms have led to a labour reallocation from the formal sector to the informal sector. Alternatively, formal sector businesses may counter intensive competition from abroad by retrenching workforce, and then these people consequently look for employment in the informal sector. However, there are mixed views concerning the relationship between trade liberalisation and the growth of informal sector employment.

In their empirical study conducted in Brazil, Goldberg and Pavcnik (2003) found that there is hardly any evidence linking increased informal sector employment to trade, while on the other hand, Currie and Harrison (1997) stated that, in Morocco, firms started hiring more temporary workers after the roll-out of widespread trade liberalisation. Ongoing economic change has increased drastically the role played by the informal sector in shaping the pattern of employment in less-developed countries. The empirical study conducted by Tokman (2001), showed that in South Africa; many of the Latin American and other African countries, trade liberalisation during the 1990s was linked to decreasing employment, and, hence, economic uncertainty for the formal sector workforce. According to Saibal and Marjit (2008), reformatory policies caused the formal manufacturing sector to contract, and drove labour out into the informal sector of the labour market.

Saibal and Marjit (2008) also stated that a combination of global under the conventional view, informal sector employment represents the inferior segment of a dual labour market, which expands counter-cyclically during times of economic downturn when workers are rationed out of the formal labour market. Fiess and Fugazza (2008) stated that trade liberalisation, if perceived as a force of greater competition for domestic producers, leads to a rise in informality, as firms shed formal workers to cut costs. Delicate competitive forces shape the formal sector economy by reducing; rationalising; sub-contracting; improving flexibility, short-term and part-time contract employment which, when combined with reduced community expenditure and wellbeing cuts, can contribute to the growth of the informal sector.

According to Goldberg and Pavcnik (2003), arrangements without minimum wages, assures work opportunities, and encourages informal business to switch from semi-permanent contracts with their workers to piecemeal casual arrangements. Trade liberalisation and investment patterns influence employment relationships and work arrangements. According to Ostry (2005), this impact can be seen when many informal sector workers have been proficient to locate new occupations or new markets for their goods despite the fact that others have lost jobs and markets. The growth of informal sector employment is largely attributed to not enough jobs being created for all those seeking work.

Carr and Chen (2002) stated that "many frustrated formal job seekers find employment or create their own work in the informal economy." High industrial development tends to generate more high-skill services sector jobs rather than low-skill occupations. In such context, individuals lacking skills to compete for high-technology formal sector jobs find employment or continue to be absorbed into the informal sector employment. Goldberg and

Pavcnik (2003) also found that informal business and micro-business sectors are more vibrant, and generate more employment than the formal sector. Carr and Chen (2002) stated that during periods of economic change, whether due to economic reorganisation or economic crises informal sector employment tends to expand. The work force moves into informal sector employment when metropolitan firms close or the public sector contract. Saibal and Marjit (2008) also found that households should complement formal sector income with informal salaries in response to inflation or cutbacks in public services.

Global trade and investment patterns have increased global competitiveness; investors are reallocating resources to nations that have low labour costs or shifting to informal employment arrangements (Carr and Chen, 2002). A direct result of trade liberalisation is an increase in the size of the informal sector. Formal sector firms respond to global competition by retrenching workers who subsequently seek employment in the informal sector (Antoine, 2004). Informal sector employment is important in African countries, and is often an entry point for broadening participation in the private sector.

Economic growth, with export-orientation which generates employment and income, fuels the domestic market, which in turn contributes to further growth in GDP and employment (Currie and Harrison, 1997). However, African countries have been more susceptible to international economic transformation, and have experienced a growing informalisation of the labour market (Habib-Mintz, 2009). According to Heintz and Pollin (2008), the limitations of the formal sector, and the rationing of formal sector employment, have stimulated innovation in informal sector employment. Soares (2005: 11) said:

"Trade liberalisation can also affect the allocation of different type of workers between and within industries. In particular, Brazilian firms may have reacted to the trade liberalisation shock not only by substituting non-registered workers for registered workers, but also sub-contracting part of the tasks that they could have performed earlier in an attempt to reduce costs.

It could be disputed that the informal sector can absorb workers banished from the formal sector, leading to downward pressure on wage in the informal sector. The amount of workers engaged in the informal sector in Brazil has increased over time, peaking in the 1990s (Goldberg and Pavcnik, 2003). It is this trend that has led some to think that deepened global competition could be contributing to the growth of informal sector employment. Heintz and Pollin (2008) showed that most of the increase in informal sector employment comes from movement of workers from formal to informal sectors employment within industries. Goldberg and Pavcnik (2003) found that 88 percent of increase in the informal employment in developing countries comes from movement of workers from formal sector employment to informal sector employment.

This preliminary evidence advocates that if trade liberalisation had any effect on the occurrence of informal sector employment, such consequences would have led to changes in formal and informal sector employment within industries. "For example, industries with a higher share of unskilled workers receive higher trade protection and unskilled workers are more likely to work in the informal sector, reliance on industry level data could potentially yield a spurious positive relationship between informality and trade policy." (Goldberg and Pavcnik, 2003: 25)

3.2.4 Labour Market Legislation

Labour market regulation mainly affects the formal sector. Galli and Kucera (2004) theorised that higher labour standards – in particular liberty of organisation and collective bargaining rights – and higher wages, reduce formal sector employment, thereby contributing to the informalisation of employment. According to Nickell (1997), it is not high wages per se that contributed to the increase in informal employment, but rather high wages paid to an immobile labour force. A rapid introduction of freedom of association and collective bargaining rights might lead to informal employment. Galli and Kucera (2004: 811) explain channels of informal employment growth as:

> "A macroeconomic channel with stronger rights contributing to 'economic and social disruption' and thus discouraging foreign and domestic investment and hindering economic development and leading to increased informality; secondly, a microeconomic channel with stronger rights leading to higher wages in the formal sector and thus reducing the demand for formal employment and leading to increased informality."

It is usually debated that employment legislation increases firms' labour costs, and adds to their administrative burdens. An increase in the minimum pay provokes companies to cut jobs as they are required to hike the wage. If the whole labour market is governed by the minimum wage legislation, this will result in higher unemployment (Lee and Saez, 2008). The response of employment in the formal sector to an increase in the minimum wage paid to labour, raises the average number of hours worked by full-time workers, but reduces the number of part-time workers in the formal sector, who then (possibly) move into the informal sector to find work (Gindling, Terrell, 2002).

According to Koeniger and Prat (2007), low-skilled workers bear most of the adverse consequences of employment protection legislation, and tend to drive small firms out of the market. The end result is high unemployment rate in due course, and the economy is expected to experience informal sector growth. The inability of the formal sector to generate sufficient employment is a major structural problem in the Sub-Sahara African countries (Archibald, 2002). Trade unions and wage-setting structures, in an attempt to raise the wages of members and reduce the wage gap between the skilled and unskilled, destroy jobs, and may reduce productive efficiency through restrictive practices. According to Nickell (1997), labour legislation could raise the cost of employing workers and/or raise the actual cost of adjusting levels of employment.

It must nevertheless be borne in mind that change in production patterns and unionisation of the labour market have generated change in the amount and structure of labour required, and may be judged to have been of more significance than autonomous change in the supply of labour arising from labour force growth. The impact of labour legislation has obliged employers to cut back on production and employment, or alternatively, to invest in labour-saving equipment – again with a reduction in formal sector employment (Burton, Benham, Vaughn and Flanagan, 1971). Lindbeck and Snower (1988) further said that after wage negotiation have taken place, an unforeseen reduction in labour demand occurs, so that firms dismiss some of their workers. As a result, when people lose jobs, they normally are forced to immediately find employment in the informal sector of the economy. This wage increase through trade unions would mean that for any given future position of the labour demand curve, employment will be lower than it would have been in the absence of a wage increase (Burton et al., 1971).

According to Ruffer and Knight (2007), trade unions help to perpetuate the initial rise in unemployment. Firms are sitting with the situation of reducing the size of their workforce through dismissal or failure to replace retired employees, and, as a result, unemployment rises. Sooner or later the economy experiences a growth in informal sector employment as a safety net. The structure of wage determination is a key factor affecting formal sector employment. Mazumdar (1989: 109) supported this view by stating that, "the increasing level of minimum wages has affected the rate of growth of employment in the formal sector." In this regard, Ruffer and Knight (2007: 3) said, "the informal sector is a 'residual sponge' which absorbs that part of the growing labor force that cannot be employed in the more productive and remunerative formal sector."

According to Gindling and Terrell (2002), the impact of a minimum wage tends to be negative with respect to formal sector employment and positive with respect to informal sector employment. This implies that the minimum wage leaves the formal sector firm with no option but to employ unskilled labour force. An empirical study conducted in Indonesia by Habib-Mintz (2009), found that increases in the minimum wage 1997-2002, had reduced formal wage employment and increased informal wage employment. The study further advocated that some formerly self-employed people may get attracted into informal sector employment following increases in minimum wages (Habib-Mintz, 2009). The low-skilled workers face a higher unemployment risk than highly-skilled workers.

The effects of minimum wages are evidenced by an increase in unemployment. Gindling and Terrell (2002: 4) support this statement by saying, "if the entire labor market is covered by minimum wage legislation, this will result in an increase in unemployment." However, if only the formal sector labour market is covered, only retrenched employers will look for

paying job in the informal sector. In terms of association between earnings and employment changes, this is consistent with the view that wages are fulfilling an allocative role, that is, that wage changes are operating to redistribute labour as a direct response to changes in the demand for labour. Burton et al. (1971) said it is also consistent with the view that when demand rises in the formal sector, employment will increase as a result of the newly available job vacancies, at the same time, conditions are created which encourage unions to demand, and employers to grant, above-average wage increases.

Conventionally, restriction on hiring and firing, and other employment protection legislation, increases the cost of labour, and leads to reduced flexibility and higher unemployment (Archibald, 2002). It is argued that trade unions, in attempting to raise the wage of members, thereby, reducing the wage gap between skilled and unskilled workers, destroy jobs and reduce productive efficiency through restrictive practices. Employment legislation impacts the functioning of the labour market in a variety of ways. According to Burton et al. (1971), the rate at which people leave employment is slowed, to the particular detriment of less-skilled and the long-term unemployed, as firms become more prudent and selective about hiring. However, the development of the informal sector was seen as a solution to African unemployment problems (Bromley, 1979).

Lemos (2004: 2) found that the, "studies that estimate minimum wage effects across sectors report larger wage effects for the informal than for the formal sector, and mixed employment effect evidence, which was found to be negative in both sectors," (Fajnzylber, 2001 cited by Lemos, 2004), and was also negative in the formal and positive in the informal sector (Carneiro, 2000 cited by Lemos, 2004). Habib-Mintz (2009) on the other hand found that minimum wage legislation consequently increases the amount of permanent workforce and

reduce the number of contract workforce in the formal sector. With respect to the informal sector, a minimum wage in the formal sector has a negative impact on informal sector wages and a positive impact on informal sector employment. Gindling and Terrell (2002: 5) further said that, "the increase in employment in the informal sector occurred because of an increase in the number of part-time workers." Therefore, the "response of employers in the formal private sector to raises in the minimum wage is to increase the number and hours worked of full-time workers by bringing in some part-time to full-time and laying-off some part-time workers, who seem to be moving into the informal sector to find work." (Habib-Mintz, 2009: 4)

3.3 Conclusion

Participation in the informal sector employment comes from a variety of reasons. These can be attributed to formal sector employment loss; economic restructuring; global markets and economic crisis. According to Saibal and Marjit (2008), people may counter a lack of economic prospects in the formal sector by finding or securing informal sector employment or by joining subsistence-type informal employment. Xaba et al., (2002) stated that a number of African countries have shown that there has been a downturn or sluggish formal sector employment, whereas the informal sector has been increasing in terms of both its share of productivity and employment

As people struggle to get employment in the formal sector of the economy, they are eventually pushed into informal sector employment. Structural unemployment arises when the economy fails to create employment for the total labour force even at times of robust growth during the business cycle. According to Mafiri (2002), the major proportion of

unemployment in African countries is structural (see footnote 3). This is caused by a change in the composition of labour supply and demand.

Becker (2004) explained the growth or decline of informal sector employment as being fundamentally correlated with the growth or decline of the formal sector employment. People who are laid-off during economic downturn, fit into place in the informal sector employment (Fox, et al., 2009). Under the conventional view, informal sector employment represents the inferior segment of a dual labour market, which expands counter-cyclically during times of economic downturn when workers are rationed out of the formal labour market. Fiess and Fugazza (2008) stated that trade liberalisation, if perceived as a force of greater competition for domestic producers, leads to a rise in informality, as firms shed formal workers to cut costs. The implication is that, higher (formal sector) unemployment, may lead to a higher share of informal employment. Informal sector employment remains to absorb part of the growing labour force that cannot be employed in the more productive and better-paying formal sector. A decline in tariffs reduces open unemployment through expansion of employment in the informal sector

CHAPTER FOUR

THEORETICAL MODEL AND ECONOMETRIC ANALYSIS

4.1 Introduction

Chapters two and three have established the theoretical linkages between informal sector employment, formal sector employment and exports (as a possible proxy for the 'trade cycle' effect on informal sector employment). Theoretically, informal sector employment and formal sector employment are (plausibly) 'substitute' activities in the labour market. However, there is mixed evidence to support/negate this hypothesis. This chapter attempts to investigate whether these two variables do, indeed, share a negative relationship and the magnitude of such relationship across various African countries, with, and without, exports as an impacting variable (see Saibal and Marjit, 2008; Xaba et al., 2002 and Walterskirchen, 1999). Further, the expectation is a positive relationship between informal sector employment and exports. Olofin and Folawewo (2009) stated that trade is expected to increase informal employment in terms of quality or quantity of job creation or a combination of both (see also Galli and Kucera, 2004).

The incorporation of exports, instead of net exports, is worthwhile for two reasons. Firstly, few of the sample countries have positive net exports for the time period. Secondly, this study also attempts to investigate how informal sector employment in certain African countries adjusts to exports, and how exports influence the relationship between formal sector employment and informal sector employment. Although it is understood that formal sector employment and exports (as independent variables), generally-speaking, have a relationship, which violates an assumption of the classical linear regression model (CLRM), this study

takes account of this fact by remedying for multicollinearity by using the method of ratio transformation.

4.2 Model Specification

4.2.1 Mathematical Model

$$y_{it} = f\left(\chi_{1it}, \chi_{2it}\right) \qquad (i)$$

This shows y_{it} as a function of χ_{1it} and χ_{2it}

4.2.2 Econometric Model

The equation explaining the relationship between informal sector employment, formal sector employment and exports is expressed as follows:

$$Iny_{it} = \alpha_{it} + \beta_1 In\chi_{1it} + \beta_2 In\chi_{2it} + \mu_{it} \qquad (ii)$$

Where y_{it} is informal sector employment; α_{it} is the intercept term; β_1 and β_2 are the slope coefficients of the explanatory variables - formal sector employment (χ_{1it}) and exports (χ_{2it}) respectively. The error term μ_{it} is introduced to account for all other factors that influence lny_{it}; t is time, and i denotes the cross-section identifier.

The intercept (α_{it}) tells us that if there was no change in the explanatory variables (or the explanatory variables were jointly held constant at zero), then y_{it} would be the value of the intercept. However, according to Gujarati (1992), the mechanical interpretation of the intercept may not have a concrete economic meaning. The slope coefficients reflect the

relationship between y_{it} and each χ_{it}, *ceteris paribus*. In (natural) log[4] form, the slope coefficients show the percentage change in y_{it} for a percentage change in each χ_{it}, *ceteris paribus*.

The expectation is a negative relationship between informal sector employment and formal sector employment (as these activities are plausible substitutes), hence a negative sign for all the β_1 coefficients, and a positive relationship between informal sector employment and exports (as exports plausibly stimulated both formal and informal sector employment), hence a positive sign for all the β_2 coefficients.

4.3 Panel Data Econometric Methodology

Before discussing the estimated regression results pertaining to informal sector employment, formal sector employment and exports, a brief explanation of the econometric testing procedure is necessary. The econometric procedure will ostensibly make use of a fixed-effects or least squares dummy variable (LSDV) approach. In the regression model, the first step will be to regress informal sector employment on formal sector employment. The second step will be to incorporate exports as a possible proxy for the 'trade cycle' effect on informal sector employment. Adopting exports in the model will reveal how informal sector employment changes due to changes in formal sector employment only (step 1), and both formal sector employment and exports (step 2).

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[4] This model formulation represents a double-log or constant elasticities model. Although other model formulations were tested, this model formulation revealed the most statistically 'meaningful' relationship between the variables chosen for this study. In terms of estimated 'one-to-one' or unit change relationships between informal and formal employment (i.e. a/unit increase in formal employment leads to a/unit decrease in informal employment), this would be best catered for in a level-form variable regression where the absolute values of each variable are used.

4.3.2   All Coefficients Constant Across Time and Countries

The first model estimated disregards the space and time dimensions of the pooled data, and estimates the 'pooled' OLS regression (Gujarati, 2003). Thus, 11 observations for all 6 sample countries are 'stacked' on top of each other giving 66 observations for each variable in the model. The assumption is that the intercept and slope coefficients are all identical for the six countries. Equation (ii) is representative of this model. According to Gujarati (2003), the pooled regression may distort the 'true' picture of the relationship between *Y* and the *X*'s across the six countries. Therefore, the following model formulations (i.e. model iii, v, vi and vii) will undertake to take into account the specific nature of informal sector employment in the six countries.

4.3.3   Slope Coefficients Constant but the Intercept Varies Across Countries

Gujarati (2003: 642) states that, "one way to take into account the 'individuality' of each country or each cross-section unit is to let the intercept vary for each country but still assuming that the slope coefficient is constant across countries." The fixed effects model shown by equation (iii) allows the intercept to vary between countries by adding m-1 differential intercept dummies to the model.

$$y_{i_t} = \alpha_1 + \alpha_2 D_{2i} + \alpha_3 D_{3i} + \alpha_4 D_{4i} + \alpha_5 D_{5i} + \alpha_6 D_{6i} + \beta_1 In\chi_{1_{i_t}} + \beta_2 In\chi_{2it} + \mu_{it}$$

<div align="right">(iii)</div>

Where α_1 = base or reference country which represents South Africa; $D_{2i} = 1$ if the observation belongs to Kenya, 0 otherwise; $D_{3i} = 1$ if the observation belongs to Namibia, 0

otherwise; $D_{4i} = 1$ if the observation belongs to Zambia, 0 otherwise; $D_{5i} = 1$ if the observation belongs to Botswana, 0 otherwise; $D_{6i} = 1$ if the observation belongs to Mauritius, 0 otherwise. Since we have 6 countries, only 5 dummies will be used to avoid falling into the dummy-variable trap (i.e. the situation of perfect collinearity which arises when using *m* dummies, and including an intercept term). South Africa is chosen as the comparison country, and α_1 represents the South Africa intercept. Having used a restricted model (equation ii) and unrestricted model (equation iii), the restricted *F* test will be used to investigate whether the restricted R^2_r and unrestricted R^2_{ur} are the same statistically (i.e. the difference between the two R^2 values is statistically insignificant). This will be performed using the *F* distribution resembling the structure of the *F* test for R^2 change (Yaffee, 2005). The hypotheses are:

$H_0 : \alpha_{it} = 0$ (i.e. all intercepts are statistically the same, therefore, R^2 values are statistically the same.)

$H_1 : \alpha_{it} \neq 0$ (i.e. all intercepts are not statistically the same, therefore, R^2 values are not statistically the same.)

$$F = \left(R^2_{ur} - R^2_r \right) / \left(n \right) \Big/ \left(1 - R^2_{ur} \right) / \left(n - k \right) \qquad \text{(iv)}$$

If *F* is statistically insignificant, this implies that there is no statistical difference between the restricted and unrestricted regressions. If *F* is statistically significant, this implies that there is a statistically significant improvement in R^2 (i.e. there are statistically significant fixed effects explained by the unrestricted regression). Just as the dummy variables have been used to account for the individual country (intercept) effects, time dummies can also be used to account for time-based effects (Gujarati, 2003).

$$\ln y_{it} = \lambda_0 + \lambda_1 D99 + \lambda_2 D00 + \ldots\ldots \lambda_{10} D08 + \beta_1 In\chi_{1i_t} + \beta_2 In\chi_{2it} + \mu_{it}$$

(v)

Equation (v) works the same way as equation (iii), except that time is now used instead of a country. The year 1998 will be treated as the base year, and its intercept will be λ_0.

4.3.4   Slope Coefficients Constant but the Intercept Varies Across Countries and Over Time

The possibility is to combine equations (iii) and (v) as follows:

$$\ln y_{it} = \alpha_1 + \alpha_2 D_{2i} + \alpha_3 D_{3i} + \alpha_4 D_{4i} + \alpha_5 D_{5i} + \alpha_6 D_{6i} + \lambda_1 D99 + \ldots \lambda_{10} D08 + \beta_1 In\chi_{1i_t} + \beta_2 In\chi_{2it} + \mu_{it}$$

(vi)

The overall effect that might emerge is that perhaps there will be pronounced individual country effects but no time effect (Gujarati, 2003). In other words, there may not be any statistically significant time effect for the sample of countries, but there may be statistically significant differences between the intercepts of each country, over the study period.

4.3.4   All Coefficients Vary Across Countries

Now the assumption is that the intercepts and slope coefficients are different for all countries. That is to say that informal sector employment is different for all countries. The estimated model would be:

$$\ln y_{it} = \alpha_1 + \alpha_2 D_{2i} + \alpha_3 D_{3i} + \alpha_4 D_{4i} + \alpha_5 D_{5i} + \alpha_6 D_{6i} + \beta_1 In\chi_{1it} + \beta_2 In\chi_{2it} + \gamma_1 \mathbf{C}_{2i} \ln \chi_{1it} + \gamma_2 \mathbf{C}_{2i} \ln \chi_{2it}$$

$$+ \gamma_3 \mathbf{C}_{3i} \ln \chi_{1it} + \gamma_4 \mathbf{C}_{3i} \ln \chi_{2it} + \gamma_5 \mathbf{C}_{4i} \ln \chi_{1it} + \gamma_6 \mathbf{C}_{4i} \ln \chi_{2it} + \gamma_7 \mathbf{C}_{5i} \ln \chi_{1it} + \gamma_8 \mathbf{C}_{5i} \ln \chi_{2it} + \gamma_9 \mathbf{C}_{6i} \ln \chi_{1it} + \gamma_{10} \mathbf{C}_{6i} \ln \chi_{2it} + \mu_{it}$$

(vii)

The γ's are the differential slope coefficients, just as α_1, α_2, α_3, α_4, α_5 and α_6 are differential intercept coefficients. Gujarati (2003: 645) stated that " if one or more of the γ coefficients are statistically significant, it will tell us that one or more slope coefficients are different from the base group". But, if all the differential intercept coefficients and all the differential slope coefficients are statistically significant, we can conclude that informal sector employment in all the countries is statistically different from the base country (South Africa), in both intercept and slope terms.

4.4 Multicollinearity

Multicollinearity is a strong or perfect collinear relationship between some or all of the explanatory variables. According to Gujarati (2003: 359), if R^2 is high and significant, but there are few significant *t*-statistics, this is a classic symptom of multicollinearity. Gujarati (2003: 366) states that, "one reason for high multicollinearity between variables is that over time both (explanatory) variables tend to move in the same direction." In this study, it is likely that formal sector employment and exports tend to move in the same direction over time. Therefore, the likelihood of multicollinearity occurring is good.

Koop (2009: 100) states that, "there is not much that can be done to correct this problem other than to drop out some of the highly correlated variables from the regression." According to Graham (2003), a useful approach to solving the problems due to multicollinearity is to explore the functional nature of the collinearity between explanatory

variables, rather than drop them. In time series data, formal sector employment and exports are likely to be highly collinear. According to Gujarati (2003: 363), multicollinearity is essentially a data deficiency problem, and sometimes we have no choice over the data we have available for empirical analysis. Thus, in this study, suitable transformed data is used as a remedy for (possible) multicollinearity.

4.5 Empirical Results and Discussion of Findings

Based on the econometric methodology and model specifications formulated in the preceding section, section 4.5 analyses the relationship between informal sector employment, formal sector employment and exports. All estimated regression models are labeled so as to accord with regression output given in Appendix C.

1. Intercept and Slope Constant Over Time and Across Countries

Without Exports

Variables	Coefficient	Standard error	t-values	p-values
Constant	0.754	1.030	0.732	0.467
$InFE_{2i}$	0.897	0.073	12.216	0.000
$R^2 = 0.700$ $R^2_A = 0.695$ df = 64 Durbin- Watson = 0.535 F = 149.232				

Dependent Variable: Informal Sector Employment

(1.1)

With Exports

Variables	Coefficient	Standard error	t-values	p-values
Constant	0.910	0.970	0.939	0.351
$lnFE_{2i}$	1.078	0.091	11.876	0.000
$lnEX_{3i}$	-0.329	0.107	-3.070	0.003

$R^2 = 0.739$ $R^2_A = 0.731$ df = 63   Durbin-Watson = 0.612   F = 89.1500

Dependent Variable: Informal Sector Employment

(1.2)

The results are obtained from the pooled regression, and it can be seen that the coefficients are individually statistically significant. The estimated coefficients β_2 (0.897) and (1.078) from equations (1.1) and (1.2) respectively, show that as formal sector employment increases by 1 percent, the estimated increase in informal sector employment would be 0.897 percent and 1.079 percent respectively.

The estimated coefficient β_3 (-0.329) for exports shows that if exports increases by 1 percent informal sector employment will decrease by 0.329 percent, *ceteris paribus.* The negative sign for exports does make economic sense since we expect more jobs to be created in the formal sector when exports increases, and informally employed people will shift from informal sector employment to formal sector employment.

The Stolper-Samuelson theorem and the Heckscher-Ohlin (HO) model of trade hypothesised that trade impacts employment and wages, thus in labour abundant economies that use labour intensively, an increase in exports, in particular, lead to an increase in formal sector employment. However, Kucera (2008b) states that more formal sector employment and urbanisation results in more informal sector employment. Galli and Kucera (2004) also found that jobs created in cities are insufficient to provide formal employment for all migrants. This

statement is justified by the coefficient estimators (0.897) and (1.078) which are statistically significant as shown by 12.216 and 11.876 being greater than 1.671 respectively (at the 5 percent level). We, therefore, reject the null hypothesis, and conclude that informal sector employment is (possibly) positively related to formal sector employment and negatively related to exports. However, the signs of the (slope) coefficients are contrary to expectations.

Both models (1.1) and (1.2) gave the R^2 (0.700) and (0.739) that is higher than the Durbin-Watson (0.535) and (0.612) respectively. This indicates that there is potential autocorrelation, and Gujarati (2003: 806) suggests very strong first-order autocorrelation.

A low Durbin-Watson value could be due to specification errors (Gujarati, 2003). The Durbin-Watson d test is used to detect autocorrelation. As a rule of thumb, if d Durbin-Watson is found to be around 2, one may assume that there is no first-order autocorrelation, either positive of negative (Gujarati, 2003: 469). For instance, the estimated models assume that the intercept value of South Africa, Kenya, Namibia, Zambia, Botswana and Mauritius are the same (Gujarati, 2003). In our regression models, the Durbin-Watsons d is equal to 0.535 and 0.612 respectively. This shows that there is evidence of serial correlation (of the first order). The pooled regression models (1.1) and (1.2) may distort the 'true' picture of the relationship between the Y's and the X's across the six countries. Therefore, the use of dummy variables will help to account for the specific nature of informal employment in each country.

2. Slope Coefficients Constant but the Intercept Varies Across Countries and Over Time

Without Exports

Variables	Coefficient	Standard error	t-values	p-values
Constant	18.898	4.864	3.885	0.000
D_{2i}	0.535	0.467	1.1.46	0.256
D_{3i}	-4.074	1.070	-3.806	0.000
D_{4i}	-0.807	0.441	-1.830	0.072
D_{5i}	-3.620	1.114	-3.248	0.002
D_{6i}	-3.274	1.113	-2.942	0.005
$InFE_{2i}$	-0.269	0.299	-0.899	0.372

$R^2 = 0.951$ $R^2_A = 0.946$ df = 59   Durbin- Watson = 1.505   F = 189.892

Dependent Variable: Informal Sector Employment

$$(2.1)$$

With Exports

Variables	Coefficient	Standard error	t-values	p-values
Constant	19.489	4.263	4.572	0.000
D_{2i}	1.269	0.443	2.869	0.006
D_{3i}	-3.803	0.939	-4.048	0.000
D_{4i}	0.192	0.449	0.428	0.671
D_{5i}	-3.672	0.976	-3.762	0.000
D_{6i}	-3.106	0.975	-3.185	0.002
$InFE_{2i}$	-0.593	0.273	-2.174	0.034
$InEX_{3i}$	0.438	0.101	4.349	0.000

$R^2 = 0.963$ $R^2_A = 0.958$ df = 58   Durbin- Watson = 1.480   F = 214.876

Dependent Variable: Informal Sector Employment

$$(2.2)$$

Models (2.1) and (2.2) seem to be better than models (1.1) and (1.2) judging by the statistical significance of the estimated coefficients. The R^2 values have increased and the Durbin-Watson d values are much higher, suggesting that models (1.1) and (1.2) were mis-specified.

The intercepts in model 2.1 for South Africa, Namibia, Zambia, Botswana and Mauritius are statistically different from one another, however, Kenya is statistically the same as South Africa. The intercepts in model 2.2 for all countries except Zambia are statistically different. The difference in the intercepts may be due to unique features of each country; impact of structural adjustment; economic growth; unemployment rate etc. as supported by the literature provided in chapter 3.

The increased R^2 value however should not be surprising as we have more variables in models (2.1) and (2.2). Equations (2.3) and (2.4) provide the formal test of the previous models. In relation to models (2.1) and (2.2), models (1.1) and (1.2) represent restricted models in that they impose a common intercept on all the countries.

Without Exports

$$F = \left(0.951 - 0.700\right) / \left(5\right) \bigg/ \left(1 - 0.951\right) / \left(66 - 7\right) = 60.445$$

(2.3)

With Exports

$$F = \left(0.963 - 0.739\right) / \left(5\right) \bigg/ \left(1 - 0.963\right) / \left(66 - 8\right) = 70.227$$

(2.4)

The restricted R^2 value is from (1.1) and (1.2) and the unrestricted R^2 is from (2.1) and (2.2), and where the number of restrictions is 5, as models (1.1) and (1.2) assume that the intercepts of South Africa, Kenya, Namibia, Zambia, Botswana and Mauritius are statistically the same. Clearly, the F values of 60.445 and 70.227 respectively (for 5 numerator degrees of freedom,

and 59 (2.3) and 58 (2.4) denominator degrees of freedom) are highly significant, and, therefore, the restricted regressions (1.1) and (1.2) seem to be invalid. These F values follow the F distribution with 5 and 59 and 58 degrees of freedom. The significance of the F values suggests that the addition of dummies to the model significantly increases the explained sum of squares (ESS), and, hence, the R^2 values. The F-test procedure provides a formal method of deciding whether a variable should be added to a regression model (Gujarati, 2003). Therefore, we reject the null hypothesis, and conclude that informal sector employment is largely structurally different across the six countries.

Time Effect : Without Exports

Variables	Coefficient	Standard error	t-values	p-values
Constant	0.966	1.147	0.842	0.403
D99	-0.337	0.525	-0.642	0.524
D00	-0.437	0.525	-0.832	0.409
D01	-0.134	0. 525	-0.256	0.799
D02	-0.379	0. 525	-0.721	0.474
D03	-0.471	0. 525	-0.897	0.374
D04	-0.241	0. 525	-0.458	0.649
D05	-0.347	0. 525	-0.661	0.511
D06	-0.002	0. 525	-0.003	0.997
D07	0.053	0. 525	0.102	0.919
D08	-0.207	0. 525	-0.394	0.695
$InFE_{2i}$	0.898	0.078	11.484	0.000

$R^2 = 0.713$ $R^2_A = 0.655$ df = 54   Durbin- Watson = 0.511   F = 12.201

Dependent Variable: Informal Sector Employment

(2.5)

Time Effect: With Exports

Variables	Coefficient	Standard error	t-values	p-values
Constant	1.120	1.041	1.076	0.287
D99	-0.379	0.477	-0.796	0.429
D00	-0.505	0.477	-1.058	0.295
D01	-0.174	0.477	-0.365	0.717
D02	-0.466	0.477	-0.977	0.333
D03	-0.499	0.477	-1.047	0.300
D04	-0.165	0.477	-0.347	0.730
D05	-0.209	0.478	-0.438	0.663
D06	0.246	0.482	0.511	0.611
D07	0.344	0.483	0.711	0.480
D08	-0.060	0.478	-0.126	0.900
$InFE_{2i}$	1.125	0.095	11.793	0.000
$InEX_{3i}$	-0.414	0.116	-3.555	0.001

$R^2 = 0.768$ $R^2_A = 0.716$ df =53   Durbin- Watson = 0.614   F = 14.647

Dependent Variable: Informal Sector Employment

$$(2.6)$$

As the regression results from models (2.5) and (2.6) show, now considering time-based effects, the intercept coefficients are statistically insignificant. This might suggest that there are no statistically significant time-based effects with respect to informal sector employment.

3. Slope Coefficients Constant but the Intercept Varies Across Countries and Over Time

Without Exports

Variables	Coefficient	Standard error	t-value	p-values
Constant	20.295	4.759	4.264	0.000
D_{2i}	0.431	0.455	0.947	0.348
D_{3i}	-4.400	1.049	-4.193	0.000
D_{4i}	-0.965	0.431	-2.239	0.030
D_{5i}	-3.960	1.093	-3.623	0.001
D_{6i}	-3.613	1.091	-3.311	0.002
D99	-0.108	0.194	-0.557	0.580
D00	-0.105	0.195	-0.540	0.591
D01	0.091	0.194	0.472	0.639
D02	-0.002	0.196	-0.010	0.992
D03	-0.058	0.197	-0.292	0.772
D04	0.133	0.196	0.680	0.500
D05	0.012	0.195	0.062	0.951
D06	0.384	0.196	1.955	0.056
D07	0.415	0.196	2.123	0.039
D08	0.343	0.199	1.728	0.090
$InFE_{2i}$	-0.361	0.294	-1.229	0.225

$R^2 = 0.965$ $R^2_A = 0.954$ $df = 49$ Durbin-Watson $= 1.701$ F$= 84.753$

Dependent Variable: Informal Sector Employment

(3.1)

Regressions (3.1) and (3.2) suggest that all estimated country dummies are individually statistically significant at the 5 percent level except D_{2i} (model 3.1) and D_{4i} (model 3.2). This suggests that informal sector employment across countries is different from the benchmark country (South Africa). The overall conclusion that emerges is that perhaps there is pronounced individual country effect but no time effect.

With Exports

Variables	Coefficient	Standard error	t-value	p-values
Constant	19.624	4.722	4.155	0.000
D_{2i}	0.970	0.577	1.682	0.099
D_{3i}	-3.992	1.072	-3.723	0.001
D_{4i}	-0.239	0.647	-0.370	0.713
D_{5i}	-3.741	1.089	-3.434	0.001
D_{6i}	-3.259	1.104	-2.952	0.005
D99	-0.111	0.191	-0.581	0.564
D00	-0.094	0.192	-0.486	0.629
D01	0.086	0.192	0.450	0.655
D02	0.022	0.194	0.115	0.909
D03	-0.073	0.195	-0.373	0.711
D04	0.051	0.201	0.254	0.800
D05	-0.111	0.210	-0.529	0.600
D06	0.189	0.234	0.806	0.424
D07	0.193	0.244	0.789	0.434
D08	0.184	0.223	0.825	0.414
$InFE_{2i}$	-0.493	0.303	-1.625	0.111
$InEX_{3i}$	0.271	0.182	1.491	0.142

$R^2 = 0.967$ $R^2_A = 0.955$ df = 48   Durbin-Watson = 1.566   F = 81.890

Dependent Variable: Informal Sector Employment

(3.2)

4. All Coefficients Vary Across Countries

Without Exports

Variables	Coefficient	Standard error	t-value	p-values
Constant	10.153	6.573	1.545	0.128
D_{2i}	12.398	9.502	1.305	0.197
D_{3i}	17.561	11.750	1.495	0.141
$InFE_{2i}$	0.269	0.405	0.666	0.508
$D_{2i}InFE$	-0.749	0.616	-1.217	0.229
$D_{3i}InFE$	-1.553	0.867	-1.792	0.078
$D_{4i}InFE$	-0.004	0.039	-0.114	0.910
$D_{5i}InFE$	-0.130	0.119	-1.091	0.280
$D_{6i}InFE$	-0.103	0.119	-0.865	0.391

$R^2 = 0.954$ $R^2_A = 0.947$ df = 57   Durbin-Watson = 1.280   F = 146.127

Dependent Variable: Informal Sector Employment

(4.1)

Excluded Variables

Variables
D_{4i}
D_{5i}
D_{6i}

With Exports

Variables	Coefficient	Standard error	t-value	p-values
Constant	22.826	4.773	4.782	0.000
D_{3i}	-7.810	2.968	-2.632	0.011
D_{4i}	5.690	2.549	2.232	0.030
D_{5i}	-2.963	3.182	-0.931	0.356
D_{6i}	0.589	4.975	0.118	0.906
$InFE_{2i}$	-1.092	0.352	-3.100	0.003
$InEX_{3i}$	0.887	0.257	3.452	0.001
$D_{2i}InFE$	0.474	0.209	2.270	0.027
$D_{2i}InEX$	-0.662	0.366	-1.810	0.076
$D_{3i}InEX$	0.498	0.344	1.447	0.154
$D_{4i}InEX$	-0.640	0.265	-2.413	0.019
$D_{5i}InEX$	-0.172	0.360	-0.477	0.636
$D_{6i}InEX$	-0.549	0.611	-0.898	0.373

$R^2 = 0.973$ $R^2_A = 0.967$ df = 53   Durbin-Watson = 1.638   F = 161.161

Dependent Variable: Informal Sector Employment

(4.2)

Excluded Variables

Variables
D_{2i}
$D_{3i}InFE$
$D_{4i}InFE$
$D_{5i}InFE$
$D_{6i}InFE$

Models (4.1) and (4.2) revealed a strong multicollinearity in that a number of variables are excluded from the estimation of each model. Further, both models have high R^2 values, high F values and few significant t-values

4.6 Ratio Transformation as a Remedy for Multicollinearity

According to Gujarati (2003), ratio transformation[5] may reduce collinearity in the original variables. Informal sector employment and formal sector employment will be represented as a proportion of total population by dividing both informal and formal sector employment by total population to obtain:

$$In\left(\frac{IF_{it}}{Pop_{it}}\right) = \left(\frac{\alpha_{it}}{1}\right) + \beta_{2i}In\left(\frac{FE_{2it}}{Pop_{it}}\right) + \beta_{3i}In\left(\frac{EX_{3it}}{1}\right) + \left(\frac{\mu_{it}}{1}\right)$$

(viii)

The above model is used to resolve the problem of excluded variables (due to strong collinearity between the explanatory variables) as per equations (4.1) and (4.2). Transformation of variables may break high collinearity between formal sector employment and exports because, over time, both variables tend to strongly correlated. Thus, since formal sector employment and exports grow over time, they are likely to be correlated. Gujarati (2003: 367) states that one solution to this problem is to express the model in ratio transformation form[6], to reduce collinearity in the original variables.

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[5] The transformation of informal and formal sector employment is to explore the contribution of each sector with respect to total population in each country over the study period.

[6] The following model was tried: $InIF_{it} = \alpha_{it} + \beta_2InFE_{2it} + \beta_3In\,(EX/GDP) + \mu_{it}$ to remedy the problem of multicollinearity, however, model (viii) above represents the most statistically meaningful approach in the current context. Further, population was used, instead of economically active population (EAP) for each country, as reliable, complete data regarding the EAP for each country, was generally unavailable.

Without Exports

Variables	Coefficient	Standard error	t-value	p-values
Constant	-2.049	0.994	-2.062	0.044
D_{2i}	-0.510	1.297	-0.394	0.695
D_{3i}	-5.439	1.731	-3.142	0.003
D_{4i}	-2.363	1.734	-1.363	0.179
D_{5i}	1.471	5.831	0.252	0.802
D_{6i}	1.374	3.271	0.420	0.676
$InNewFE_{2i}$	0.764	0.708	1.079	0.285
$D_{2i} InNewFE_{2i}$	-1.049	0.780	-1.344	0.184
$D_{3i} InNewFE_{2i}$	-3.235	1.063	-3.042	0.004
$D_{4i} InNewFE_{2i}$	-2.466	1.269	-1.944	0.057
$D_{5i} InNewFE_{2i}$	0.282	3.288	0.086	0.932
$D_{6i} InNewFE_{2i}$	0.082	1.533	0.053	0.958

$R^2 = 0.737$ $\quad R^2_A = 0.684$ $\quad$ df = 54 $\qquad$ Durbin-Watson = 1.457 $\qquad$ F = 13.791

Dependent Variable: Informal Sector Employment

(5.1)

According to model (5.1) excluding exports, only Namibia and Zambia have differential slope coefficients significant at 5 percent level. That level of informal employment as a proportion of population (or changes therein) not dependent on changes to formal employment as proportion of population (i.e. the intercept) are only statistically significant for South Africa and Namibia.

With Exports

Variables	Coefficient	Standard error	t-value	p-values
Constant	-5.943	3.587	-1.657	0.104
D_{2i}	0.814	4.159	0.196	0.846
D_{3i}	-13.967	4.205	-3.322	0.002
D_{4i}	-0.231	3.938	-0.059	0.954
D_{5i}	1.550	5.953	0.260	0.796
D_{6i}	10.312	5.138	2.007	0.050
$InNewFE_{2i}$	0.195	0.730	0.266	0.791
$InEX_{3i}$	0.291	0.262	1.109	0.273
$D2\ InNewFE_{2i}$	-0.083	0.829	-0.100	0.921
$D2\ InEX_{3i}$	0.162	0.442	0.367	0.715
$D3\ InNewFE_{2i}$	-3.624	0.946	-3.832	0.000
$D3\ InEX_{3i}$	1.154	0.346	3.339	0.002
$D4\ InNewFE_{2i}$	-2.347	1.110	-2.114	0.040
$D4\ InEX_{3i}$	-0.134	0.285	-0.469	0.641
$D5\ InNewFE_{2i}$	0.558	2.472	0.226	0.822
$D5\ InEX_{3i}$	0.118	0.352	0.335	0.739
$D6\ InNewFE_{2i}$	-0.898	1.520	-0.591	0.558
$D6\ InEX_{3i}$	-1.430	0.701	-2.039	0.047

$R^2 = 0.874$ $R^2_A = 0.830$ df = 48   Durbin-Watson = 1.960   F = 19.646

Dependent Variable: Informal Sector Employment

(5.2)

According to model (5.2) including exports, South Africa (10 percent level), Namibia and Mauritius have statistically significant intercept values. With respect to formal employment as a proportion of population, only Namibia and Zambia have statistically significant (differential) slope coefficients. With respect to exports, only Namibia and Mauritius have statistically significant (differential) slope coefficients.

4.7 Conclusion

This chapter detailed the econometric analysis of the relationship between informal sector employment and formal sector employment. In addition, the incorporation of exports, as a possible proxy for the trade cycle effect, was used to investigate the impact 'trade' has on informal sector employment by measuring the magnitude of the relationship between informal sector and formal sector employment, in the presence of exports, over the study period (1998-2008).

The expectation was a negative relationship between informal sector employment and formal sector employment (as these activities are plausibly substitute activities in the labour market), hence a negative sign for all the β_1 coefficients, and a positive relationship between informal sector employment and exports (as exports plausibly stimulates both formal and informal sector employment), hence a positive sign for all the β_2 coefficients.

Using various fixed effects or LSDV panel data regression models, the following key findings were applicable (see models 5.1 and 5.2, in particular).

With respect to the (differential) intercept coefficients:

1) South Africa (10 percent level), Namibia and Mauritius had statistically significant levels (or average changes therein) of informal employment as a proportion of population not dependent on changes to formal employment as a proportion of population and exports. The intercept for Namibia was statistically less than South Africa, whereas the intercept for Mauritius was statistically greater than South Africa.

With respect to the (differential) slope coefficients:

2) In Namibia and Zambia, informal employment as a proportion of population was statistically related to formal employment as proportion of population, with negative sign (as hypothesised) and 'elasticity' greater than 1.

3) In Namibia and Mauritius, informal employment as a proportion of population was statistically related to exports. Namibia had a positive sign (as hypothesised), and 'elasticity' barely in excess of 1. Mauritius, however, had a negative sign and 'elasticity' greater than 1.

CHAPTER FIVE

SUMMARY AND CONCLUSION

5.1 Introduction

The objective of this study was to estimate the relationship between informal sector employment and formal sector employment in selected African countries. The study addresses the relationship between informal sector employment and formal sector employment, on the one hand, and informal sector employment, formal sector employment and exports, on the other hand. What has been lacking in the literature thus far is a study of the relationship between informal sector employment and formal sector employment with the inclusion of the export sector.

The study explored this relationship using various panel data regression models, which used a fixed effects or least-squares dummy variable (LSDV) approach to estimation for the six selected African countries. Exports were incorporated as a possible proxy for the 'trade cycle' effect on informal sector employment. The panel data approach consists of observations characterising both a cross-sectional dimension (i.e. between various countries), and a time series dimension (i.e. over time).

5.2 Summary of Findings

Various fixed effects or LSDV panel data regression models were estimated. Most noteworthy was how the inclusion of various dummy variables not only improves the predictive power of each successive model, but also how the suspected 'true' relationship emerged throughout this process. Models (5.1) and (5.2) represent the most comprehensive results which incorporate ratio transformations to remedy for multicollinearity.

Without Exports

Variables	Coefficient	Standard error	t-value	p-values
Constant	-2.049	0.994	-2.062	0.044
D_{2i}	-0.510	1.297	-0.394	0.695
D_{3i}	-5.439	1.731	-3.142	0.003
D_{4i}	-2.363	1.734	-1.363	0.179
D_{5i}	1.471	5.831	0.252	0.802
D_{6i}	1.374	3.271	0.420	0.676
$InNewFE_{2i}$	0.764	0.708	1.079	0.285
$D_{2i} InNewFE_{2i}$	-1.049	0.780	-1.344	0.184
$D_{3i} InNewFE_{2i}$	-3.235	1.063	-3.042	0.004
$D_{4i} InNewFE_{2i}$	-2.466	1.269	-1.944	0.057
$D_{5i} InNewFE_{2i}$	0.282	3.288	0.086	0.932
$D_{6i} InNewFE_{2i}$	0.082	1.533	0.053	0.958

$R^2 = 0.737$ $R^2_A = 0.684$ df = 54   Durbin-Watson = 1.457   F = 13.791

(5.1)

With Exports

Variables	Coefficient	Standard error	t-value	p-values
Constant	-5.943	3.587	-1.657	0.104
D_{2i}	0.814	4.159	0.196	0.846
D_{3i}	-13.967	4.205	-3.322	0.002
D_{4i}	-0.231	3.938	-0.059	0.954
D_{5i}	1.550	5.953	0.260	0.796
D_{6i}	10.312	5.138	2.007	0.050
$InNewFE_{2i}$	0.195	0.730	0.266	0.791
$InEX_{3i}$	0.291	0.262	1.109	0.273
$D2 InNewFE_{2i}$	-0.083	0.829	-0.100	0.921
$D2 InEX_{3i}$	0.162	0.442	0.367	0.715
$D3 InNewFE_{2i}$	-3.624	0.946	-3.832	0.000
$D3 InEX_{3i}$	1.154	0.346	3.339	0.002
$D4 InNewFE_{2i}$	-2.347	1.110	-2.114	0.040
$D4 InEX_{3i}$	-0.134	0.285	-0.469	0.641
$D5 InNewFE_{2i}$	0.558	2.472	0.226	0.822
$D5 InEX_{3i}$	0.118	0.352	0.335	0.739
$D6 InNewFE_{2i}$	-0.898	1.520	-0.591	0.558
$D6 InEX_{3i}$	-1.430	0.701	-2.039	0.047

$R^2 = 0.874$ $R^2_A = 0.830$ df = 48   Durbin-Watson = 1.960   F = 19.646

(5.2)

The expectation was a negative relationship between informal sector employment and formal sector employment (as these activities are plausibly substitute activities in the labour market), hence a negative sign for all the β_1 coefficients, and a positive relationship between informal sector employment and exports (as exports plausibly stimulates both formal and informal sector employment), hence a positive sign for all the β_2 coefficients.

The following summary findings were applicable for selected African countries, over the study period 1998-2008. Using various fixed effects or LSDV panel data regression models, the following key findings were applicable (see models 5.1 and 5.2, in particular).

With respect to the (differential) intercept coefficients:

1) South Africa (10 percent level), Namibia and Mauritius had statistically significant levels (or average changes therein) of informal employment as a proportion of population not dependent on changes to formal employment as a proportion of population and exports. The intercept for Namibia was statistically less than South Africa, whereas the intercept for Mauritius was statistically greater than South Africa.

With respect to the (differential) slope coefficients:

2) In Namibia and Zambia, informal employment as a proportion of population was statistically related to formal employment as proportion of population, with negative sign (as hypothesised), and 'elasticity' greater than 1.

3) In Namibia and Mauritius, informal employment as a proportion of population was statistically related to exports. Namibia had a positive sign (as hypothesised), and 'elasticity' barely in excess of 1. Mauritius, however, had a negative sign and 'elasticity' greater than 1.

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APPENDICES

Appendix A

The Size of the Informal Economy of 23 African Countries

Africa	GNP at market prices (current US$, billion) 2000	Informal Economy in % of GNP 1999/2000	Informal Economy GDP per capita	GDP per capita 2000, Atlas method (current US$)	Informal Economy (current USD in billion)GNP per capita 2000, Atlas method (current US$)	Private consumption per capita 2000 (current US$)	Population aged 15-64 total (thousand 2000)	Population total (thousand 2000)
Algeria	506,1	34,1	172,6	538,8	1580	731	18555	30399
Benin	21,5	45,2	9,7	167,2	370	283	3192	6272
Botswana	52,8	33,4	17,6	1102,2	3300	1835	882	1602
Burkina Faso	21,7	38,4	8,3	80,6	210	148	5418	11274
Cameroon	82,8	32,8	27,2	190,2	580	415	7921	14876
Cote d'lvoire	86,1	39,9	34,4	239,4	600	418	8773	16013
Egypt, Arab Rep	996,6	35,1	349,8	523,0	1490	1126	38708	63976
Ethiopia	63,3	40,3	25,5	40,3	100	77	33356	64,298
Ghana	48,3	38,4	18,5	126,7	330	210	10778	19306
Madagascar	38,0	39,6	15,1	99,0	250	216	8112	15523
Malawi	16,6	40,3	6,7	68,5	170	135	5232	10311
Mali	2,6	41,0	9,3	98,4	240	168	5407	10840
Morocco	324,6	36,4	118,1	429,5	1180	728	17567	28705
Mozambique	35,8	40,3	14,4	84,6	210	170	9346	17691
Niger	18,1	41,9	7,6	75,4	180	142	5143	10832
Nigeria	367,3	57,9	212,6	150,5	260	147	65863	126910
Senegal	42,9	43,2	18,5	211,7	490	631	5067	9530
South Africa	1226,4	28,4	348,3	857,7	3020	1871	26713	42801
Tanzania	89,8	58,3	52,4	157,4	270	226	17714	33696
Tunisia	185,7	38,4	71,3	806,4	2100	1231	6163	9564
Uganda	61,6	43,1	26,5	129,3	300	243	10722	22210
Zambia	27,9	48,9	13,6,	146,7	300	274	5097	10089
Zimbabwe	71,4	59,4	42,4	273,2	460	357	6515	12627
Average	**192**	**42**	**70**	**287**	**782**	**500**	**14014**	**25624**

Source: Schneider, 2002

Appendix B

Data on Selected African Countries: Annual Time Series for Informal Sector Employment, Formal Sector Employment and Exports in Millions of US Dollars (US $)

South Africa

Year	Informal Employment	Formal Employment	Exports (Million $)	Population
1998	1429000	7961000	27650	43294000
1999	1892000	8477000	28000	43943000
2000	1802050	12238000	30800	44523000
2001	1967000	11181000	32300	45032000
2002	1780000	11296000	31800	45541000
2003	1903000	11424000	36770	46768678
2004	1946000	11643000	41970	46344136
2005	2462000	12301000	50910	46344136
2006	2379000	12800000	59150	47187637
2007	2455000	13609000	76190	47997838
2008	2758000	13712000	86120	48782756

Sources: Index Mundi, 2008; the World Bank, 2009; Statistics South Africa, 2007; Statistics South Africa, 2006; South Africa Reserve Bank, 2007

Kenya

Years	Informal Employment	Formal Employment	Exports (Million $)	Population
1998	3354000	3107425	2156	28752000
1999	3738000	2897825	2200	29410000
2000	4151000	2664110	1700	30100000
2001	4624000	2367145	1800	30865000
2002	5086000	3521864	2100	31517000
2003	5533000	3291956	2514	31639091
2004	5971000	3094724	2589	33829590
2005	6407000	2891524	3173	33829590
2006	4300000	1858000	3614	34707817
2007	7900000	1851000	4127	36913721
2008	7500000	1881000	4958	37953840

Sources: Central Bureau of Statistics of Kenya, 2004; Khan, 2009; Kilele, 2008; Index Mundi, 2008; the World Bank, 2009; Pollin, Githinji and Heintz, 2007; Obwocha, 2007

Namibia

Years	Informal Employment	Formal Employment	Exports (Million $)	Population
1998	74767	299064	1375	1806000
1999	41463	325783	1400	1853000
2000	48618	369750	1400	1894000
2001	164262	256204	1580	1930000
2002	144490	268604	1210	1960000
2003	76585	333200	1090	1987447
2004	30481	385329	1256	2030692
2005	110960	298900	2040	1957000
2006	52560	374490	2321	2044147
2007	248820	376200	2919	2055080
2008	252126	380190	2791	2088669

Sources: Humavindu, 2008; Index Mundi, 2008; the World Bank, 2009; Institute for Public policy Research, 2007

Zambia

Years	Informal Employment	Formal Employment	Exports (Million $)	Population
1998	1812287	1978882	900	10100000
1999	1852014	2557544	900	10200000
2000	1029600	2743107	928	10300000
2001	1057514	2804712	876	10547000
2002	1071727	2889004	709	10800000
2003	1101600	2934399	1039	11058000
2004	1152000	3058263	1548	11261795
2005	1187922	3167792	1947	11561795
2006	1180800	3148800	3928	11873000
2007	1197360	3167792	4594	11524000
2008	2494500	3242850	4818	11745000

Sources: Central Bank of Zambia, 2009; Central Statistical Office, 2009; Index Mundi, 2008; the World Bank, 2009

Botswana

Years	Informal Employment	Formal Employment	Exports (Million $)	Population
1998	129486	248800	2250	1572000
1999	108559	266700	2360	1623000
2000	131786	270600	2600	1641000
2001	122717	274600	2500	1660000
2002	112817	285400	2400	1679000
2003	167178	291000	2544	1673267
2004	148197	297400	2940	1740115
2005	177241	294900	3680	1740115
2006	174053	298800	4836	1769833
2007	182785	302000	5025	1815508
2008	195892	306000	4904	1842323

Sources: Bank of Botswana, 2008; Central Statistics Office, 2009; Central Statistics Office, 2007; Curry, 2006; Marobela, 2008; Index Mundi, 2008; the World Bank, 2009

Mauritius

Years	Informal Employment	Formal Employment	Exports (Million $)	Population
1998	217500	248000	1700	2329000
1999	219229	260270	1700	2447000
2000	223069	259014	1600	2508000
2001	221862	267635	1600	2568000
2002	207706	280727	1600	2630000
2003	199469	293983	1965	2912584
2004	181368	308875	2012	3089859
2005	184503	320923	1949	3086859
2006	225680	283360	2318	3177388
2007	217525	299450	2231	3270065
2008	192864	339808	2404	3364940

Sources: Central Bank of Mauritius, 2009; Central Statistics Office, 2009; Central Statistics Office, 2005; Index Mundi, 2008; the World Bank, 2009; Nation Master, 2006

Appendix C

Regression Output

Model 1.1

Model Summary(b)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					Sig. F Change	R Square Change	F Change	df1	df2	
1	.837(a)	0.700	0.695	0.854739285	0.700	149.232	1	64	0.000	0.535

a. Predictors: (Constant), LnFE

b. Dependent Variable: lnIF

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B		Correlations			Std. Error
		B	Std. Error	Beta			Zero-order	Partial	Part	B		
1	(Constant)	0.754	1.030		0.732	0.467	-1.303	2.812				
	LnFE	0.897	0.073	0.837	12.216	0.000	0.750	1.044	0.837	0.837	0.837	

Regression Output

Model 1.2

Model Summary(b)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					Sig. F Change	R Square Change	F Change	df1	df2	
1	.860(a)	0.739	0.731	0.803490831	0.739	89.150	2	63	0.000	0.612

a. Predictors: (Constant), LnEX, LnFE

b. Dependent Variable: lnIF

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B		Correlations				
		B	Std. Error	Beta			Zero-order	Partial	Part	B	Std. Error
1	(Constant)	0.910	0.970		0.939	0.351	-1.027	2.848			
	LnFE	1.078	0.091	1.005	11.876	0.000	0.897	1.259	0.837	0.831	0.765
	LnEX	-0.329	0.107	-0.260	-3.070	0.003	-0.543	-0.115	0.393	-0.361	-0.198

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Regression Output

Model 2.1

Model Summary(b)

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate | Change Statistics | | | | | Durbin-Watson |
					Sig. F Change	R Square Change	F Change	df1	df2	
1	.975(a)	0.951	0.946	0.360551710	0.951	189.892	6	59	0.000	1.505

a. Predictors: (Constant), LnFE, D2, D4, D3, D6, D5

b. Dependent Variable: lnIF

Coefficients(a)

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. | 95% Confidence Interval for B | | Correlations | | |
		B	Std. Error	Beta			Zero-order	Partial	Part	B	Std. Error
1	(Constant)	18.898	4.864		3.885	0.000	9.164	28.632			
	D2	0.535	0.467	0.130	1.146	0.256	-0.399	1.470	0.637	0.148	0.033
	D3	-4.074	1.070	-0.988	-3.806	0.000	-6.215	-1.932	-0.543	-0.444	-0.110
	D4	-0.807	0.441	-0.196	-1.830	0.072	-1.689	0.075	0.239	-0.232	-0.053
	D5	-3.620	1.114	-0.878	-3.248	0.002	-5.849	-1.390	-0.399	-0.389	-0.094
	D6	-3.274	1.113	-0.794	-2.942	0.005	-5.500	-1.047	-0.299	-0.358	-0.085
	LnFE	-0.269	0.299	-0.251	-0.899	0.372	-0.868	0.330	0.837	-0.116	-0.026

Regression Output

Model 2.2

Model Summary(b)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					Sig. F Change	R Square Change	F Change	df1	df2	
1	.981(a)	0.963	0.958	0.315791557	0.963	214.876	7	58	0.000	1.480

a. Predictors: (Constant), LnEX, D5, D2, D6, D3, D4, LnFE

b. Dependent Variable: lnIF

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B		Correlations			
		B	Std. Error	Beta			Zero-order	Partial	Part	B	Std. Error
1	(Constant)	19.489	4.263		4.572	0.000	10.957	28.022			
	D2	1.269	0.443	0.308	2.869	0.006	0.384	2.155	0.637	0.353	0.073
	D3	-3.803	0.939	-0.923	-4.048	0.000	-5.684	-1.922	-0.543	-0.469	-0.102
	D4	0.192	0.449	0.047	0.428	0.671	-0.707	1.092	0.239	0.056	0.011
	D5	-3.672	0.976	-0.891	-3.762	0.000	-5.626	-1.718	-0.399	-0.443	-0.095
	D6	-3.106	0.975	-0.753	-3.185	0.002	-5.058	-1.154	-0.299	-0.386	-0.081
	LnFE	-0.593	0.273	-0.553	-2.174	0.034	-1.138	-0.047	0.837	-0.275	-0.055
	LnEX	0.438	0.101	0.346	4.349	0.000	0.236	0.640	0.393	0.496	0.110

Regression Output

Model 2.5

Model Summary(b)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					Sig. F Change	R Square Change	F Change	df1	df2	
1	.844(a)	0.713	0.655	0.909780187	0.713	12.201	11	54	0.000	0.511

a. Predictors: (Constant), LnFE, D00, D08, D05, D07, D04, D02, D99, D06, D01, D03

b. Dependent Variable: lnIF

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B		Correlations		
		B	Std. Error	Beta			Zero-order	Partial	Part	B	Std. Error
1	(Constant)	0.966	1.147		0.842	0.403	-1.334	3.266			
	D99	-0.337	0.525	-0.063	-0.642	0.524	-1.390	0.716	-0.037	-0.087	-0.047
	D00	-0.437	0.525	-0.082	-0.832	0.409	-1.490	0.616	-0.043	-0.113	-0.061
	D01	-0.134	0.525	-0.025	-0.256	0.799	-1.187	0.919	0.004	-0.035	-0.019
	D02	-0.379	0.525	-0.071	-0.721	0.474	-1.432	0.675	-0.024	-0.098	-0.053
	D03	-0.471	0.525	-0.088	-0.897	0.374	-1.525	0.582	-0.038	-0.121	-0.065
	D04	-0.241	0.525	-0.045	-0.458	0.649	-1.294	0.813	0.004	-0.062	-0.033
	D05	-0.347	0.525	-0.065	-0.661	0.511	-1.400	0.706	-0.020	-0.090	-0.048
	D06	-0.002	0.525	0.000	-0.003	0.997	-1.055	1.051	0.055	0.000	0.000
	D07	0.053	0.525	0.010	0.102	0.919	-1.000	1.107	0.063	0.014	0.007
	D08	-0.207	0.525	-0.039	-0.394	0.695	-1.260	0.846	0.003	-0.054	-0.029
	LnFE	0.898	0.078	0.838	11.484	0.000	0.741	1.055	0.837	0.842	0.837

Regression Output

Model 2.6

Model Summary(b)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					Sig. F Change	R Square Change	F Change	df1	df2	
1	.877(a)	0.768	0.716	0.825205172	0.768	14.647	12	53	0.000	0.614

a. Predictors: (Constant), LnEX, D04, D03, D05, D08, D01, D99, D00, D06, D02, LnFE, D07

b. Dependent Variable: lnIF

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B		Correlations		
		B	Std. Error	Beta			Zero-order	Partial	Part	B	Std. Error
1	(Constant)	1.120	1.041		1.076	0.287	-0.968	3.209			
	D99	-0.379	0.477	-0.071	-0.796	0.429	-1.335	0.576	-0.037	-0.109	-0.053
	D00	-0.505	0.477	-0.094	-1.058	0.295	-1.461	0.452	-0.043	-0.144	-0.070
	D01	-0.174	0.477	-0.033	-0.365	0.717	-1.130	0.782	0.004	-0.050	-0.024
	D02	-0.466	0.477	-0.087	-0.977	0.333	-1.423	0.491	-0.024	-0.133	-0.065
	D03	-0.499	0.477	-0.093	-1.047	0.300	-1.455	0.457	-0.038	-0.142	-0.069
	D04	-0.165	0.477	-0.031	-0.347	0.730	-1.122	0.791	0.004	-0.048	-0.023
	D05	-0.209	0.478	-0.039	-0.438	0.663	-1.168	0.750	-0.020	-0.060	-0.029
	D06	0.246	0.482	0.046	0.511	0.611	-0.720	1.212	0.055	0.070	0.034
	D07	0.344	0.483	0.064	0.711	0.480	-0.626	1.313	0.063	0.097	0.047
	D08	-0.060	0.478	-0.011	-0.126	0.900	-1.020	0.899	0.003	-0.017	-0.008

	B	Std. Error	Beta	t	Sig.	Lower	Upper	Zero-order	Partial	Part
LnFE	1.125	0.095	1.049	11.793	0.000	0.934	1.316	0.837	0.851	0.780
LnEX	-0.414	0.116	-0.327	-3.555	0.001	-0.648	-0.180	0.393	-0.439	-0.235

Regression Output

Model 3.1

Model Summary(b)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Sig. F Change	R Square Change	F Change	df1	df2	Durbin-Watson
1	.982(a)	0.965	0.954	0.332976797	0.965	84.753	16	49	0.000	1.701

a. Predictors: (Constant), LnFE, D00, D08, D05, D07, D04, D02, D2, D99, D3, D01, D4, D06, D6, D03, D5

b. Dependent Variable: lnIF

Coefficients(a)

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.	95% Confidence Interval for B Zero-order	Partial	Correlations Part	B	Std. Error
1	(Constant)	20.295	4.759		4.264	0.000	10.731	29.859			
	D2	0.431	0.455	0.105	0.947	0.348	-0.484	1.345	0.637	0.134	0.025
	D3	-4.400	1.049	-1.067	-4.193	0.000	-6.509	-2.291	-0.543	-0.514	-0.112
	D4	-0.965	0.431	-0.234	-2.239	0.030	-1.832	-0.099	0.239	-0.305	-0.060
	D5	-3.960	1.093	-0.960	-3.623	0.001	-6.156	-1.763	-0.399	-0.460	-0.097
	D6	-3.613	1.091	-0.876	-3.311	0.002	-5.806	-1.420	-0.299	-0.428	-0.088
	D99	-0.108	0.194	-0.020	-0.557	0.580	-0.497	0.282	-0.037	-0.079	-0.015
	D00	-0.105	0.195	-0.020	-0.540	0.591	-0.497	0.286	-0.043	-0.077	-0.014
	D01	0.091	0.194	0.017	0.472	0.639	-0.298	0.481	0.004	0.067	0.013
	D02	-0.002	0.196	0.000	-0.010	0.992	-0.396	0.392	-0.024	-0.001	0.000

D03	-0.058	0.197	-0.011	-0.292	0.772	-0.455	0.339	-0.038	-0.042	-0.008
D04	0.133	0.196	0.025	0.680	0.500	-0.260	0.527	0.004	0.097	0.018
D05	0.012	0.195	0.002	0.062	0.951	-0.381	0.405	-0.020	0.009	0.002
D06	0.384	0.196	0.072	1.955	0.056	-0.011	0.778	0.055	0.269	0.052
D07	0.415	0.196	0.078	2.123	0.039	0.022	0.808	0.063	0.290	0.057
D08	0.343	0.199	0.064	1.728	0.090	-0.056	0.743	0.003	0.240	0.046
LnFE	-0.361	0.294	-0.337	-1.229	0.225	-0.952	0.229	0.837	-0.173	-0.033

Regression Output

Model 3.2

Model Summary(b)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate			Change Statistics			Durbin-Watson
					Sig. F Change	R Square Change	F Change	df1	df2	
1	.983(a)	0.967	0.955	0.328895855	0.967	81.890	17	48	0.000	1.566

a. Predictors: (Constant), LnEX, D04, D5, D03, D05, D08, D01, D2, D99, D00, D6, D06, D02, D3, D07, D4, LnFE

b. Dependent Variable: InIF

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients			95% Confidence Interval for B		Correlations		
		B	Std. Error	Beta	t	Sig.	Zero-order	Partial	Part	B	Std. Error
1	(Constant)	19.624	4.722		4.155	0.000	10.129	29.119			
	D2	0.970	0.577	0.235	1.682	0.099	-0.190	2.131	0.637	0.236	0.044
	D3	-3.992	1.072	-0.968	-3.723	0.001	-6.147	-1.836	-0.543	-0.473	-0.098
	D4	-0.239	0.647	-0.058	-0.370	0.713	-1.540	1.061	0.239	-0.053	-0.010

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D5	-3.741	1.089	-0.907	-3.434	0.001	-5.931	-1.550	-0.399	-0.444	-0.090
D6	-3.259	1.104	-0.790	-2.952	0.005	-5.478	-1.040	-0.299	-0.392	-0.078
D99	-0.111	0.191	-0.021	-0.581	0.564	-0.496	0.274	-0.037	-0.084	-0.015
D00	-0.094	0.192	-0.018	-0.486	0.629	-0.481	0.293	-0.043	-0.070	-0.013
D01	0.086	0.192	0.016	0.450	0.655	-0.299	0.471	0.004	0.065	0.012
D02	0.022	0.194	0.004	0.115	0.909	-0.368	0.413	-0.024	0.017	0.003
D03	-0.073	0.195	-0.014	-0.373	0.711	-0.466	0.320	-0.038	-0.054	-0.010
D04	0.051	0.201	0.010	0.254	0.800	-0.353	0.456	0.004	0.037	0.007
D05	-0.111	0.210	-0.021	-0.529	0.600	-0.533	0.311	-0.020	-0.076	-0.014
D06	0.189	0.234	0.035	0.806	0.424	-0.282	0.659	0.055	0.116	0.021
D07	0.193	0.244	0.036	0.789	0.434	-0.298	0.683	0.063	0.113	0.021
D08	0.184	0.223	0.034	0.825	0.414	-0.265	0.633	0.003	0.118	0.022
LnFE	-0.493	0.303	-0.460	-1.625	0.111	-1.103	0.117	0.837	-0.228	-0.043
LnEX	0.271	0.182	0.214	1.491	0.142	-0.094	0.636	0.393	0.210	0.039

a. Dependent Variable: lnIF

Regression Output

Model 4.1

Model Summary(b)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					Sig. F Change	R Square Change	F Change	df1	df2	
1	.976(a)	0.954	0.947	0.356460962	0.954	146.127	8	57	0.000	1.280

a. Predictors: (Constant), D6LnFE, D2LnFE, D3LnFE, D4LnFE, D5LnFE, LnFE, D2, D3

b. Dependent Variable: lnIF

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients			95% Confidence Interval for B		Correlations		
		B	Std. Error	Beta	t	Sig.	Zero-order	Partial	Part	B	Std. Error
1	(Constant)	10.153	6.573		1.545	0.128	-3.010	23.315			
	D2	12.398	9.502	3.007	1.305	0.197	-6.630	31.425	0.637	0.170	0.037
	D3	17.561	11.750	4.260	1.495	0.141	-5.967	41.090	-0.543	0.194	0.043
	LnFE	0.269	0.405	0.251	0.666	0.508	-0.541	1.080	0.837	0.088	0.019
	D2LnFE	-0.749	0.616	-2.686	-1.217	0.229	-1.983	0.484	0.636	-0.159	-0.035
	D3LnFE	-1.553	0.867	-4.787	-1.792	0.078	-3.288	0.183	-0.544	-0.231	-0.051
	D4LnFE	-0.004	0.039	-0.016	-0.114	0.910	-0.082	0.073	0.239	-0.015	-0.003
	D5LnFE	-0.130	0.119	-0.397	-1.091	0.280	-0.369	0.109	-0.399	-0.143	-0.031
	D6LnFE	-0.103	0.119	-0.314	-0.865	0.391	-0.341	0.135	-0.299	-0.114	-0.025

a. Dependent Variable: lnIF

Excluded Variables(b)

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics Tolerance
1	D4	4.739(a)	1.385	0.171	0.182	0.000
	D5	-7.407(a)	-1.327	0.190	-0.175	0.000
	D6	3.036(a)	0.767	0.446	0.102	0.000

a. Predictors in the Model: (Constant), D6LnFE, D2LnFE, D3LnFE, D4LnFE, D5LnFE, LnFE, D2, D3

b. Dependent Variable: lnIF

Regression Output

Model 4.2

Model Summary(b)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					Sig. F Change	R Square Change	F Change	df1	df2	
1	.987(a)	0.973	0.967	0.280006241	0.973	161.161	12	53	0.000	1.638

a. Predictors: (Constant), D6LnEX, D4LnEX, D3LnEX, D2LnEX, D5LnEX, LnEX, LnFE, D4, D3, D5, D2LnFE, D6

b. Dependent Variable: lnIF

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B		Correlations			Std. Error
		B	Std. Error	Beta			Zero-order	Partial	Part	B		
1	(Constant)	22.826	4.773		4.782	0.000	13.253	32.400				
	D3	-7.810	2.968	-1.895	-2.632	0.011	-13.763	-1.858	-0.543	-0.340	-0.059	
	D4	5.690	2.549	1.380	2.232	0.030	0.577	10.803	0.239	0.293	0.050	
	D5	-2.963	3.182	-0.719	-0.931	0.356	-9.345	3.419	-0.399	-0.127	-0.021	
	D6	0.589	4.975	0.143	0.118	0.906	-9.390	10.568	-0.299	0.016	0.003	
	LnFE	-1.092	0.352	-1.019	-3.100	0.003	-1.799	-0.386	0.837	-0.392	-0.070	
	LnEX	0.887	0.257	0.700	3.452	0.001	0.372	1.402	0.393	0.428	0.077	
	D2LnFE	0.474	0.209	1.698	2.270	0.027	0.055	0.892	0.636	0.298	0.051	
	D2LnEX	-0.662	0.366	-1.268	-1.810	0.076	-1.396	0.071	0.639	-0.241	-0.041	
	D3LnEX	0.498	0.344	0.896	1.447	0.154	-0.192	1.187	-0.537	0.195	0.032	
	D4LnEX	-0.640	0.265	-1.147	-2.413	0.019	-1.173	-0.108	0.240	-0.315	-0.054	
	D5LnEX	-0.172	0.360	-0.335	-0.477	0.636	-0.894	0.551	-0.397	-0.065	-0.011	
	D6LnEX	-0.549	0.611	-1.005	-0.898	0.373	-1.775	0.677	-0.299	-0.122	-0.020	

a. Dependent Variable: lnIF

Excluded Variables(b)

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics Tolerance
1	D2	-5.238(a)	-2.035	0.047	-0.272	0.000
	D3LnFE	-7.556(a)	-3.467	0.001	-0.433	0.000
	D4LnFE	-2.364(a)	-0.740	0.463	-0.102	0.000
	D5LnFE	5.503(a)	0.865	0.391	0.119	0.000
	D6LnFE	.608(a)	0.150	0.882	0.021	0.000

a. Predictors in the Model: (Constant), D6LnEX, D4LnEX, D3LnEX, D2LnEX, D5LnEX, LnEX, LnFE, D4, D3, D5, D2LnFE, D6

b. Dependent Variable: lnIF

Regression Output

Model 5.1

Model Summary(b)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics Sig. F Change	R Square Change	F Change	df1	df2	Durbin-Watson
1	.859(a)	0.737	0.684	0.3241732060	0.737	13.791	11	54	0.000	1.457

a. Predictors: (Constant), D6lnFENew, D2lnFENew, D3lnFENew, D4lnFENew, D5lnFENew, lnFENew, D2, D3, D4, D6, D5

b. Dependent Variable: lnIFNew

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients			95% Confidence Interval for B	
		B	Std. Error	Beta	t	Sig.	B	Std. Error
1	(Constant)	-2.049	0.994		-2.062	0.044	-4.041	-0.056
	D2	-0.510	1.297	-0.332	-0.394	0.695	-3.111	2.090
	D3	-5.439	1.731	-3.542	-3.142	0.003	-8.909	-1.969
	D4	-2.363	1.734	-1.539	-1.363	0.179	-5.840	1.114
	D5	1.471	5.831	0.958	0.252	0.802	-10.219	13.162
	D6	1.374	3.271	0.895	0.420	0.676	-5.185	7.933
	lnFENew	0.764	0.708	0.611	1.079	0.285	-0.655	2.183
	D2lnFENew	-1.049	0.780	-1.739	-1.344	0.184	-2.613	0.515
	D3lnFENew	-3.235	1.063	-3.765	-3.042	0.004	-5.366	-1.103
	D4lnFENew	-2.466	1.269	-2.168	-1.944	0.057	-5.010	0.078
	D5lnFENew	0.282	3.288	0.329	0.086	0.932	-6.310	6.874
	D6lnFENew	0.082	1.533	0.122	0.053	0.958	-2.991	3.154

a. Dependent Variable: lnIFNew

Regression

Model 5.2

Model Summary(b)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					Sig. F Change	R Square Change	F Change	df1	df2	
1	.935(a)	0.874	0.830	0.2378855988	0.874	19.646	17	48	0.000	1.960

a. Predictors: (Constant), D6LnEX, D2lnFENew, LnEX, D5LnEX, D3LnEX, D4LnEX, lnFENew, D4lnFENew, D2, D3lnFENew, D5lnFENew, D4, D3, D2LnEX, D6lnFENew, D6, D5

b. Dependent Variable: lnIFNew

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients			95% Confidence Interval for B	
		B	Std. Error	Beta	t	Sig.	B	Std. Error
1	(Constant)	-5.943	3.587		-1.657	0.104	-13.156	1.269
	D2	0.814	4.159	0.530	0.196	0.846	-7.549	9.178
	D3	-13.967	4.205	-9.096	-3.322	0.002	-22.422	-5.513
	D4	-0.231	3.938	-0.150	-0.059	0.954	-8.149	7.688
	D5	1.550	5.953	1.009	0.260	0.796	-10.419	13.519
	D6	10.312	5.138	6.715	2.007	0.050	-0.018	20.643
	InFENew	0.195	0.730	0.156	0.266	0.791	-1.274	1.663
	LnEX	0.291	0.262	0.617	1.109	0.273	-0.237	0.819
	D2InFENew	-0.083	0.829	-0.137	-0.100	0.921	-1.750	1.585
	D2LnEX	0.162	0.442	0.833	0.367	0.715	-0.726	1.050
	D3InFENew	-3.624	0.946	-4.217	-3.832	0.000	-5.525	-1.722
	D3LnEX	1.154	0.346	5.579	3.339	0.002	0.459	1.848
	D4InFENew	-2.347	1.110	-2.063	-2.114	0.040	-4.578	-0.115
	D4LnEX	-0.134	0.285	-0.643	-0.469	0.641	-0.707	0.440
	D5InFENew	0.558	2.472	0.650	0.226	0.822	-4.413	5.529
	D5LnEX	0.118	0.352	0.619	0.335	0.739	-0.590	0.826
	D6InFENew	-0.898	1.520	-1.340	-0.591	0.558	-3.954	2.159
	D6LnEX	-1.430	0.701	-7.027	-2.039	0.047	-2.839	-0.020